

AUSTRALIA'S HEALTH

2012

The thirteenth biennial health report of the
Australian Institute of Health and Welfare



The Australian Institute of Health and Welfare (AIHW) is a major national agency which provides reliable, regular and relevant information and statistics on Australia's health and welfare. The Institute's mission is authoritative information and statistics to promote better health and wellbeing.

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Australian Government
**Australian Institute of
Health and Welfare**

*Authoritative information and statistics
to promote better health and wellbeing*

The Hon Tanya Plibersek MP
Minister for Health
Parliament House
Canberra ACT 2600

Dear Minister

On behalf of the Board of the Australian Institute of Health and Welfare, I am pleased to present to you *Australia's health 2012*, as required under Subsection 31(1) of the *Australian Institute of Health and Welfare Act 1987*.

I commend this report to you as a significant contribution to national information on health needs and services and to the development and evaluation of health policies and programs in Australia.

Yours sincerely

Dr Andrew Refshauge
Board Chair

21 May 2012

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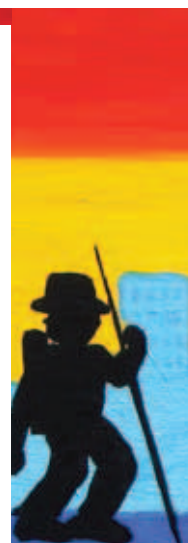
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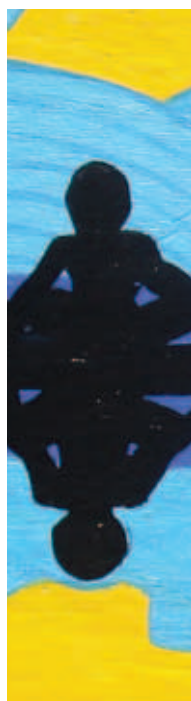
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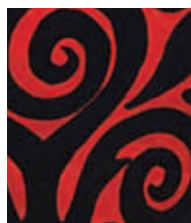
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Preface

This year, the AIHW celebrates 25 years of providing comprehensive and influential statistics on the health of Australians. Every two years, the AIHW compiles a report card on the nation's health, and I'm delighted to introduce *Australia's health 2012*, our thirteenth report in this series.

The demand for health information that is regular, reliable and relevant has increased over the last 25 years. *Australia's health* has become an indispensable resource for decision makers and others with an interest in health or the health system. We are continually looking for innovative ways to present the results—to widen our audience to include the next generation of policy makers, now at schools and colleges around the country. Following the success of the inaugural *Australia's health—in brief* publication in 2010, this edition is also accompanied by a mini report, as well as enhanced web content.

Australia's health 2012 contains new or extended information on topics such as health and medical research, palliative care outcomes, and blood, organ and tissue donation. It also covers the tried and true markers of Australia's health, such as risk factors, major causes of ill health, health service use and health spending.

Australia's health system faces a number of opportunities and challenges with major reform in health financing, performance reporting and accountability. While e-health is set to influence the delivery of health care, the implications for the collection, analysis and reporting of health information also require early attention.

The AIHW manages many important national health information collections. We also rely on the cooperation of state and territory governments, the Australian Bureau of Statistics, other independent bodies, and close engagement with the non-government sector that delivers some health services, to ensure that health-related data are collected accurately and in a timely manner.

These arrangements have led to many improvements and enhancements to national health data over the past two years, several of which are noted in 'Section 10.2 Improving health information—process and progress'.

Yet many data issues remain, and these are listed under the 'What is missing from the picture?' heading in each section. One gap in particular in this edition relates to cause of death unit record data, which were last available to the AIHW and other researchers for 2007 death registrations. This means that this edition lacks detailed analysis of mortality patterns and trends since that time. For example, it was not possible to report comprehensively on injury mortality, which requires an assessment of both the underlying and associated causes of deaths.

At the time of publication, interim processes were being put in place to provide the AIHW with up-to-date mortality data, although this relies on the cooperation and goodwill of the state and territory Registrars of Births, Deaths and Marriages, and Coroners. The AIHW is also actively seeking a permanent solution for the ongoing supply of this information that is critical for fundamental understandings of disease patterns.

David Kalisch

Director



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Many other staff from the AIHW and its collaborating units contributed time and expertise to the production of this report. Their contributions are also gratefully acknowledged.



Summary

This section presents a selection of key findings from *Australia's health 2012*. Other summary material is in the 'At a glance' box at the start of each topic, and in our companion report *Australia's health 2012—in brief*.

We are a healthy nation

- Australians enjoy one of the highest life expectancies in the world—79.5 years for males and 84.0 years for females, both 25 years longer than a century ago.
- Most Australians feel positive about their quality of life. In 2007, 82% said they were delighted, pleased or mostly satisfied, 14% said they had mixed feelings, while only 4% felt mostly dissatisfied, unhappy or terrible.
- Australia's level of smoking continues to fall and is among the lowest of Organisation for Economic Cooperation and Development (OECD) countries, with 1 in 7 people aged 14 and older smoking daily in 2010.
- In June 2011, most children were fully immunised—92% of 1 year olds, 93% of 2 year olds, and 90% of 5 year olds. This is an improvement for 5 year olds over the past few years, but there has been little change for the younger ages.

But some groups experience poorer health

- Aboriginal and Torres Strait Islander people generally fare worse on a number of health measures—for example, life expectancy is about 12 years shorter than for other Australians. And access to and use of health services is often lower—for example, in 2009–10, 36% of Indigenous women were screened for breast cancer, compared with 55% of non-Indigenous women.
- Many aspects of health are related to how well-off people are financially: generally, with increasing social disadvantage comes less healthy lifestyles and poorer health. For example, in 2010, 25% of people living in the lowest socioeconomic areas smoked tobacco, twice the rate of people living in the highest socioeconomic areas.
- The further people live away from major cities, the less healthy they are likely to be. For example, in 2009–10, the rate of hospitalised injury cases for residents of *Very remote* areas (4,299 per 100,000 population) was more than twice that for people in *Major cities* (1,728 per 100,000).
- Severe or profound disability often carries an extra health burden: in 2007–08, 46% of people aged 15–64 with severe or profound disability reported poor or fair health, compared with 5% for those without disability.

And there is other room for improvement

- In 2007–08, almost all Australians aged 15 and over (99%) had at least one risk factor for poorer health (such as high blood pressure or not eating enough vegetables), and about 1 in 7 people had 5 or more risk factors.
- Comparisons among OECD countries show that Australia has one of the highest rates of obesity. In 2007–08, 1 in 4 Australian adults and 1 in 12 children were obese.



- Although most babies (96%) in Australia in 2010 were initially breastfed, only 39% of infants were exclusively breastfed to around 4 months, and 15% to around 6 months, the recommended period.
- The prevalence of diabetes more than doubled between 1989–90 and 2007–08. An estimated 898,800 people have been diagnosed at some time in their lives.
- The number of people on the organ transplant waiting list continues to exceed the number of available organs. In 2010, there were about 1,770 Australians on the list.

The health sector is busy

- A typical day in the health sector includes: 342,000 people visiting a GP, 742,000 medicines being dispensed by community pharmacies, 23,000 people being admitted to hospital, and 17,000 people presenting to an emergency department at larger public hospitals, and that's only part of the story.
- There was a 51% increase in the number of palliative care hospitalisations between 2000–01 and 2009–10.
- The most commonly used medicines in Australia in 2010–11 were for reducing blood cholesterol, lowering stomach acid, lowering blood pressure, and antibiotics.

Making it happen: health spending and workforce

- Australia spent \$121.4 billion on health in 2009–10, which accounted for 9.4% of total spending on all goods and services—similar to the average for all OECD countries.
- Hospitals were by far the biggest area of health spending, consuming \$4 in every \$10 of recurrent health spending.
- Cardiovascular diseases accounted for the greatest spending (\$7.9 billion or 11%) followed by oral health (\$7.1 billion, or 10%) and mental disorders (\$6.1 billion or 8%).
- In 2010 there were more than three-quarters of a million workers in health occupations. This is an increase of 26% since 2005—more than double that of the overall workforce (12%).
- Employers of health workers across Australia report workforce shortages or recruitment difficulties for many health professions, particularly midwives and physiotherapists.

Helping it happen: health research and information

- Health and medical research spending comprises 14% of all research and development spending in Australia, and this figure has been climbing over the past two decades.
- The AIHW contributes to the health and medical research effort by analysing and reporting on data, making data holdings available to other researchers, and developing and promoting information standards for the health sector.
- Along with other stakeholders, the AIHW continues to develop health data and information, leading to new collections, and expanded and higher quality data collections, which in turn lead to better information on Australia's health.



About *Australia's health 2012*

Welcome to *Australia's health 2012*, the nation's report card on the health of Australians and their health system. The information below will help you navigate this extensive report. It outlines what's new in *Australia's health 2012*, describes additional material on the web, and explains commonly used terms. This section also provides information about how the report was prepared and the data sources used.

New in 2012

Features of *Australia's health* that are different from previous editions include:

- each section has an 'at a glance' box of key points, and icons that show whether the section covers any of four broad themes



**Inequalities
in health**



Life stages



**International
comparisons**



**Performance
indicator**

- statistics related to life stages (for example, children, older Australians) and population groups (for example, people living in remote Australia) are distributed throughout the report in the relevant topics (rather than collated in chapters as in the 2010 edition)
- new headings for each topic: What is missing from the picture? Where do I go for more information?
- performance indicators are included within the relevant topic, and a summary of the indicator results is included in 'Section 1.6 Measuring Australia's health performance'.

Additional material on the web

This report is available online at <www.aihw.gov.au/ah12> as a complete document and in smaller sections. It is also supplemented by other resources online, including:

- *Australia's health 2012—in brief*
- education worksheets
- supporting data for all charts in the report, in Excel worksheets
- separate .jpg files for many of the charts in the report.

Common terms

Common concepts and terms that appear throughout *Australia's health 2012* are described briefly below and explained in further detail in the sections referenced. Other concepts and terms are defined in the Glossary at the end of the report.

Concept	Definition	Where can I find more information?
Admitted patient/hospitalisation	A hospital patient who has undergone a formal process to begin an episode of care. May involve an overnight stay or be same day. In this report, admitted patient episodes of care are referred to as hospitalisations.	7.9 Admitted hospital care
Age standardisation	A statistical procedure to adjust for different age structures of populations being compared.	2.8 Mortality
Burden of disease	A summary measure of health that combines the burden of premature death with the burden of years lived with disability.	3.3 Burden of disease and risk factors
Comorbidity	The presence of two or more diseases in a person at the same time.	6.16 Multiple chronic conditions
Health determinant	Something that can influence health in a positive way (protective factor) or negative way (risk factor). Includes social and environmental factors and health behaviours.	1.3 Determinants of health
Incidence	A measure of the number of new cases of a disease or characteristic in a population in a specified period.	1.5 Sources of health data
Prevalence	A measure of the level of the disease or characteristic in a population at a specific point in time.	1.5 Sources of health data
Remoteness (ASGC RA)	A classification of areas across Australia based on the distance from different services. Main categories are <i>Major cities, Inner regional, Outer regional, Remote</i> and <i>Very remote</i> .	2.1 Australia's population
Socioeconomic status (SEIFA)	An indication of how 'well off' a person or group is. In this report, socioeconomic status is mostly reported using the Socio-Economic Indexes for Areas measures developed by the Australian Bureau of Statistics. Typically, socioeconomic status is reported for five groups, from the most disadvantaged (worst off) to the least disadvantaged (best off).	2.5 Disadvantage and inequalities



Quality assurance

Drafting and review

The report content was largely prepared by AIHW staff, and underwent a rigorous internal review and clearance process (see Acknowledgments). The following Australian Government departments and agencies were involved in comprehensive external review of the material:

- Department of Health and Ageing (DoHA)
- Australian Bureau of Statistics (ABS)
- Department of Employment, Education and Workplace Relations (DEEWR)
- Australian National Preventive Health Agency (ANPHA)
- Health Workforce Australia (HWA)
- National Health and Medical Research Council (NHMRC)

Additional peer reviewers were used to validate and strengthen the content of the report.

Data sources

The best available information has been used to inform the report, drawn from a range of data sources (referenced throughout the report—see also ‘Section 1.5 Sources of health data’). Some data sources are national collections managed by the AIHW under national information governance arrangements. A number of others are provided by the ABS, and managed within its data quality framework. These main sources are supplemented by other data collections, as appropriate.

Each of the data sources used in *Australia’s health 2012* has strengths and limitations that affect how the data can be used and what we can infer from the results. The AIHW takes great care to ensure that data used are correct and that the conclusions drawn are robust. At various points in this report you will see boxes that highlight issues to consider when interpreting results.

Although this report is published in 2012, most of the statistics refer to 2010 or earlier. This is because some data, such as population-based surveys, are collected every 3–5 years or even less often. Also, it can often take some time before data are fully processed and provided to the AIHW. Finally, the AIHW often needs time to analyse the data and ensure the statistics are accurate and high quality.

Given the comprehensive nature of this report, and the time it takes to prepare a compendium report of this scale, it is possible that some other reports may be released by the AIHW or others with more recent data. Readers are referred to the latest releases within the ‘Where do I go for more information?’ subsection of each topic.





What does it mean to be healthy or sick? How can we measure the health of Australians?

This chapter sets the scene for reporting on the nation's health. It defines broad concepts such as health and illness and their associated web of causes, known as health determinants. It describes the health system in broad terms, and highlights connections between the fields of health and welfare.

Assessing the health of Australians and the success of our health system is a complex task. This chapter examines data sources and techniques used to measure our performance in these areas, and ends with an overview of how Australia's health compares with similar, developed countries.



CHAPTER 1

AUSTRALIA'S HEALTH IN CONTEXT

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1.1 Understanding health and illness

At a glance

- The concepts of health and illness are difficult to define—they are relative and dynamic, and can be interpreted differently by individuals, groups and societies.
- Over the past 60 years, the World Health Organization (WHO) has encouraged a holistic view of health by defining it as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.
- *Australia's health 2012* takes a broad view of health and illness, including both physical and mental dimensions, within a context that includes genetic, cultural, socioeconomic and environmental determinants.

What is health?

The concepts of 'health' (and 'ill health') are difficult to define and measure. They encompass a wide range of experiences and events and their interpretation may be relative to social norms and context. As such, individuals, groups and societies may have very different interpretations of what constitutes illness and what it means to be in good health (Box 1.1).

For example, Aboriginal and Torres Strait Islander people view health as 'not just the physical well-being of the individual but the social, emotional and cultural well-being of the whole community' (National Aboriginal Health Strategy Working Party 1989). An ongoing and active relationship with 'country' means that the health of community land plays an important role in determining the health of the people themselves (Green 2008). This view of health takes a whole-of-life approach and can include the cyclical concept of life–death–life.

A biomedical or clinical view of health focuses on the presence or absence of disease. It assumes that diseases occur because of physical abnormalities in the body and treats people in isolation to their environments. The WHO encourages a more holistic concept of health, defining it as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO 1946). This definition includes mental and social dimensions and moves the focus beyond individual physical abilities or dysfunction.

Ideas around the definition of health and ill health continue to evolve. While the WHO definition has become widely accepted over the past 60 years, it has also been subject to debate. It has been argued that a 'complete' state of wellbeing is not necessary (or even possible) as a prerequisite for health, and that any definition must be specific and measurable (Salomon 2003; Huber et al. 2011). There is support for a more dynamic concept of health that is based around the ability to adapt to one's surroundings (Lancet 2009; Huber et al. 2011).

This report takes a broad view of health and functioning, incorporating both physical and mental dimensions, in a context that includes genetic, cultural, socioeconomic and environmental determinants. The complex and varied factors contributing to health and functioning are presented in 'Section 1.3 Determinants of health'.

Box 1.1: Health in quotations

Having good health is very different from only being not sick. Seneca the Younger (50 AD).

Health is not a condition of matter, but of mind. Mary Baker Eddy (1821–1910).

By health I mean the power to live a full, adult, living, breathing life in close contact with what I love. Joan Welsh (1888–1923).

Health is the state about which medicine has nothing to say. W. H. Auden (1907–1973).

Health is the well-working of the organism as a whole. Leon Kass (1981).

Health is something of an enigma. Like the proverbial elephant, it is difficult to define but easy to spot when we see it. Michael Bury (2005).

Health is merely the slowest way someone can die. Author unknown (year unknown).

What causes disease and illness?

A disease refers to a physical or mental disturbance involving symptoms, dysfunction or tissue damage, while illness (or sickness) is a more subjective concept that refers to the patient's personal experience of the disease (AIHW 2010a).

There are many diseases that can afflict the human body, ranging from common colds to cancers. Two broad categories of disease that may lead to ill health are:

- *Infectious diseases*, which are caused by pathogens (germs) and can be spread from person to person by air, food, water, inanimate objects and insects, or by direct or indirect contact with an infected person. Examples include influenza, malaria and human immunodeficiency virus (HIV). See 'Section 6.11 Infectious diseases' for information about existing and emerging infectious diseases in Australia.
- *Chronic diseases*, which are caused by multiple factors in a person's genetics, lifestyle and environment. They are long-term conditions and cannot be directly spread from one person to another. Examples include diabetes, asthma and heart disease. See Chapter 6 for more information on the prevalence and burden of chronic diseases in Australia.

Some diseases can be both infectious and chronic, for example, long-term infectious skin conditions or diseases such as HIV that are currently incurable. Further, there can be common mechanisms underlying infectious and chronic diseases. An injury, for example, could lead to an infection or a chronic back problem, depending on the type and location of the injury.

Theories about disease have a long history as people have tried to understand the causes and meaning of ill health in their societies (Box 1.2). The earliest physicians in Ancient Egypt believed that illnesses were the work of gods, evil spirits and sorcery. This was challenged by the 'father of Western medicine', Greek physician Hippocrates, who argued that illnesses were the product of environmental factors, diet and living habits, rather than punishment from supernatural forces. Since this time, the causes of many diseases have been identified and current theories draw on biological, genetic and environmental factors. There has also been increasing awareness of what keeps people well, see 'Chapter 4 Protecting and promoting health' for more information.



Box 1.2: A timeline of beliefs about disease causation

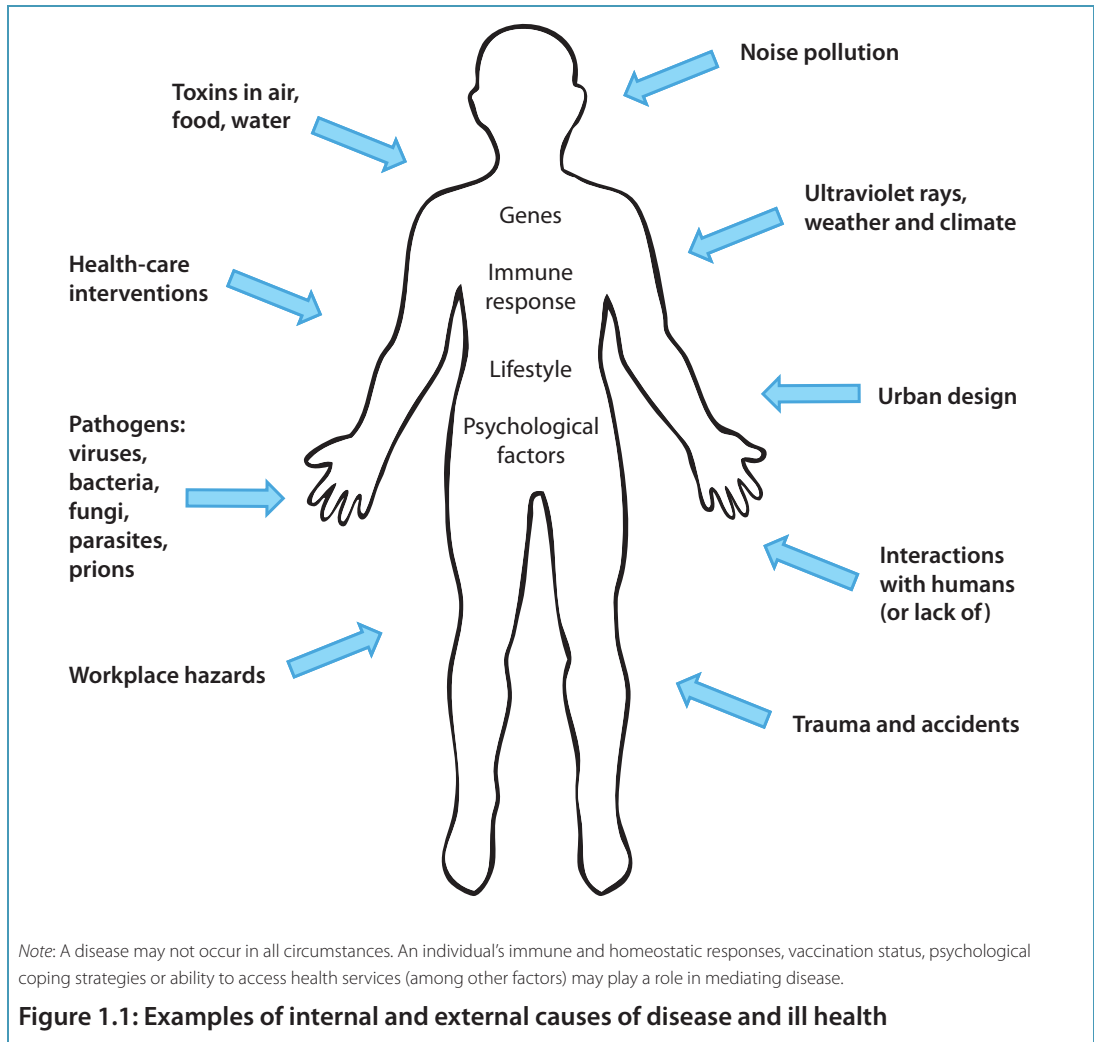
460 BC	Birth of Hippocrates, credited as the first person to argue that diseases are caused naturally and not as a result of superstition, gods and evil spirits.
131 AD	Birth of Galen of Pergamon, who advanced the theory of humourism, which states that people get sick from imbalances of the four basic substances in the body (blood, phlegm, black bile and yellow bile).
1520s	Swiss physician Paracelsus was one of the first to argue that illness is a result of the body being attacked by outside agents (rather than from sources within).
1546	Girolamo Fracastoro published the book <i>On contagion</i> , suggesting that infectious diseases are caused by 'disease seeds' carried by wind or transmitted by touch.
1850–70s	Louis Pasteur and Robert Koch established the germ theory of disease that states that micro-organisms are the cause of many diseases. Before this discovery, most doctors believed diseases were caused by spontaneous generation.
1880–90s	Golden age of bacteriology—researchers identified microbial causes of diseases such as typhoid, tuberculosis, cholera, tetanus, pneumonia and plague.
1970s	Social determinants of health theory is first introduced and attention drawn to the broader social and economic conditions that contribute to disease.
2003	Project to map the human genome completed, leading to greater understanding of the genetic causes of disease.

There are a large number of potential causes for disease and feelings of ill health in the human body (Figure 1.1). There may be a single cause (for example, a specific pathogen) or a range of causes (such as multiple lifestyle factors) that lead to a person developing a particular disease.

Other factors, such as the strength of a person's immune response, vaccination status, resilience and mental state, or their current health, may influence whether a person develops a disease, or how severely they are affected. Some population groups or age groups may be more susceptible to certain diseases, due to their genetic, biological, environmental or socioeconomic characteristics. As such, a disease may not develop in all individuals or at the same level of severity. Further, people can successfully manage many chronic conditions with the assistance of lifestyle changes, medicines, and other forms of support.

Health and medical researchers continue to study the causes of existing and emerging diseases and the characteristics that determine their development and spread. In the search for causes of disease, medical research has now advanced to the molecular level. The mapping of the human genome, completed in 2003, has increased our understanding of the role that genes (the smallest unit of heredity) play in contributing to, or causing disease. It has also enabled a better understanding of how genes can protect us from disease (US Department of Energy Genome Program 2011). It is now known that variations within the genome have a wide range of influences on the probability of developing a particular disease. This may range from simple and direct causation of congenital disorders, to subtle effects on cancer and a person's susceptibility to disease later in life.

Such knowledge has enabled researchers to pinpoint variations in genes, with important implications for health. The genetic basis for a number of severe diseases, such as Huntington disease, cystic fibrosis and haemophilia, has already been identified. Researchers have also begun to examine diseases with a complex pattern of causation, such as diabetes, asthma, cancer and mental illness. In the future, this knowledge may present new ways of intervening in the development and progression of diseases.



While knowledge of the genetic basis of disease is advancing, there is also growing awareness of the broader social and economic conditions that contribute to disease. Known as the social determinants of health, these are the conditions into which people are born, grow, live, work and age (WHO 2011a). According to this view, a person's occupation, education, material resources, social support networks and social status can affect their health and contribute to broader health inequalities within the population. These circumstances are, in turn, shaped by a wider set of forces, such as economics, social policies and politics. Similar to genetics, these are factors that are often beyond the control of individuals. 'Section 1.3 Determinants of health' provides more information about these factors.



1.2 Connecting health and welfare

At a glance

- There are links between the health and welfare sectors, ranging from strong and direct to subtle and indirect.
- Many aspects of health follow a social gradient: each step up the socioeconomic ladder is generally associated with better health and lower levels of risk factors.
- Various groups targeted for specialised welfare services may also have specific health-care needs, which present challenges for service delivery.



Introduction

The health sector is often considered separately from other service sectors, including welfare; however, there is an intricate relationship between health and welfare. Welfare issues such as aged care, disability and homelessness are also, to a large extent, health issues. The same is true in reverse: health status, health behaviours and access to health services need to be understood in terms of the social conditions in which people grow, live, work and age.

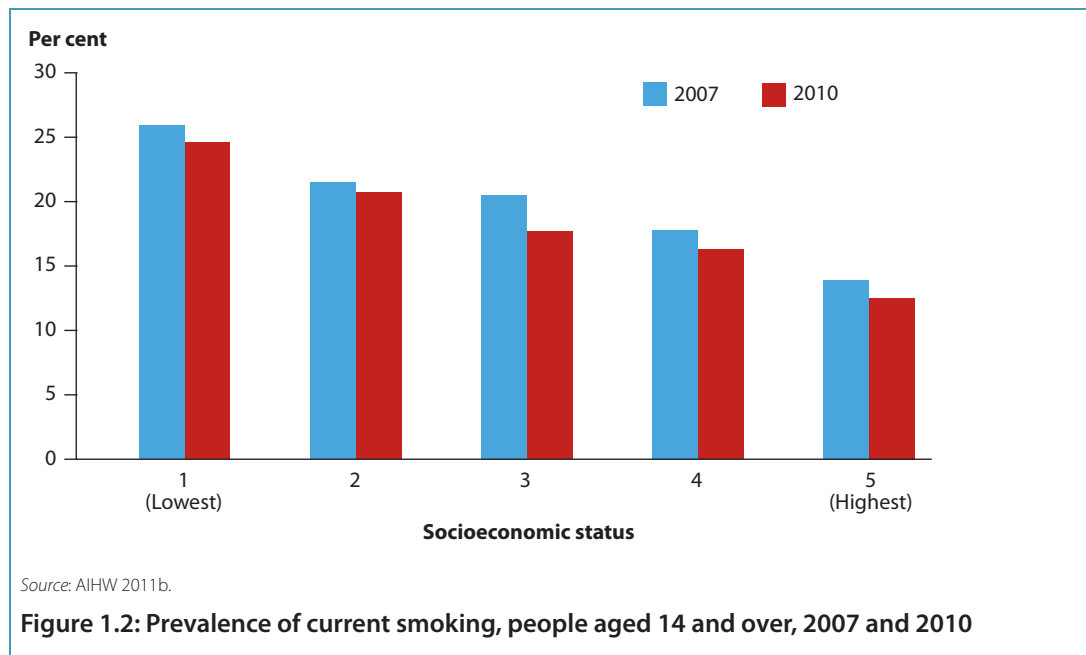
Similar to the concepts of health and illness discussed in the previous section, welfare can mean different things to different people. For example, it can refer to specific services and payments that replace or supplement employment, or to a generalised concept of individual and societal wellbeing. Here, welfare services and the welfare sector refer to the range of activities funded (wholly or in part) by governments to support individuals to participate in society and live as independently as possible. It broadly covers non-health services to children and families and people with disabilities and their carers, aged care, housing assistance and services to people who are homeless.

This section highlights some of the connections between health and welfare. More information on the factors that influence health, including the social determinants of health, is in 'Section 1.3 Determinants of health' and a discussion of disadvantage and health is in 'Section 2.5 Disadvantage and inequalities'. The AIHW flagship publication *Australia's welfare 2011* provides more detailed reporting on welfare services and statistics in Australia (AIHW 2011a).

Social gradients in health

Health status within a population typically follows a gradient, with overall health tending to improve with each step up the socioeconomic ladder (Kawachi et al. 2002). This is commonly known as the socioeconomic gradient of health, or the social gradient of health, and is a global phenomenon seen in low, middle and high income countries (WHO 2012).

An example of a health behaviour with a strong social gradient is tobacco smoking: in 2010 its prevalence among people living in the lowest socioeconomic areas was 25%, twice the rate among people living in the highest socioeconomic areas (Figure 1.2). This gradient has persisted since 2007, even though overall prevalence declined over that period.



Other social gradients are presented throughout *Australia's health 2012*, for example:

- risk factors such as physical inactivity and obesity, as well as the prevalence of multiple risk factors in an individual
- adverse outcomes such as lower cancer survival, poor oral health and incidence of end-stage kidney disease
- summary measures such as life expectancy and self-assessed health status
- the ability to find, understand and apply information about health—that is, health literacy.

Social gradients also exist in the access to, and use of, health-care services and resources in Australia, with the strength and direction of the relationship varying between service groups. For example, people living in the most disadvantaged areas have relatively high rates of general practitioner (GP) consultation. On the other hand, they are less likely to receive preventive dental care and more likely to be hospitalised for potentially preventable conditions.

The precise cause of social gradients in health is not fully understood—it is thought to be a complex set of relationships between education, attitudes and behaviours, economic resources, and the ability to exercise choice. Insofar as the welfare system has the capacity to modify socioeconomic factors, such as education and access to economic resources, it may affect individuals' health outcomes as well as the extent and manner in which they interact with the health system.



Shared demographic drivers

Australia has undergone considerable change in population size and composition over the course of two generations. Long-standing demographic trends of an ageing population and lower birth rates, which are mirrored in many other developed countries, mean that the mix of services required by society, and the ways in which they are funded and delivered, will not be the same in the future as in the past. This is equally true in the health sector as in the broad range of services that come under the umbrella of welfare.

Population ageing is a major driver of anticipated demand for both health and welfare services and associated expenditure. Australia's ageing population is expected to increase the number of people requiring specialist disability services, aged care and/or high-end health care at a rate outstripping population growth. Ageing and population growth account for 23% and 21%, respectively, of the projected increase in total expenditure on health and residential aged care over the period 2003–2033 (Goss 2008).

As disability and health conditions tend to become more prevalent and complex with age, the need to provide services to an ageing population highlights the interrelationship between the health and welfare sectors. For example, discharge from hospital of an older person whose health has declined depends on the availability of appropriate support services in the community or residential care.

Another notable demographic change in recent decades has been in patterns of family formation, particularly an increase in the average age of child bearing. Fertility rates among women in their 30s and 40s have risen since the late 1970s while rates for younger women have fallen. In the welfare sector, this shift has occurred alongside a greater likelihood for mothers of young children to remain in the workforce, leading to growth in demand for child care services (AIHW 2011a). In the health sector, use of assisted reproductive technology has become increasingly common, with women in their late 30s and 40s comprising a disproportionately large share of those undergoing treatment (see 'Section 2.2 Fertility' for more information).

Demographic factors other than age also have considerable impact on the provision of health and welfare services. For example, the population is becoming increasingly diverse in terms of cultural and language backgrounds, with more than one-quarter of Australians born overseas (AIHW 2011a). There is strong regional growth in some areas and population decline in others, and the emergence of considerable numbers of temporary residents in some locations associated with employment patterns. Each of these factors can affect demand for health and welfare services as well as models of service delivery, so lessons learned in one sector may well be applicable to another.

Health needs of key welfare service groups

Various target groups for welfare services have additional or specialised health-care needs that are not explained by relative socioeconomic status alone. In addition, people in these groups may face unique barriers that require non-standard models of health-care delivery to achieve comparable outcomes to the broader Australian population.

Integrated approaches to service delivery recognise these challenges and attempt to bring a person-centred focus to meeting needs through continuity of care, in contrast to approaches that consider the various needs of an individual according to defined sectoral boundaries. Examples of integrated service delivery across the health and welfare sectors include services that provide accommodation, health care and employment support to people experiencing homelessness; or early childhood centres with health-care, education and playgroup facilities.

Older people

As people age, their health-care needs tend to become more complex. Among older Australians living in the community in 2009, almost half (49%) aged 65–74 had five or more long-term conditions; this rate increased to 70% of those aged 85 or over. In government-subsidised residential aged care settings, 48% of permanent residents in June 2010 had medium or high needs for complex health-care services as appraised by the Aged Care Funding Instrument. In addition, it is estimated that half of all permanent residents in Australian Government-subsidised aged care facilities have a diagnosis of dementia—the large majority of whom have high-care needs (AIHW 2011a).

People with disabilities

People with disabilities aged under 65 are much more likely than people without disabilities to report having long-term physical and mental health conditions, and to rate their overall health as fair or poor. A number of health risk factors are also more common among people with severe or profound limitations than those without disability, including being overweight or obese, engaging in low levels of exercise, and smoking daily (AIHW 2010b). Therefore, people with disability often have high and complex needs for health care.

In 2003, half of all Australians with disability (about 2 million people) had multiple types of disability. In addition, the average person with disability had 3.1 long-term health conditions, which are not always directly associated with their disability (AIHW 2009). People with severe or profound limitations, in particular, are extensive users of health services, and are more likely than those without disability to consult general practitioners, specialist doctors and other health-care professionals, as well as social workers and welfare workers (AIHW 2011c).

Despite this, people with disability may have unmet or under-met need for health care. For example, in 2009, 59% of people aged 5–64 with severe or profound core activity limitations needed personal help with their health care, but almost 1 in 10 (34,200 people) reported that they did not receive any assistance (AIHW 2011a). Research suggests that people with disabilities may be especially susceptible to inadequate or inappropriate health care if their interactions with services are additionally complicated by communication or behavioural difficulties (Bywodd et al. 2011).



Informal carers

Informal carers of people with disability are more likely than non-carers to report having a long-term health condition, especially psychological and physical conditions (discussed in 'Section 2.6 Caring for others'). According to the 2009 Survey of Disability, Ageing and Carers, 10% of primary carers reported having been diagnosed with a stress-related disorder, and 29% said that their overall physical and emotional wellbeing had been affected by the caring role (AIHW 2011a). However, it is difficult to identify patterns of health service usage by this group, as information systems tend to capture statistics oriented around the service needs of care recipients to a greater extent than care providers.

People experiencing homelessness

There is a lack of comprehensive national data about the health needs of people experiencing homelessness. However, a range of information sources indicate that homeless people tend to have high and complex health-care needs, and may under-use health services relative to their needs.

Australian and international research demonstrates disproportionate rates of mental illness among people who are homeless or marginally housed, as well as a high prevalence of substance use disorders (reviewed in MHCA 2009). In particular, primary homelessness—that is, living on the streets or in public places—is associated with risk of chronic disease of increased severity and complexity than the general population, as well as infectious diseases associated with poor living conditions. However, homeless people also report unmet need for general and specialised health care, including medicines and dental treatment (reviewed in Bywood et al. 2011).

The Specialist Accommodation Assistance Program (SAAP) National Data Collection shows that 7–9% of support periods provided by these services were for people primarily seeking assistance because of a health issue (including substance use and mental health/psychiatric illness); this figure was up to 16% for lone men aged 25 or over (AIHW 2011d). Specialist homelessness services provided, or referred people to, a range of specialist health-care services, including psychological and psychiatric services, alcohol and other drug treatment, pregnancy/family planning support as well as general health/medical services.

1.3 Determinants of health

At a glance

- A person's health and wellbeing result from a complex interplay between biological, lifestyle, socioeconomic, societal and environmental factors, many of which can be modified to some extent by health care and other interventions.
- Although not a new concept, in recent years there has been increasing interest in the social determinants of health: those conditions into which people are born, grow, live, work and age.
- Of all the ill health, disability and premature death that occurs in Australia, almost one-third can be attributed to the presence of health risk factors.



Many things can affect how healthy we are, ranging from the macro to the molecular: from society-wide influences right down to highly individual factors, such as genetic make-up (see also 'Section 1.1 Understanding health and illness'). Some of these effects can be direct (such as being burnt by the sun), whereas other are less direct (such as education improving our ability to understand health information and use it to improve our health). And, of course, our health is affected by the quality of health care we receive or, in some cases, don't receive.

The group of indirect influences is known as health determinants because they help determine how likely we are to stay healthy or become ill or injured. Information on some of the direct influences is in 'Chapter 6 Causes of ill health', and information on health services is in 'Chapter 7 Treating ill health'.

Some determinants are positive in their effects on health and others are negative. A high daily intake of fruit and vegetables, for example, or being vaccinated against disease, are positive influences, and often termed protective factors.

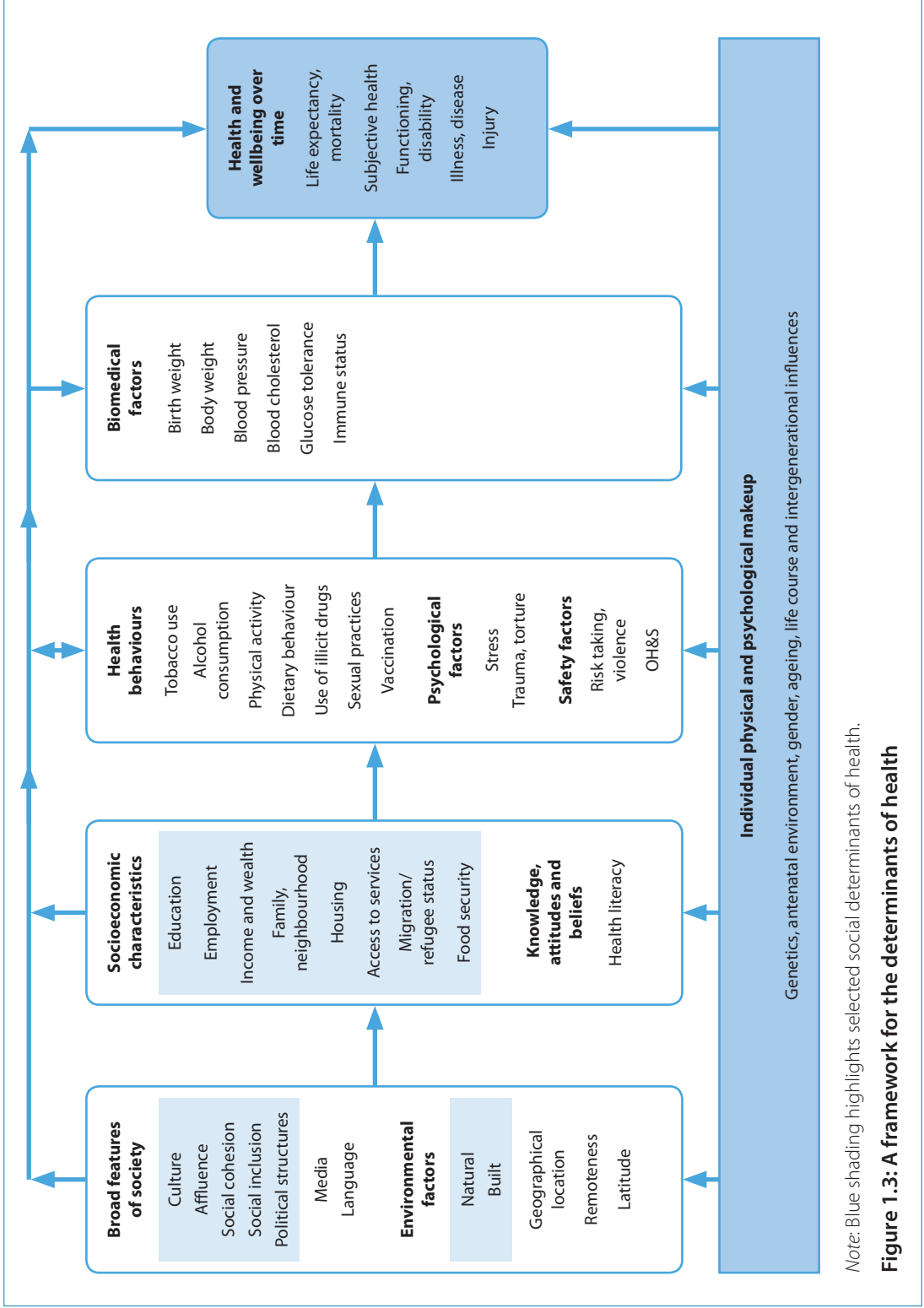
Those things that increase our risk of ill health are known as risk factors. Examples include behaviours such as smoking or being physically inactive, or the wider influence of lower socioeconomic status.

Measuring and monitoring determinants helps to explain trends in health. This information can then be used to help understand why some groups have poorer health than others, and to develop and evaluate policies and interventions to prevent disease and promote health.

A framework for determinants

A person's health and wellbeing result from a complex interplay between biological, lifestyle, socioeconomic, societal and environmental factors, many of which can be modified to some extent by health care and other interventions. These factors are summarised in Figure 1.3, including the pathways through which they can act. For this reason, determinants are often described as a web of causes, but they can also be thought of as part of broad causal pathways that affect health.





Note: Blue shading highlights selected social determinants of health.

Figure 1.3: A framework for the determinants of health



The conceptual framework divides determinants into four main groups (large boxes) whose main direction of influence goes from left to right, that is, from the 'upstream' background factors (such as culture and affluence) through to more immediate influences (such as blood pressure).

The framework shows how the first main group—the broad features of society, environmental factors and geographic location—can determine the nature of another main group; that is, people's socioeconomic characteristics, such as their level of education and employment. Both these main groups also influence people's health behaviours, their psychological state and factors relating to safety. These, in turn, can influence biomedical factors, such as body weight and glucose metabolism, which may have health effects through various further pathways.

At all stages along the path, the various factors interact with an individual's genetic composition. In addition, the factors within a box often interact and are closely related to each other.

Social determinants of health

Although not a new concept, in recent years there has been increasing interest among governments, researchers and health practitioners in the social determinants of health: a term that encompasses the social, economic, political, cultural and environmental determinants of health. Some of these social determinants are highlighted with a shaded background in Figure 1.3.

Conceptually, the social determinants of health can be described by two key questions:

1. What are the societal factors (for example, income, education and employment conditions) that shape health and help explain health inequalities?
2. What are the societal forces (for example, economic, social and political) that shape the quality of these societal factors? (Raphael 2008).

Two of the prominent researchers in this field, Wilkinson and Marmot, assessed a large volume of research across the fields of economics, sociology, neurobiology and medicine, and summarised the key social determinants to be the social gradient, stress, early life, social exclusion, work, unemployment, social support, addiction, food, and transport (Wilkinson & Marmot 2003).

A similar set of factors has been described by the US Centers for Disease Control and Prevention, including, but not limited to, socioeconomic status, transportation, housing, access to services, discrimination by social grouping (for example, ethnicity and religion), and social or environmental stressors (CDC 2010).

Put simply, the social determinants of health are the conditions into which people are born, grow, live, work, and age (WHO 2011a). This concept can be turned around to provide a platform for improved health. That is, health starts where we live, learn, work and play (RWJF 2010).

Arguably the most important determinants are those that produce inequalities within a society in terms of power, prestige, and access to resources. These structural determinants include the distribution of income, discrimination, and political and governance structures that reinforce rather than reduce inequalities in socioeconomic position (WHO 2011a).



The discrepancies arising from these mechanisms shape individual health status and outcomes through their effect on intermediary determinants, such as living conditions, psychosocial circumstances, behavioural and/or biological factors, and the health system itself.

An important factor in how social determinants affect physical health relates to stress and personal control over life's circumstances. This is also summarised by Wilkinson & Marmot (2003:9):

It is not simply that poor material circumstances are harmful to health; the social meaning of being poor, unemployed, socially excluded, or otherwise stigmatized also matters. As social beings...we need to feel valued and appreciated...and we need to exercise a significant degree of control over meaningful work.

The social determinants approach is underpinned by an appreciation of the broader value of health to society and the dependence of health on actions far beyond the health sector, as both problems and solutions are system-wide. Policies and interventions are required from all sectors and levels of society, for example, transport and housing policies at the local level; environmental, educational, and social policies at the national level; and financial, trade, and agricultural policies at the global level (WHO 2011b).

Measuring determinants

How do we measure the effects of different determinants to decide how important it is to act on them? This can be done at both the individual and community level. For individuals, the first point to note is that nearly all risk and protective factors are not 'all or nothing' in their effect. Further, they vary in the amount of risk they pose, and the level and duration of a person's exposure. For a person with a blood pressure level above optimal, for example, there is no exact point where their risk begins, but each increment in their level carries a further increase in the risk of stroke or heart attack. Similarly, a smoker's risk of various diseases increases with the number of cigarettes they smoke each day and how long they have been smoking.

An individual's risk can be described in either 'relative' or 'absolute' terms. The risk of a smoker getting lung cancer, relative to a non-smoker, is about 10-fold, so the relative risk is 10. The absolute risk in this case, however, refers to the chance of that smoker—or a non-smoker, for that matter—getting lung cancer in a given period or over their lifetime. Smoking carries both a high relative and a high absolute risk for lung cancer. Some risk factors, however, may carry a high relative risk but a low absolute risk if the disease in question is rare. On the other hand, a risk factor may have a moderate relative risk for a disease, but have a large effect on the population because the disease is very common, for example, obesity and coronary heart disease.

A final point about individual risk is that many people have more than one risk factor for one or more health problems (see 'Section 5.12 Multiple risk factors' and 'Section 6.16 Multiple chronic conditions'). The more risk factors, the greater the risk for a particular problem and the greater the overall risk of ill health. This total risk is important, and all these considerations can be the basis for personalised advice or treatment.



At the community level there are further considerations about risk and prevention: the seriousness of the particular problem for the individuals affected, the number of people currently at risk, the prospects for onset and prevalence in the community, and the means and cost of tackling the relevant risk factors.

Health determinants also vary in how modifiable they are. The more 'upstream' (social) determinants, such as education, employment, income and family structure, can be complex to modify and are more directly influenced by the broad features of society; that is, our culture, resources and policies. For the more 'downstream' determinants, modification can be more specific. Programs and policies aimed at influencing health behaviours (for example, legislation against tobacco smoking in cars with children, restricting alcohol sales to young people, and enforcing the wearing of seat belts) help to reduce the burden of illness and injury, and result in better health for the whole population. On the other hand, age is one risk factor that is not modifiable but which is strongly associated with many health conditions.

How much of the disease burden is due to health determinants?

The effect of risk factors on health depends not only on their prevalence in the population but also on the relative amount they contribute to the level of ill health. Studies that quantify this burden use a measure of disability-adjusted life years (DALYs) to describe the relative contribution of specific illnesses and risk factors to the overall burden of ill health (Begg et al. 2007)—see 'Section 3.3 Burden of disease and risk factors' for an explanation of DALYs.

Australia's most recent national study of the burden of illness and injury used data from 2003 and summarised the contribution of 14 selected risk factors to the national burden for that year. The joint contribution of those determinants to the total burden was 32%. That is, of all the ill health, disability and premature death that occurred in Australia in 2003, almost one-third was attributed to the presence of the health risk factors studied.



1.4 Australia's health system—an overview

At a glance

- The Australian health system is a complex set of arrangements involving multiple providers, funders, participants and supporting mechanisms.
- Although they are not seen as strictly part of the health system, many other government and non-government organisations play a role in influencing health.
- There are rich data sources on the health of Australians and their health services, although important gaps and data quality issues remain, particularly relating to the primary care sector.

A complex system

The Australian health system comprises a set of public and private service providers in multiple settings, supported by a variety of legislative, regulatory and funding arrangements, with responsibilities distributed across the three levels of government, non-government organisations and individuals. This web of public and private providers, settings, participants and supporting mechanisms is nothing short of complex.

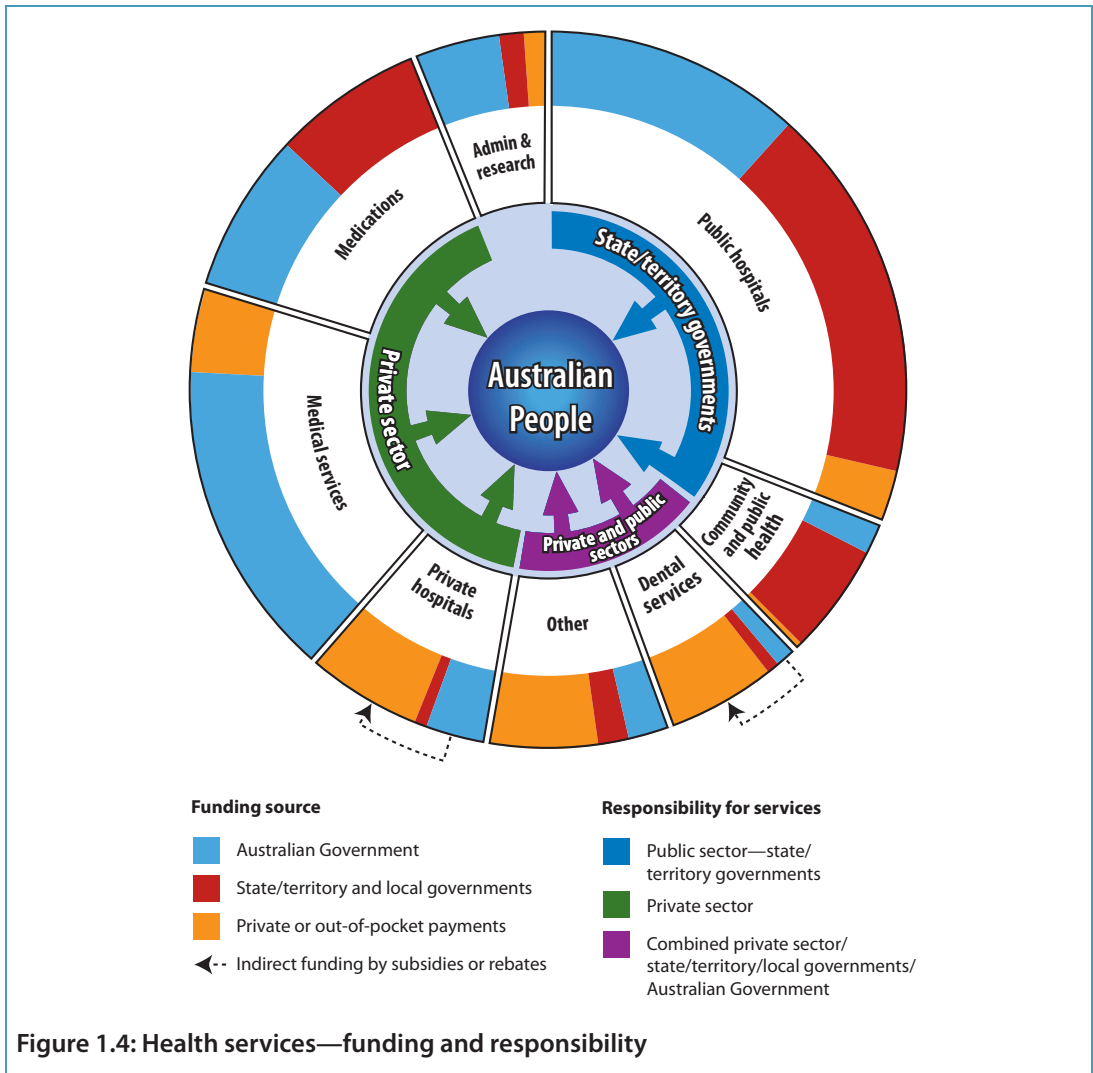
Those who provide health services include medical practitioners, nurses, allied and other health professionals, hospitals, clinics, and government and non-government agencies. Funding is provided by all levels of government, health insurers, non-government charitable organisations and individual Australians. These aspects are illustrated in Figure 1.4, and more detail is provided in chapters 8 and 9, 'The economics of health' and 'Health workforce'.

The (white) middle ring in Figure 1.4 shows the major groups of services; the outer ring shows the funders of each group and in what proportion; and the inner ring shows who actually delivers the service—the public sector, private sector or both.

In the middle ring, the size allocated to each service group relates to its total expenditure. *Public hospitals*, *Private hospitals*, *Dental services* and *Medications* are familiar elements of the system. The *Community and public health* group includes community nursing and public health education campaigns, among others. *Medical services* includes general practice and specialist care as well as pathology (blood tests, urine tests and so forth) and medical imaging (X-rays, ultrasound and so forth). *Other* includes patient transport and aids, as well as health professionals such as physiotherapists and psychologists. *Administration and research* includes state departments of health, and hospital or community health administration and research. These examples are not exhaustive, and each group of services covers many types of activities.

Private sector providers (inner ring in the figure) include private hospitals, medical practices and pharmacies. Public sector service provision is the responsibility of state and territory governments for public hospitals, and a mixture of Australian Government and state, territory and local governments for community and public health services.

From 2008 onwards we have seen elements of an extensive program of health system reform in Australia, affecting the way services are delivered and funded (see 'Section 10.3 Health reform—new information challenges and opportunities'). Hence the description of the system in this section may not endure over coming years.



Who uses the health system?

Central to the health system are the Australian public as consumers of health services. Australians largely aim for a 'healthy' life, which requires prevention of illness and, where illness is present, appropriate services to treat, manage or support those affected.

The Australian public are a diverse group of individuals with different needs and expectations of the health system. Expectations are shaped by the experiences of each individual, which are in turn shaped by such things as age, gender, locality and cultural background.



Who funds the health system?

Health is an important and expensive business: in 2009–10, total health expenditure was \$121.4 billion, or 9.4% of gross domestic product (AIHW 2011e). More than two-thirds of total health expenditure in Australia was funded by government, with the Australian Government contributing two-thirds of this, and state, territory and local governments the other third.

The Australian Government's major contributions include the two national subsidy schemes, the Medicare Benefits Scheme (MBS) and the Pharmaceutical Benefits Scheme (PBS, including the Repatriation Pharmaceutical Benefits Scheme (RPBS)). The MBS subsidises payments for services provided by doctors, optometrists and, in some circumstances, other allied health professionals, such as clinical psychologists (see 'Section 7.2 Primary health care in Australia'). The PBS subsidises payments for a high proportion of prescription medicines bought from pharmacies, with individuals contributing out-of-pocket payments for these services as well (see 'Section 7.7 Use of medicines'). The Australian Government and state and territory governments also jointly fund public hospital services.

Between them, these government arrangements aim to give all Australians—regardless of their personal circumstances—access to adequate health care at an affordable cost or no cost. These schemes are supplemented by social welfare arrangements, with larger rebates provided for individuals or families who receive certain income-support payments (such as for unemployment or disability). Additional government programs aim to improve access to health services in regional and remote Australia, or provide access to allied health services for people with chronic and complex conditions (such as diabetes or mental illness). There are also special health-care arrangements for members of the Australian Defence Force and their families, and for war veterans and their dependants.

In 2009–10, private health insurance schemes contributed 8% of the funding for the health system, with accident compensation schemes contributing another 5%. Finally, individuals make out-of-pocket contributions to the costs of services, mostly in the private sector, amounting to 18% of total funding in 2009–10 (AIHW 2011e).

What services are provided and where?

Services provided in the health system include disease prevention and health promotion activities; direct clinical consultations (such as with a general practitioner or dentist); surgical procedures (such as removal of a cancer, or replacement of a knee joint); pharmaceuticals, pathology and imaging; and a range of other services. These services are provided in a variety of settings, with a large proportion provided in hospitals.

Hospital services can require patients to be admitted (for either same-day or overnight stays) or be provided through outpatient clinics and emergency departments. Clinical consultations and related services are provided in an assortment of health service facilities, ranging from a single practitioner to complex facilities providing extensive treatments or services by a number of practitioners. These clinics can be either public or private, and are sometimes a combination of both.

Some services are provided in the consumer's home, although the AIHW classifies most disability and aged care services as outside the health system, with much of the support for these consumers coming from the welfare services sector.

The services provided in the settings described above are complemented by a range of public health and preventive services that are integral to the health system. They include:

- immunisation services and other communicable disease control (including biosecurity)
- public health education campaigns (including health promotion in the areas of nutrition and physical activity)
- activities to monitor food and water quality
- injury prevention activities
- programs to reduce the use and harmful effects of tobacco, alcohol and illicit drugs
- environmental monitoring and control
- screening programs for diseases such as breast, cervical and bowel cancer.

Such public health and preventive services are provided in many settings, including schools, workplaces and community health facilities. Some of the services are independent of a specific setting, for example, the use of mass media—including television, newspapers, billboards and the internet—to present health promotion messages (see 'Section 4.2 Health promotion').

It is worth noting that not all health services are provided to people who are sick or even at risk of ill health. For example, the range of services oriented around having a baby—family planning, birthing classes, antenatal care, birthing centres, and so on—is an important part of the health system used by people who are generally well.

Who provides the services?

The extensive range of facilities providing health services draws on a large and diverse group of health services providers. They include well-recognised health professions, such as doctors, nurses, dentists and pharmacists (see 'Section 9.1 About the health workforce').

There are also a number of allied health professional occupations, including physiotherapists, occupational therapists and nutritionists. In addition, there are a number of occupations delivering other health services, such as naturopaths, massage therapists and acupuncturists. As well as those with specific clinical skills, there are numerous managers, planners and other administrative and facilities personnel who play essential roles in the health system.

Who are the other players in the health system?

Health services are supported by many other agencies. Research organisations contribute to our knowledge about health and disease and use this knowledge to improve people's health throughout their lives. Statistical agencies (such as the AIHW and the ABS) provide the information needed to inform activities around disease prevention, detection, diagnosis, treatment, and associated policy. Consumer and advocacy groups contribute to public discussion and policy development. Professional associations for health practitioners set professional standards and clinical guidelines. Universities and hospitals train undergraduate and postgraduate health professionals. Voluntary agencies contribute in various ways, including raising funds for research, running educational and health promotion programs, supporting patients (and their families) during care, and coordinating voluntary care.

Although they are not seen as strictly part of the health system, many other government and non-government organisations (such as departments of transport and the environment, liquor licensing authorities, the education sector and the media) play a role in influencing health through their policies and actions.



How is the system coordinated and regulated?

Overall coordination of the public health-care delivery system is the responsibility of Australian Government, state and territory health ministers, collectively referred to as the Standing Council on Health. They are supported by the Australian Health Ministers' Advisory Council (AHMAC), a committee of the heads of the Australian Government, state and territory health authorities. The AHMAC advises health ministers on policy, resources and financial issues. Some decisions about how best to fund and provide an effective health system are made by the Council of Australian Governments (COAG), with input from health ministers.

What is missing from the picture?

As illustrated in the pages of this report, Australia has a range of rich information sources on the health of Australians and their health services. Yet there are important gaps, and not all data are suitable for policy and planning purposes. Many of these gaps and quality issues are spelt out in other sections of this report.

One gap worth highlighting in this overview of the health system relates to the primary care sector. Despite its critical importance, the Australian primary care setting has not experienced the same national focus on data collection, collation and reporting as other areas of the health system, such as hospitals. As a result, in some cases there are little data or only poor quality data collected about a particular service type at any level of government. Alternatively, in some cases there are many 'bits' of data collected at a variety of different levels of government that are often overlapping, non-standardised and not centrally collated. And in other cases there are significant volumes of data collected and stored within the private sector that the government has historically not accessed, for example, by individual general practices or private health insurers.

Where do I go for more information

As noted throughout this section, most aspects of the health system described here are discussed in more detail elsewhere in this report.

For more information on the intergovernmental financing arrangements, see the COAG website: <www.coag.gov.au/intergov_agreements/federal_financial_relations>.

1.5 Sources of health data

At a glance

- Major sources of health data include administrative data sets, population health surveys, health registers and health surveillance systems.
- Information from these sources can be used to examine at-risk population groups, existing and emerging health patterns, and future health needs.
- A variety of legislation and privacy-related guidelines ensure the protection of personal health information in Australia.

Introduction

There is a range of data sources related to health risk factors, disease, mortality, health service use and health expenditure in Australia. If this information is of sufficient quality, it can be used to examine existing and emerging health patterns, population groups at risk of ill health, current health service use and future demand on the health system. It can also be used to inform the development of new policies and programs, and evaluate their progress.

Data may be collected continuously over many years, allowing analysis of change in rates of disease, health service use or expenditure over time. Conversely, surveys may be conducted periodically or 'once-off' and can provide a snapshot at one point in time. Often, a range of data sources are brought together to create a picture of a health issue among Australians.

This section examines data sources that appear throughout the *Australia's health* report, specifically administrative data sets, population health surveys, health registers and national surveillance systems. The methods used to assess the quality of data from these sources, and the arrangements that protect Australia's health data, are also described.

How do we know about Australia's health?

Administrative data sets

Administrative data are collected as a by-product of the delivery of health services, for example, at the point of care, such as a hospital admission or visit to a general practitioner, or through other processes, such as registration of birth, death or marriage events. Administrative data can include demographic characteristics, such as age, sex and location, as well as the type and timing of the service or event. Although they have many uses and can provide insight into the users of a particular health service, administrative data usually cannot tell us about the non-users of that service.

Administrative data sets include the National Coroners Information System (for deaths referred to a coroner), the AIHW National Hospital Morbidity Database (for hospitalisations), and data from the MBS and PBS (for medical procedures, consultations and medicines funded fully or partially by the Australian Government).



The National Hospital Morbidity Database, for example, contains data supplied by state and territory health authorities relating to admitted patients in almost all public and private hospitals (AIHW 2011f). The database contains information on demographics and length of stay, diagnoses for patients, the procedures they underwent in hospital and external causes of injury and poisoning.

Population health surveys

Population health surveys involve the collection of data related to health and disease within a sample of a defined population. Surveys may collect information on current and previous conditions, use of health services, and lifestyle issues, such as drug use, exercise and nutrition. Information may be provided by the respondent (self-reported data) or collected via physical measurements or biomedical specimens (measured data). Different modes of collection can be used, including face-to-face interviews, drop-and-collect paper questionnaires, telephone interviews and online surveys.

Examples of recent population health surveys conducted by the ABS include the National Health Survey, Survey of Disability, Ageing and Carers, and Survey of Mental Health and Wellbeing. These surveys are run at intervals of 3–6 years. The 2011–13 ABS Australian Health Survey, which incorporates elements from the National Health Survey, is currently being conducted and will collect self-reported and measured data for a range of health measures.

The AIHW conducts the National Drug Strategy Household Survey every 3 years to provide cross-sectional data on alcohol and other drug use in Australia. It also conducted the 2010 Australian National Infant Feeding Survey and the 2006 and 2009 Adult Vaccination Survey.

Health registers

Health registers are collections of records containing data about individuals who are typically patients or clients of a health service or health program (NHIMG & AIHW 2001). They aim for complete coverage of the relevant population and timely data supply, although this can vary between registers. They can be used to measure incidence and prevalence, follow-up individuals for further treatment, plan services, monitor survival rates and recall following adverse events, and evaluate the effects of treatments or other interventions.

The Australia and New Zealand Dialysis and Transplant Registry, the Australian Childhood Immunisation Register, state and territory cancer registries, and state and territory breast screening and Pap smear registries are examples of this type of data source. The AIHW operates the National Diabetes Register (for new cases of insulin-treated diabetes) and the Australian Cancer Database (for new cases of cancer, excluding non-melanocytic skin cancer). All states and territories have legislation that makes notification of cancer mandatory.

Health surveillance systems

Health surveillance is the ongoing systematic collection, assembly, analysis and interpretation of health data, and the communication of information derived from these data. It can be used to measure the incidence of selected diseases and identify emerging threats.

Examples include the National Notifiable Diseases Surveillance System (for selected infectious diseases) and OzFoodNet (for the incidence and outbreaks of foodborne disease). All states and territories have legislation that requires mandatory notification of certain infectious diseases.



Understanding incidence and prevalence

Information on how often and how much disease occurs in the population, and in particular population groups, plays an important role in preventing and treating illness. Incidence and prevalence are two related but different measures used to describe the level of a disease in populations.

Incidence measures the number of new cases (of an illness or event) occurring in a specific population in a given period. To calculate incidence rates, three measures are needed: the number of new cases of a disease or condition, the time frame for measuring these cases, and the size of the population or subpopulation of interest.

In contrast, prevalence measures the total number of cases of a disease in a specific population at a particular point in time. This includes new cases (incidence) and pre-existing cases of the disease, and is a function of past incidence, case remission (that is, people getting better) and survival. It is generally easier to measure prevalence because only two measures are needed: the number of people with the disease at a particular time and the size of the population or subpopulation. Prevalence estimates are also used to quantify risk factors and other characteristics of a population.

Incidence and prevalence statistics are calculated or interpreted by the AIHW for a wide variety of illnesses and events, and these appear throughout the *Australia's health 2012* report. The different measures can inform different aspects of health services planning and delivery. For example, data on the incidence of heart attacks are important for planning emergency response capacity, whereas data on the prevalence of heart disease are important for planning and delivering primary care services, pharmaceuticals and, perhaps, cardiovascular surgical units. Both measures would contribute to designing prevention, health promotion and evaluation activities.

Although incidence and prevalence quantify levels of disease in the population, higher incidence or prevalence rates do not necessarily mean poorer population health. For example, high prevalence rates for a specific chronic disease could indicate that the disease is being successfully managed so people are living longer with the disease, rather than dying from it.

Further, many serious diseases—those that could be life-threatening if not well managed—have relatively low incidence or prevalence (for example, fewer than 1% of the population are living with HIV) (Kirby Institute 2011), whereas the most common conditions are generally not as serious (for example, 47% of people have long- or short-sightedness) (ABS 2009a).

In Australia, incidence statistics can be readily obtained for diseases that are mandatorily reported (say, by health practitioners to state health authorities), such as HIV, tuberculosis and swine flu. Similarly, reliable incidence figures can be obtained for diseases that have a nationally coordinated register. The AIHW, for example, calculates cancer incidence based on new cases of cancer reported by states and territories and compiled into the Australian Cancer Database (see 'Section 6.1 Cancer'). However, for other conditions or diseases, such as depression and Crohn disease, incidence and prevalence data are not readily available.

Prevalence data typically come from population surveys, but the prevalence of many important diseases is difficult to estimate because not enough cases are counted in the surveys to enable reliable calculations; incidence estimates are even more difficult because of this limitation.



Other concerns with survey-based data are that people may not be aware that they have a condition at the time of the survey, they may not know the medical term for a condition, or they may be unwilling to report it. For example, a large national study in 1999–2000 found that for every person who self-reported Type 2 diabetes, there was another person with the condition (determined by medical tests during the study) who was unaware they had it (Dunstan et al. 2001).

Survey administrators use several techniques to improve the reliability of estimates. These include prompt cards (for example, a picture of a plate of food to help respondents understand serving sizes), multi-pass methods (in which respondents are prompted in different ways to recall information), calibration questions (by which a question, possibly with alternative wording, is repeated in another part of the survey), and so on.

Another technique to improve the accuracy of collected information is to take objective measures; for example, height and weight could be collected by trained interviewers on standardised equipment. Further, small amounts of blood, urine or saliva could be collected and analysed in pathology laboratories to provide accurate assessments of biomedical measures, such as blood cholesterol or urinary iodine.

The latest national data on prevalence for selected chronic diseases are available from the 2007–08 National Health Survey—relevant results are in 'Chapter 6 Causes of ill health'. The 2011–13 Australian Health Survey will provide updated estimates, with first results from that survey expected in late 2012. This survey includes measured height, weight, blood pressure and waist and hip circumference, and blood and urine samples.

How do we assess the quality of health data?

Having accurate and reliable health data is essential. If the data collected (or analysed) are not robust, the conclusions drawn may be erroneous and ineffective in improving the health of Australians. However, assessing data quality is complex and there is no universally agreed definition of what constitutes 'good' data. Data quality may vary within data sources, between jurisdictions and over time (ABS 2009b).

The AIHW uses several dimensions to evaluate the quality of health data sources; an approach that aligns with the ABS Data Quality Framework. Depending on what data source is being assessed, some dimensions will be more relevant than others. Dimensions include:

- institutional environment: the factors that may provide insight on the effectiveness and credibility of the agency producing the statistics
- relevance: how well the statistics or product meets the needs of users
- timeliness: the delay between the reference period (to which the data pertain) and the date at which the data become available
- accuracy: the degree to which the data correctly describe what it is designed to measure
- coherence: the internal consistency of a product, its comparability with other sources of information and over time
- interpretability: the availability of information to help provide insight into the data (for example, information on variables, concepts and classifications used)
- accessibility: the ease by which the data can be obtained by users.

As part of this framework, the AIHW produces a data quality statement for each data collection where it acts as data custodian. This presents information about the quality of a data item or a collection of data items, using the ABS Data Quality Framework. It helps users understand how accurate and reliable the data are, and where caution should be used. The AIHW publishes data quality statements for its collections on the AIHW website.

Information about the quality of data in this report is in 'About *Australia's health 2012*' and other sections related to data sources (such as hospital data) throughout this report.

How is health information protected?

Many people consider information on their health, including their conditions and levels of functioning, to be sensitive. For this reason, a range of legislation and privacy-related guidelines ensure the protection of personal health information. At a federal level, the *Privacy Act 1988*, *Healthcare Identifiers Act 2010* and associated regulations and guidelines published by the Office of the Australian Information Commissioner and the National Health and Medical Research Council (NHMRC) establish a strong privacy framework. State and territory arrangements also exist to protect the privacy of individuals and organisations.

Information collected or held by the AIHW is subject to the *Australian Institute of Health and Welfare Act 1987*, for which the scope of protection is 'information concerning a person'. This includes information that relates to living people, deceased individuals, corporations and other entities. A breach of confidentiality relating to information of this type is a criminal offence under the Act.

The role of the AIHW Ethics Committee is to determine the ethical acceptability of activities undertaken by the AIHW. Any activity of the AIHW that involves identified or identifiable data must be submitted to the committee. External researchers seeking access to AIHW identifiable data must seek the approval of the committee.

The AIHW has also adopted a number of policies and protocols designed to ensure the protection of health information. These include arrangements to assist in maintaining the confidentiality of its data, for example:

- limiting who can access the data (and for what purpose), through the use of robust application processes, an Ethics Committee, and/or a nominated data custodian
- when releasing information, removing components in data sets that could be used to identify information about individuals
- avoiding the publication of data cells with values that could identify information about individuals
- ensuring physical and computer security for storing the data.

For more information, see the brochure *Privacy at the AIHW* (AIHW 2011g).

Where do I go for more information?

More information about specific data sources is presented throughout the *Australia's health* report, as summarised in Table 1.1 over the page.



Table 1.1: Where to find more information about data sources in Australia's health 2012

Type of data	Data source	More information
Administrative data sets	AIHW National Hospital Morbidity Database	7.9 Admitted hospital care
	Medicare Benefits Scheme data	7.3 General practitioners
	Pharmaceutical Benefits Scheme data	7.7 Use of medicines
Population health surveys	National Health Survey	3.1 Self-assessed health status
	Bettering the Evaluation And Care of Health Survey	7.3 General practitioners
	National Survey of Mental Health and Wellbeing	6.3 Mental illness
	Survey of Disability, Ageing and Carers	3.2 Functioning and disability
	National Drug Strategy Household Survey	5.8 Tobacco smoking
	2010 Australian National Infant Feeding Survey	5.3 Infant feeding and early nutrition practices
	Adult Vaccination Survey	4.5 Adult vaccination
Health registers	National Diabetes Register	6.6 Diabetes
	Australia and New Zealand Dialysis and Transplant Registry	7.14 Blood, organ and tissue donation
	Australian Cancer Database	6.1 Cancer
Health surveillance systems	National Notifiable Diseases Surveillance System	6.11 Infectious diseases
	OzFoodNet	4.1 Health and the environment

1.6 Measuring Australia's health performance

At a glance

- Health performance measurement is central to Australia's recent health reform initiatives set out in the National Healthcare Agreement (NHA), agreed in 2008 and the National Health Reform Agreement (NHRA), agreed in 2011.
- While performance measurement has improved over time, there are still areas that require development, for example, good quality information on health system outcomes is particularly limited in the areas of primary health care services, mental health care, aged care, and private hospitals.



Introduction

There is a strong appetite among health policy makers, the general public, health professionals and researchers for accurate and meaningful answers on questions such as: How healthy are Australians? How well is our health system functioning? Citizens, as users of the health system, are also interested in the quality of care they receive. For example: Will health care or treatment achieve the desired results? Is health care or treatment available when required?

This section provides a summary of how these questions may be answered. It includes a broad overview of health performance measurement and its importance in Australia, a summary of how performance measurement can be undertaken, and concludes with some potential areas for further work.

What is health performance measurement and why is it important?

In the broadest sense, performance describes how well someone or something fulfils its roles. Health performance measurement is guided by conceptual frameworks that include a broad range of dimensions relating to population health status (such as health conditions), determinants of health (such as health behaviours) and health system attributes (such as sustainability and effectiveness).

Regular measurement of health performance provides a mechanism to define and monitor goals for the health of a population and the health system. More specifically, health performance measurement provides a number of benefits, such as guiding health policy and planning in the management and provision of health services, driving improvements in the quality of care, providing transparency and accountability, and providing the community with an understanding of their health and the quality of their health system.



In particular, it can be used to drive improved outcomes by using performance benchmarks or targets, including those associated with financial or other incentives. For example, a government may provide reward payments to service providers for achieving specific outcomes or set a benchmark that is used to distinguish between acceptable performance and performance that could be improved. These incentive schemes require careful design and monitoring to ensure any unintended consequences do not occur, for example, patient safety being compromised.

Health performance measurement in Australia

Recent national health reform initiatives set out in the NHA and the NHRA have elevated the importance of health performance measurement in Australia (Box 1.3). In particular, these agreements represent a significant shift towards more transparent performance reporting arrangements that aim to improve the accountability of governments and strengthen the evidence available to inform health funding and policy decisions.

Box 1.3: The role of performance reporting in Australia's national health reform

In late 2008, the Australian Government and state/territory governments signed the Intergovernmental Agreement on Federal Financial Relations and a series of associated national agreements. Among these was the NHA, which outlines the goals of the health system and specifies the roles and responsibilities of these governments in managing and providing health services. Under these arrangements, the Australian Government and state/territory health authorities regularly report on a range of performance measures specified in the agreement (AIHW 2010c). All governments' performance against these measures is assessed annually by an independent agency, the COAG Reform Council, based on performance data provided by the ABS and the AIHW.

In August 2011, the Australian Government and state/territory governments agreed to the NHRA. It has a more local focus than the NHA and incorporates performance reporting for individual public hospitals, as well as groups of public hospitals (Local Hospital Networks) and primary health-care services (Medicare Locals) (COAG 2011). This performance reporting is guided by a Performance and Accountability Framework, agreed on by COAG, which also includes a set of endorsed performance indicators.

Under the NHRA, nationally consistent reporting of health performance at the service delivery level will be available for the first time in Australia through the publication of Hospital Performance Reports and Healthy Communities Reports that summarise the performance of Local Hospital Networks, Medicare Locals, and individual private and public hospitals. The MyHospitals website, currently provided by the AIHW, will also be used to report on the performance of individual hospitals and Local Hospital Networks. For more information on Australia's national health reform, see 'Section 10.3 Health reform—new information challenges and opportunities'.

There is also separate, well-established performance reporting that complements the above arrangements. For example, other government agencies, such as the Steering Committee for the Review of Government Service Provision, the ABS and the AIHW, regularly publish statistics and information on health and health services. In particular, this report and previous editions of *Australia's health* provide a national summary of health performance in Australia.



In addition to these national performance reporting arrangements, states and territories also undertake their own performance measurement. Service-level monitoring of compliance against quality and safety to improve clinical outcomes and the appropriateness of their services, for example, through organisation accreditation processes, is closely related to, but not part of, performance measurement.

Health performance measurement generally involves reporting against a set of indicators that reflect a balance of performance information related to the topic of interest. Ideally, the selection of indicators is guided by a suitable conceptual framework and well-established criteria on the preferred attributes of indicators.

A conceptual framework

Conceptual frameworks provide a useful guide for the selection of indicators that assist us to understand and evaluate the health of Australians and the health system. In Australia, the National Health Performance Framework (NHPF) that was created under the auspices of the Australian Health Ministers' Advisory Council is commonly used (AIHW 2010a). The framework contains 14 health dimensions grouped under three broad domains: health status, determinants of health, and health system performance (Figure 1.5), and is consistent with health performance frameworks used around the world (ISO 2010; OECD 2011a).

As Figure 1.5 shows, the NHPF adopts a broad approach to the analysis of health performance as it includes areas of performance that can be influenced by both the health system and elements outside it. For example, improvements in physical activity levels may be influenced by health promotion campaigns, decreased air pollution, access to safe and appropriate urban spaces, and personal lifestyle choices.

Indicators agreed by Australian health ministers for reporting against the NHPF are featured throughout *Australia's health 2012*. A summary of these indicators that provides the most current measures and describes whether there have been favourable or unfavourable trends over time is at the end of this section (Table 1.2). However, the indicators are not the only health and contextual measures that may be considered important to population health policy and planning. Other performance measures, such as participation in cancer screening, are also included in the publication.



Health status			
How healthy are Australians? Is it the same for everyone? Where are the best opportunities for improvement?			
Health conditions	Human function	Wellbeing	Deaths
Prevalence of disease, disorder, injury or trauma, or other health-related states	Alterations to body structure or function (impairment), activity limitations and restrictions in participation	Measures of physical, mental and social wellbeing of individuals	Mortality rates and measures of life expectancy
Determinants of health			
Are the factors determining good health changing for the better? Where and for whom are these factors changing? Is it the same for everyone?			
Environmental factors	Community and socioeconomic	Health behaviours	Biomedical factors
Physical, chemical and biological factors such as air, water and soil quality.	Community factors, such as social capital, support services; and socioeconomic factors, such as housing, education, employment and income	Attitudes, beliefs, knowledge and behaviours, such as patterns of eating, physical activity, smoking and alcohol consumption	Genetic-related susceptibility to disease; and other factors such as blood pressure, cholesterol levels and body weight
Health system performance			
How does the health system perform? What is the level of quality of care across the range of patient care needs? Is it the same for everyone? Does the system deliver value for money and is it sustainable?			
Effectiveness	Continuity of care	Safety	
Care, intervention or action provided is relevant to the client's needs and based on established standards. Care, intervention or action achieves desired outcome	Ability to provide uninterrupted, coordinated care or service across programs, practitioners, organisations and levels over time	The avoidance or reduction to acceptable limits of actual or potential harm from health-care management or the environment in which health care is delivered	
Accessibility	Responsiveness	Efficiency and sustainability	
People can obtain health care at the right place and right time irrespective of income, physical location and cultural background	Service is client-oriented. Clients are treated with dignity and confidentiality, and encouraged to participate in choices related to their care	Achieving desired results with the most cost-effective use of resources. Capacity of the system to sustain workforce and infrastructure, to innovate and respond to emerging needs	

Source: Adapted from AIHW 2010a.

Figure 1.5: National Health Performance Framework (2nd edn)

Performance indicators

There is a wide range of published criteria to guide the selection of indicators (Box 1.4). In reality, the extent to which a suite of indicators alone can provide a complete picture of health performance will depend on several factors, including the appropriateness of the framework used to select the indicators, the appropriateness of the indicators chosen, and the quality and availability of the data. In some cases, indicators will be used as a flag for further investigation, rather than a measure of absolute performance.

Box 1.4: Selecting performance indicators

There are many guides to the development of good quality performance indicators that have been published, for example, the Intergovernmental Agreement on Federal Financial Arrangements and the Conceptual Framework for Performance Reporting prepared by Heads of Treasuries. These documents suggest that good performance indicators should be:

- meaningful and understandable
- comparable
- accurate
- avoid perverse incentives
- technically correct
- attributable
- timely
- administratively simple and cost effective
- hierarchical
- measurable
- well documented
- based on existing data sets.

In addition, these documents note that, where possible, indicators should also be:

- outcomes measures that focus on the end objective or goal, rather than inputs (also known as structures) and outputs (also known as processes) that focus on provision of services
- meaningfully and consistently reported across a number of levels (for example, state and territory, and facility) over time and for different population groups.

A good indicator set should be designed to reflect a balance of performance information for all appropriate aspects of the system being examined. This approach should provide maximum visibility of the impact (intended or unintended) of change in one area (for example, access) on other areas (for example, safety).

Reporting

There is no single, preferred method of reporting health performance. A broad approach is useful as it can demonstrate how well contributions outside the health system are being addressed through, for example, whole-of-government approaches. However, a more specific approach, for example, one that focuses on dimensions of health system performance only, is likely to be more relevant when the performance of particular services is of primary interest. Health performance can also be reported for different components of the health system, for example, reporting may be at the national, state and territory, health service network, facility, or health professional level. Measuring the performance of parts of a health system, such as primary or hospital care, or performance among particular population groups, is also common.



The perspective of performance reporting will depend on the overall objective of the task and the target audience. For example, as part of the national health reform, different frameworks and indicators have been developed to address different reporting needs.

Ideally, any method of health performance measurement is evaluated regularly to ensure that it continues to support its objective. For example, in February 2011, COAG established a formal review of the NHA performance reporting framework, including the agreed set of indicators. This work was still under way at the time of preparing this publication.

Cross-cutting aspects of health performance

There are three aspects—quality, patient experience and equity—that are integral to health performance measurement and prominent within Australia's health reform initiatives. Quality typically describes some of the dimensions of health system performance, while patient experience is applicable to all domains of health system performance. Equity is overarching, and has relevance to the entire NHPF. These three aspects are discussed below.

Quality

Quality is a broad concept about whether health care achieved the desired effect for the patient and whether it was delivered in line with standards or guidelines. Regarding the NHPF, quality usually relates to several dimensions of health system performance, in particular effectiveness, safety, responsiveness and continuity of care.

The measurement of quality is a key part of the overall performance measurement implemented through Australia's national health reform. Some indicators of safety and quality are already reported publicly at a national and state or territory level, and selected quality measures will also be reported at other levels in the future (Medicare Local, Local Hospital Network and Hospital) (COAG 2011).

Patient experience

The patient's experience with the health system is an important and meaningful measure of quality of care that is relevant across all domains of health system performance. Whether a patient's experience is considered good or bad will depend on the extent to which their expectations and goals are met. For example, did the patient feel they were treated with dignity and respect? Was their care well coordinated or was their time waiting for care and treatment acceptable?

Measures of patient experience are an important part of measuring the quality of care as they can often provide a different perspective of performance for policy makers and service providers. For example, a patient with asthma may feel that the general practitioner treated them with dignity and respect but their treatment was not in accordance with clinical guidelines; or a patient may feel that they waited longer than acceptable in an emergency department but were seen within the nationally appropriate time for their health issue. Therefore, it is possible that the assessment of performance of a health event will differ depending on the perspective of reporting.

Equity

Equity—defined by the WHO as the absence of avoidable differences between people—is a primary goal of health systems around the world (WHO 2011c). It is integral to the measurement of health performance as it cuts across all the domains of the NHPF and is relevant to all levels of reporting and analysis.

Like quality, the principle of equity is embedded within the NHRA. In this context, particular focus is given to Indigenous Australians, socioeconomically disadvantaged people, people living in rural and remote areas and those with disability, and performance indicators are reported for these population groups where data are available. The development of separate frameworks for particular population groups, such as the National Aboriginal and Torres Strait Islander Health Performance Framework, is also a common way of ensuring that equity is considered in broader Australian performance measurement.

What is missing from the picture?

Further work is required to improve the quality of indicators and data available to measure health performance effectively, particularly in the area of health system performance. Historically, the measurement of health system performance has been much more focused on describing system inputs and outputs, such as expenditure or the number of people treated, rather than outcomes of the people or community. While the focus is changing, good quality information on health system outcomes is particularly limited in the areas of primary health care services, mental health care, aged care and private hospitals. Challenges also exist in measuring system performance outcomes for sustainability and continuity of care, with commonly used indicators having an indirect relationship to these dimensions.

In addition, performance measurement needs to be supported by high quality data. While Australia has well-developed national data standards and a strong health information infrastructure, work to ensure that the data underlying performance measurement are reported sufficiently frequently and consistently needs to continue, particularly in response to changing policy priorities.

Where do I go for more information?

For examples of national health performance reporting in Australia, see *National Healthcare Agreement: performance report 2009–10* (COAG Reform Council 2011), *Report on Government Services 2012* (Steering Committee for the Review of Government Service Provision forthcoming). For an example of performance reporting for particular population groups, see *Aboriginal and Torres Strait Islander Health Performance Framework* (AIHW 2011h).

More information on international comparisons of health performance, including international work on health-care quality indicators, is in 'Section 1.7 International comparisons'.



Table 1.2: Summary of health performance indicators

Trend legend

✓ Favourable	✘ Unfavourable	~ No trend	.. Trend unclear/ no data
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Health status

Indicator	Trend				See Section
	✓	✘	~	..	
Incidence of heart attacks	○				6.2
Incidence of selected cancers					6.1
bowel cancer			○		
melanoma			○		
lung cancer				○	
female breast cancer			○		
cervical cancer	○				
Incidence of sexually transmitted infections and bloodborne viruses					6.11
syphilis			○		
HIV			○		
hepatitis B	○				
hepatitis C	○				
chlamydia		○			
gonococcal infection			○		
Incidence of end-stage kidney disease				○	6.10
Hospitalisation for injury and poisoning		○			7.9
Severe or profound core activity limitation	○				3.2
Self-assessed health status			○		3.1
Psychological distress			○		6.3
Infant/young child mortality rate					2.8
of infants (<1 year)	○				
of Indigenous infants (<1 year)	○				
of children aged 1–4 years	○				
Life expectancy					3.4
all males	○				
all females	○				
Indigenous males				○	
Indigenous females				○	

(continued)



Table 1.2 (continued): Summary of health performance indicators

Health determinants

Indicator	Trend				See Section
	✓	✗	~	..	
Children exposed to tobacco smoke in the home	○				5.8
Water quality				○	4.1
People with low income		○			2.5
Proportion of babies born with low birthweight			○		2.3
Health literacy				○	5.1
Educational attainment	○				2.5
Proportion of adults who are daily smokers	○				5.8
Proportion of adults at long-term risk of harm from alcohol				○	5.9
Fruit and vegetable intake					5.4
fruit			○		
vegetables				○	
Physical inactivity				○	5.5
Proportion of adults overweight or obese		○			5.6

(continued)



Table 1.2 (continued): Summary of health performance indicators

Health system performance

Indicator	Trend				See Section
	✓	✘	~	..	
Unsafe sharing of needles			○		5.10
Immunisation rates for vaccines in the national schedule					4.3 and 4.5
1 year			○		
2 years			○		
5 years adults	○			○	
Selected potentially preventable hospitalisations				○	7.2
Survival following heart attack	○				6.2
Survival of people diagnosed with cancer	○				6.1
Potentially avoidable deaths	○				2.8
Adverse events treated in hospitals			○		7.9
Falls resulting in patient harm in hospitals				○	7.9
Proportion of people with diabetes with a GP annual cycle of care				○	6.6
Proportion of people with asthma who have a written asthma plan				○	6.4
Proportion of people with mental illness who have GP care plan				○	6.3
Bulk-billing for non-referred (GP) attendances	○				7.2
Potentially avoidable GP-type presentations to emergency departments				○	7.2
Waiting times for elective surgery		○			7.9
Waiting times for emergency department care			○		7.10
Cancer screening rates					4.6
breast			○		
cervical			○		
bowel				○	
Proportion of pregnancies with an antenatal visit in the first trimester				○	5.2
Differential access to hospital procedures					7.9
cataract extraction				○	
cystoscopy				○	
inguinal herniorrhaphy				○	
Net growth in health workforce					9.4
medical practitioners	○				
nurses and midwives	○				
Cost per casemix-adjusted separation for acute care episodes				○	7.9

1.7 International comparisons

At a glance

- While it is useful to compare health on an international scale, comparisons of this kind are complex due to the diverse nature of health and health-care systems, data sources and definitions across countries.
- Among OECD countries, Australia compares well on indicators such as daily smoking, life expectancy and all-cause mortality.
- Australia compares less favourably on indicators such as infant mortality, chronic obstructive pulmonary disease (COPD) mortality, obesity, alcohol consumption, and diphtheria, tetanus and pertussis (DTP) vaccination. While Australia's comparative ranking may be low among OECD countries, there has been marked improvement on some of these indicators in Australia over the past two decades.



Introduction

Comparing health between countries is a common practice. Researchers, policy makers and the general public are often interested to see how national experiences of health and health care compare on an international scale. Many countries face similar health challenges and have similar health goals. International comparisons of health provide a global view of health and allow lessons to be shared across countries. For example, an awareness of other countries' successes and setbacks may inform the development and implementation of new policies, health interventions, or preventive measures.

The diverse nature of health and health-care systems across countries adds a level of complexity to international comparisons. Different definitions and data collection methods can produce variation that is not due to an underlying health pattern or trend. The selection of countries, data availability and the presentation of results can also influence the conclusions drawn from international comparisons. Consequently, the use and interpretation of these comparisons requires careful consideration. The AIHW report *A working guide to international comparisons of health* (AIHW 2012) provides a general guide for those conducting or interpreting comparisons of this kind.

It is important to note that there is no single indicator to summarise health or a health-care system. This section includes a range of measures to paint a broad picture of Australia's health compared with other countries. Other international comparisons are shown in sections of this report; follow the international comparison icon to find where these are presented.



How does Australia's health and health system compare?

The results provided here show how Australia compares with member countries of the OECD—an international organisation of 34 countries. Most OECD members are high-income economies and are regarded as developed countries. Due to these similarities, OECD countries provide a useful basis for comparison with Australia.

Figures 1.6 and 1.7 show broadly how Australia compares with the 34 current OECD countries, based on data from 1988 and 2007 (or the nearest years available). Data have been adjusted by the OECD for cross-country comparison purposes and are not necessarily comparable with data presented elsewhere in this report.

As well as rankings, the values for Australia are shown for each indicator. The value of an indicator may have improved even though Australia's comparative ranking has fallen, and vice versa. For each indicator:

- the direction and position of the arrow shows the change in ranking over the period
- the data next to the arrow head are the most recent value.

Figure 1.6 shows Australia's standing for life expectancy and mortality. In 2007, Australia's life expectancy at birth and at age 65 were among the highest in the world, both having increased substantially over the previous 20 years. Between the years being compared, Australia's ranking among OECD countries improved for mortality from all causes of death and a range of major causes, such as breast cancer and coronary heart disease. However, since 1988 our ranking has fallen for mortality due to chronic obstructive pulmonary disease and for infant mortality. Notably, our ranking based on the infant mortality rate declined from 15th to 23rd out of 34 countries, although the actual rate almost halved from 8.7 to 4.2 deaths per 1,000 live births.

Australia's ranking in relation to a range of other factors is shown in Figure 1.7. Our smoking rates have continued to fall, with the ranking improving from middle third to best third. However, our obesity rates (based on measured data) are among the highest in the world, with about 1 in 4 Australian adults classified as obese.

The ranking for low birthweight babies improved between 1988 and 2007, moving from the worst third into the middle third of OECD countries, although the proportion of Australian babies with low birthweight actually increased slightly over this time. Childhood immunisation rates have improved substantially, although our ranking on this measure is comparatively low due to the large number of countries with close to complete child immunisation. The incidence of acquired immune deficiency syndrome (AIDS) in Australia has decreased by 75% since 1988; in the international context Australia now ranks in the middle compared with the worst third in 1988.

Life expectancy

Males at birth		73.1 → 79.0
Females at birth		79.5 → 83.7
Males at 65		14.8 → 18.5
Females at 65		18.7 → 21.6

Mortality

All causes		725.3 → 459.3
Breast cancer	26.7	→ 18.5
Prostate cancer	24.3//29.5	
Lung cancer	38.0	→ 28.7
Colon cancer	25.6	→ 14.3
Coronary heart disease	192.4	→ 73.5
Cerebrovascular disease		74.1 → 35.2
Diabetes		12.3//12.5
COPD	3.9 ←	14.3
Accidental falls		5.7//3.8
Transport accidents	18.1	→ 7.1
Suicide		12.8 → 7.5
Infant mortality	4.2 ←	8.7
Maternal mortality		4.9 → 1.8
PYLL		5,000.6 → 2,822.9

Worst third

Middle third

Best third

Value in 1988 → Value in 2007

Change in ranking

// No improvement in rank.

COPD Chronic obstructive pulmonary disease (here includes bronchitis, asthma and emphysema).

PYLL Potential years of life lost.

Notes

1. Data for Australia reflect those in the OECD database and may differ to data presented elsewhere in this report.

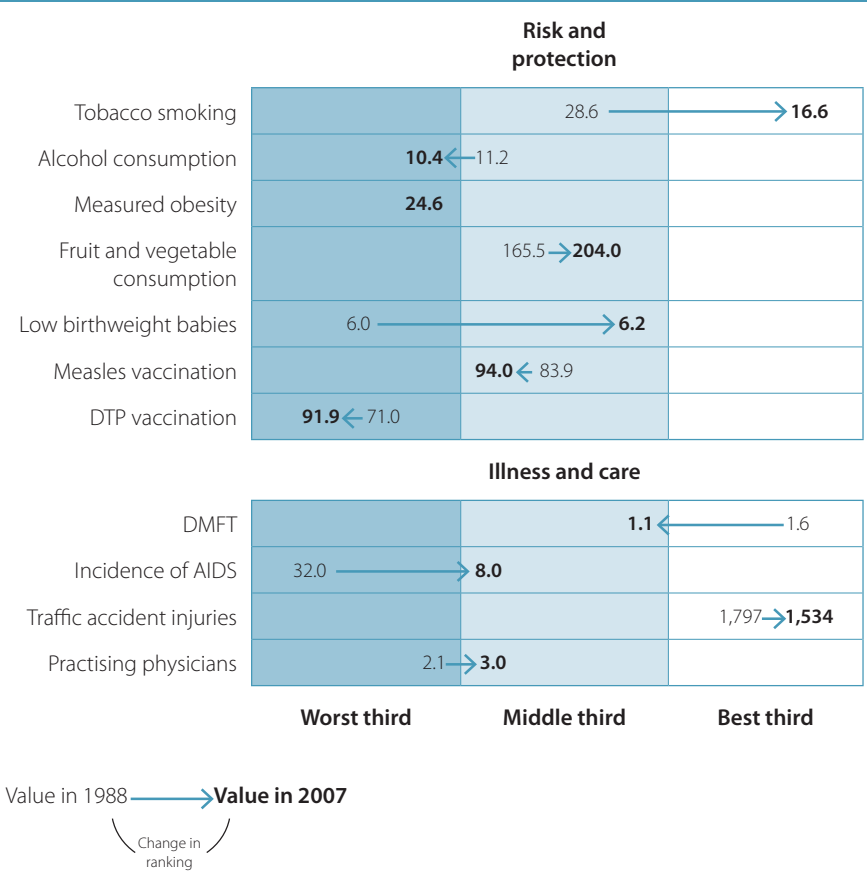
2. Life expectancy figures represent years of life remaining at the stated age.

3. Values for mortality data refer to number of deaths per 100,000 population, with the exception of values for infant mortality (deaths per 1,000 live births), maternal mortality (deaths per 100,000 live births) and PYLL (years lost per 100,000 population aged 0–69). All mortality data have been standardised to the 1980 OECD population.

Source: AIHW analysis of OECD.Stat 2011a.

Figure 1.6: Australia's ranking among OECD countries, selected mortality indicators, 1988 and 2007 (or nearest years)





DTP Diphtheria, tetanus and pertussis.
 DMFT Decayed, missing or filled teeth.
 AIDS Acquired immune deficiency syndrome.
 ESKD End-stage kidney disease.

Notes

1. Data for Australia reflect those in the OECD database and may differ to data presented elsewhere in this report.
2. Risk and protection data are, in order: proportion of people aged 15 and over who are daily smokers, annual litres of alcohol per capita, proportion of people aged 18 and over with a measured BMI of 30 or more, annual kilograms of fruit and vegetables per capita, number of babies weighing less than 2,500g per 100 live births, and proportion of children immunised at 24 months.
3. Data for DMFT are the average number of decayed, missing or filled teeth among children aged 12. The latest Australian data for DMFT are from 2004.
4. Data on incidence of AIDS and road traffic accident injuries are number per million population.
5. Practising physicians refer to physicians providing care directly to patients, and are presented here per 1,000 population.

Source: AIHW analysis of OECD.Stat 2011a.

Figure 1.7: Australia's ranking among OECD countries, selected risk and illness indicators, 1988 and 2007 (or nearest years)



What are the new developments in international comparisons?

Improving the safety and quality of health care provided to patients is an increasing focus of health system governance, both in Australia and internationally. In recognition of the importance of quality in health care, the OECD started a Health Care Quality Indicators (HCQI) project in 2002 to compare the quality of health care across member countries. The first HCQI-related publication, *Improving value in health care: measuring quality*, was released in 2010.

Australia has reported on a number of the HCQIs, in 2009 and 2011. These include:

- 30 day in-hospital mortality indicators (for example, deaths in hospital after acute myocardial infarctions and stroke)
- health promotion, prevention and primary care indicators (for example, asthma hospital admission rates, uncontrolled diabetes hospital admission rates)
- patient safety indicators (for example, obstetric traumas, post-operative pulmonary embolism or deep vein thrombosis and sepsis).

The data that Australia provides for the HCQIs are derived specifically for the purpose of international comparisons; therefore, they are not directly comparable to the same sort of indicators designed for use at the hospital level or for public reporting at the state or territory level within Australia. Further, all international comparisons of health and health-care data require careful consideration (as described in the introduction section) and, importantly, the information prepared for the purpose of international comparisons may not be meaningful outside that context.

The HCQI are regularly reviewed in accordance with expert advice provided by OECD member countries. Work is continuing to improve the validity of the indicators for international comparisons.

Where do I go for more information?

There are numerous reports published by national and international organisations that present international comparisons of health. The AIHW report *A working guide to international comparisons of health* (AIHW 2012) provides a general guide to reporting and understanding comparisons.

Health at a glance published biennially by the OECD compares OECD countries (including Australia) on key indicators of health and health system performance (OECD 2011b). Other OECD reports include *Health at a glance: Asia/Pacific 2010* (OECD 2010a) and *Health at a glance: Europe 2010* (OECD 2010b).

The *World health report* and *World health statistics report* published annually by the WHO provide a global assessment of health through statistics and information relating to 193 WHO member states (WHO 2011d; WHO 2011e).



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Australia is a diverse and dynamic nation. As individuals and a population we experience constant change, and these changes have important implications for health and wellbeing. Different life stages and roles bring about new challenges and health needs as we move from childhood to caring for others to old age.

This chapter provides an overview of the Australian population, and takes a look at milestones in our lives from conception and birth to death.

CHAPTER 2

LIVING AND DYING IN AUSTRALIA

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2.1 Australia's population

At a glance

- There were 22.3 million people living in Australia at June 2010, although this number is always changing due to births, deaths and migration.
- In the next two decades, the number of people aged 65 and over is projected to rise by 91%, and the number aged 85 and over to more than double.
- In June 2006, about 1 in 40 Australians identified as being of Aboriginal or Torres Strait Islander origin. One-quarter of the Indigenous population lived in *Remote* or *Very remote* areas, while the remainder lived in *Major cities* or regional areas.



Introduction

The size and composition of Australia's population is shaped by trends in births, deaths and migration. Through these drivers, the population is undergoing constant change, and this change has important implications for health and wellbeing. The health of people living in Australia can also influence the size, structure and composition of the overall population.

Demographic characteristics can influence health and health care, for example:

- the number of older people in the population strongly influences morbidity and mortality for many chronic conditions, and demand for health and aged care services (such as hearing services and residential aged care)
- the composition of the population (for example, in terms of language diversity) and its geographic spread, influences the provision of specialised health services and modes of delivery
- the workforce for health and other industries is generally drawn from the population aged 15–64.

Conversely, health can influence the size and composition of the population, for example:

- the prevalence of chronic and acute conditions shapes mortality rates and longevity
- reproductive health issues can affect fertility
- the health of potential migrants can influence their selection to come to Australia.

For these reasons and more, population statistics are important to health in Australia. This section provides an overview of the population (past, present and future) to set the scene for *Australia's health 2012*. More information about fertility and mortality rates is in 'Section 2.2 Fertility' and 'Section 2.8 Mortality'.

What do we know about Australia's population?

At June 2010, there were 22.3 million people living in Australia (ABS 2011a). Based on current growth, the population increases by 40 people every hour, resulting from births, deaths and migration (ABS 2011b).

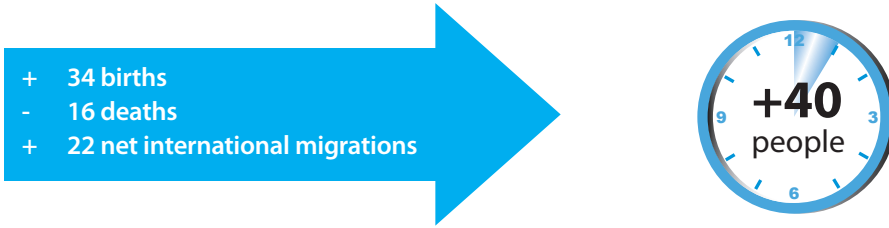
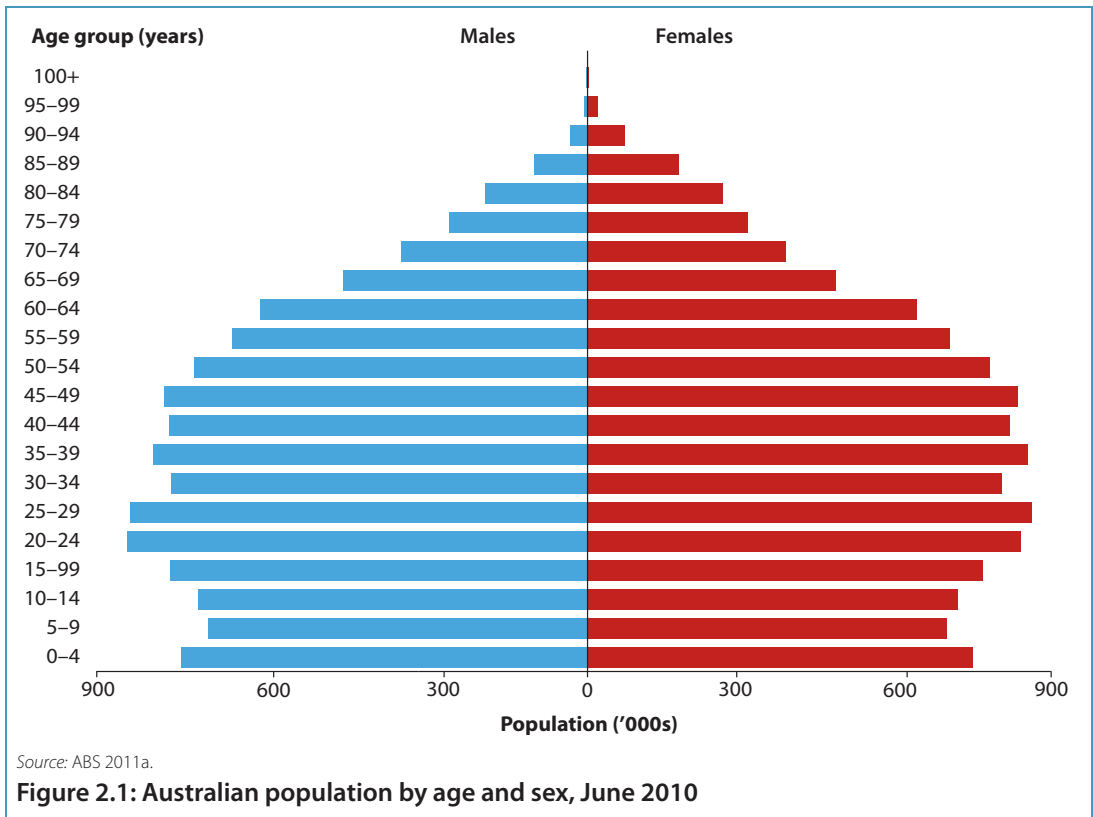


Figure 2.1 shows the size and structure of the Australian population at June 2010. In this population:

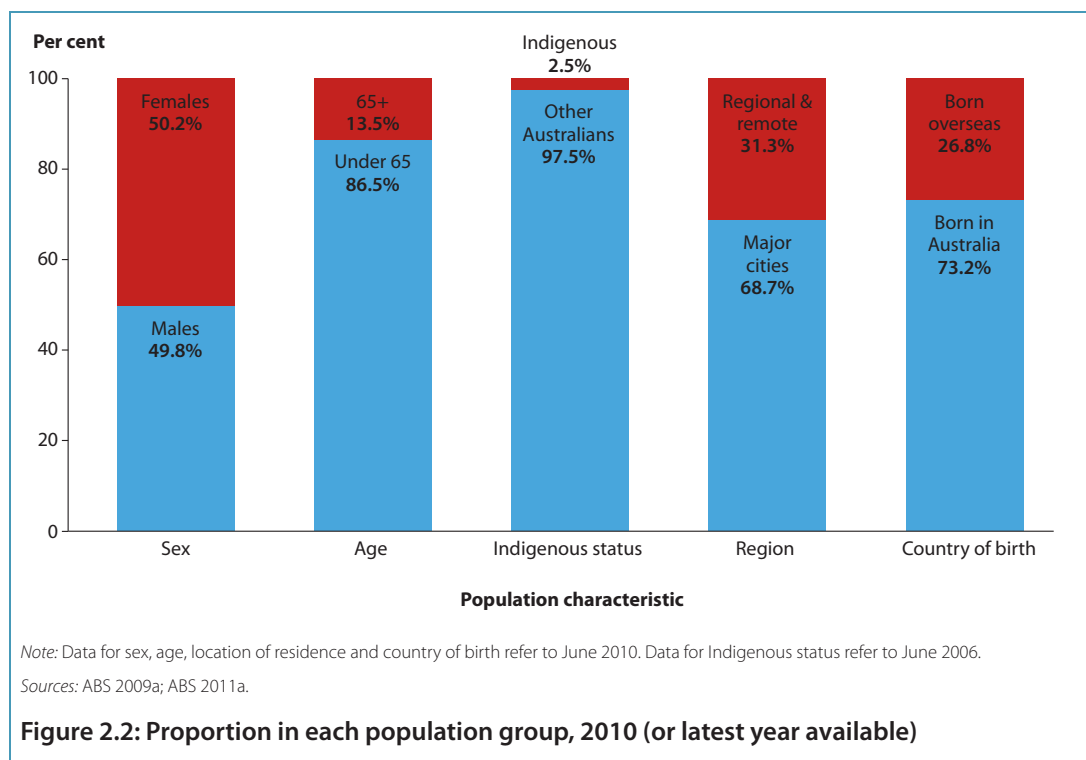
- 1% were infants (aged under 1 year)
- 18% were children (aged 1–14)
- 15% were adolescents and young adults (15–24)
- 53% were adults (25–64)
- 13% were older adults (65 and over) including 0.02%, or an estimated 3,700 people, who were centenarians (aged 100 or over).

Overall, there were fewer males than females in the population—11.1 million males compared with 11.2 million females—although there were more males than females at ages up to 35 (ABS 2011a).



Australian population groups at a glance

In addition to age and sex, there are other demographic characteristics available to describe the distribution of the population, for example, Indigenous status, country of birth, or where the person lives in Australia (Figure 2.2). These characteristics may have important implications for the delivery of health services, for example, what services are provided, for whom, and their mode of delivery.



Data in *Australia's health 2012* may be presented for these population groups, particularly when there are disparities in a health measure. Look for the 'Inequalities in health' icon in the 'At a glance' box of each section to find where these differences are presented. The next subsection examines three population groups that are commonly reported on in *Australia's health*.

Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander people, as a whole, experience disproportionate levels of disadvantage and poorer health compared with other Australians.

In June 2006, about 1 in 40 Australians (2.5% or 517,000 people) identified as being of Aboriginal or Torres Strait Islander origin (ABS 2009a). The age profile of the Indigenous population is considerably younger than the total Australian population. In 2006, 57% of all Indigenous people were aged under 25, and only 3% were aged 65 or over. This is due to both higher fertility rates and earlier mortality among Indigenous people.

In 2006, one-quarter of Indigenous Australians lived in remote areas of Australia (9% in *Remote* and 15% in *Very remote* areas). The remaining three-quarters lived in *Major cities* (32%), *Inner regional areas* (22%) and *Outer regional areas* (22%) (ABS 2009a).

People living in regional and remote areas

Regional and remote areas vary greatly in character, from sparsely populated outback and tropical rainforest areas to coastal communities, regional centres and mining towns. However, people in regional and remote areas share the common characteristic that they often live far away from cities (Box 2.1). In some (but not all) circumstances, they can face barriers to accessing health services, higher costs of and difficulties sourcing fresh food, harsher environmental conditions and relative social isolation (AIHW 2008).

Box 2.1: Defining regional and remote areas

This report largely relies on the ABS Australian Standard Geographical Classification Remoteness Area classification, or ASGC RA (ABS 2006a). The classification allocates one of five remoteness categories to areas depending on their distance from urban centres, where the population size of the urban centre is considered to govern the range and types of services available.

Areas are classified as *Major cities*, *Inner regional*, *Outer regional*, *Remote* or *Very remote*. The category *Major cities* includes Australia's capital cities, with the exceptions of Hobart and Darwin, which are classified as *Inner regional*. Note that areas placed in the same broad categories may differ dramatically in their location, economic activities, climate and demography.

On average, people who live in regional and remote areas have shorter lives and higher levels of some illnesses than people who live in *Major cities* (AIHW 2008). They are also more likely to engage in behaviours that are associated with poorer health, such as tobacco smoking and physical inactivity.

At June 2010, 69% of the population lived in *Major cities* and just 2% in *Remote* or *Very remote* Australia. The remaining 29% lived in *Inner regional* and *Outer regional* areas (ABS 2011c).

People born overseas

As a group, people born overseas have health characteristics that are different from the rest of the population. The mortality and morbidity patterns of migrants can be influenced by both their country of origin and where they currently live, and by the process of migration itself.

Research has found that most migrants enjoy health that is as good, if not better, than that of the Australian-born population. Known as the 'healthy migrant effect', this is reflected in longer life expectancy, lower death and hospitalisation rates, and a lower prevalence of some lifestyle-related risk factors (AIHW: Singh and de Loopier 2002). To some extent, this is because health requirements and eligibility criteria ensure that generally only those in good health migrate to Australia. However, this effect diminishes over time as a migrant's stay in Australia increases (Anikeeva 2010). Migrants may also face challenges, such as language barriers and cultural practices, that make it difficult to access health services and participate in society more generally.

Australia's net overseas migration was 215,600 people over the 12 months to June 2010, accounting for 57% of the country's net population growth (ABS 2011a). In 2010, 27% of the Australian population was born overseas—9% in mainly English-speaking countries (the United Kingdom, Ireland, New Zealand, Canada, the United States and South Africa) and 18% in other countries (referred to as non-mainly English-speaking countries) (AIHW analysis of ABS 2011d).



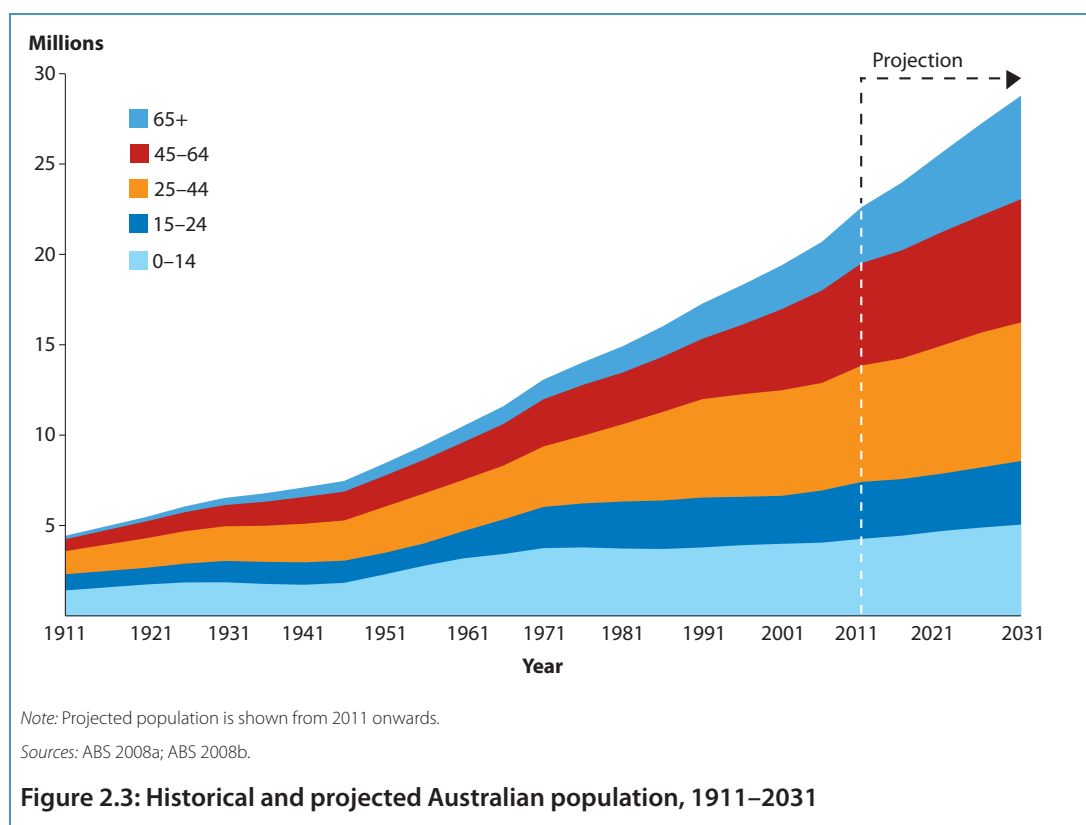
How has the past shaped the current population?

The structure of the current population is the combined result of historical, social and economic factors. These include a shift from infectious to chronic diseases as a leading cause of morbidity and mortality, the birth of the baby boomer generation (from the end of World War II to the early 1960s), mass migration after World War II, and changing social attitudes regarding family and work.

Since Federation in 1901, the population has increased almost sixfold, or by 18.5 million people (ABS 2008a; ABS 2011a). As well as increasing in size, the population has aged—a trend driven by sustained periods of low fertility and increasing life expectancy in recent times.

As a consequence of these changes, older Australians account for an increasing share of the population (Figure 2.3). In 1901, people aged 65 or over comprised 4% of the population, compared with 13% in 2010. In the past century there was a corresponding decline in the share of the population aged under 25, from 54% in 1901 to 33% in 2010.

Australia's long history of immigration has also shaped the size, composition and culture of the population. The White Australia policy excluded all non-European people from immigrating to Australia until it was officially abolished in March 1966 (DIC 2009). Since then, Australia has opened up more widely to migrants from across Asia, the Middle East and Africa. Migrants now come from more than 200 different countries, although people born in the United Kingdom continue to be the largest group of residents born overseas (ABS 2011d).



What could the future hold?

The ABS regularly produces series of population projections based on a number of assumptions about migration, fertility and mortality. These projections provide an insight into what the population might look like in the future.

Based on medium-level growth assumptions, the ABS has projected that the population will grow to 28.8 million people over the next two decades—an increase of 29% compared with 2010 levels (ABS 2008b). The number of people aged 65 and over is projected to rise by 91%, and those aged 85 and over to more than double (Figure 2.3). While the median age was 22.5 in 1901 and 36.9 in 2010, it is expected to increase to 40.3 by 2031 (ABS 2008a; ABS 2008b). For more information on the ageing of the population, see 'Section 2.7 Adding years to life and life to years'.

Overall, growth is not likely to be the same across all regions in Australia. Based on medium-level growth assumptions, capital cities are projected to experience a higher rate of growth than other areas (ABS 2008b). This will result in a higher concentration of the population within Australia's capital cities, placing pressure on existing services and housing, and particularly service provision for older people.

Where do I go for more information?

The ABS collects information on Australia's population through its 5-yearly Census, other surveys and administrative data sets. Key publications related to the past, present and future of the population include:

- Past: *Australian historical population statistics* (ABS 2008a)
- Present: *Australian demographic statistics* (ABS 2011a)
- Future: *Population projections, Australia* (ABS 2008b).

The AIHW report *Australia's welfare 2011* has a detailed analysis of Australia's population in the context of welfare statistics (AIHW 2011a).



2.2 Fertility

At a glance

- Since the late 1970s until very recently, Australia's total fertility rate has been declining and the most recent rate (1.89 babies per woman) is well below replacement level.
- Fertility rates differ among women of different backgrounds. Indigenous women, women from areas of low socioeconomic status, and women with lower educational qualifications, have higher fertility rates than the general female population.
- Australian clinics performed more than 65,000 assisted reproductive technology (ART) treatment cycles in 2009, an increase of 15% since 2008 and almost 50% since 2005. This represents about 3% of all women who gave birth in Australia in 2009.



Introduction

Fertility has important social and economic consequences because of its impact on population growth and family size, and its potential to affect workforce participation. As people live longer and have fewer children, family structures are transformed, which has implications for providing care for the elderly.

The total fertility rate (TFR) is a summary measure used to describe the number of children a woman could expect to bear during her lifetime if she experienced current age-specific fertility rates throughout her child-bearing life. Since the late 1970s until very recently, Australia's TFR has been declining, and the current rate of 1.89 is well below the replacement level of 2.1 babies per woman (the rate needed to maintain the population size by 'replacing' the number of deaths) (ABS 2011e). Below-replacement level fertility rates are a concern in many developed countries because of consequences associated with a shrinking workforce and a rapidly ageing population (Morgan & Taylor 2006).

Such concerns have generated public debate in Australia about both the causes of fertility decline and appropriate policy responses to reverse the trend (Australian Treasury 2002; Gray et al. 2008). For example, this debate was a contributing factor in the introduction of the Maternity Payment in 2004 (now known as the Baby Bonus), where mothers received an amount starting at \$3,000 per new child as of 1 July of that year, which increased to \$4,000 in 2006, and \$5,000 in 2008 (Drago et al. 2009).

Fertility is important not only for society but for families because it fulfils the aspiration of many people to have and raise their own children. Infertility can have a profound psychological and social impact on those who wish to conceive, as well as financial consequences related to accessing fertility treatment.

Infertility is defined as the biological inability to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (Zegers-Hochschild et al. 2009). One in 6 Australian couples are infertile (Fertility Society of Australia 2008). The likelihood of being infertile varies depending on a range of factors, such as the age of the partners trying to conceive; whether any of the partners have

a history of cancer treatment, or sexually transmissible and other pelvic infections; obesity, low body weight and smoking (in females); excessive alcohol consumption (in males); and use of prescription and recreational drugs (ARTRC 2006). Infertility in women can also be caused by endometriosis (a condition characterised by the growth of endometrial tissues outside the uterus), ovulation problems and blockage of the fallopian tubes.

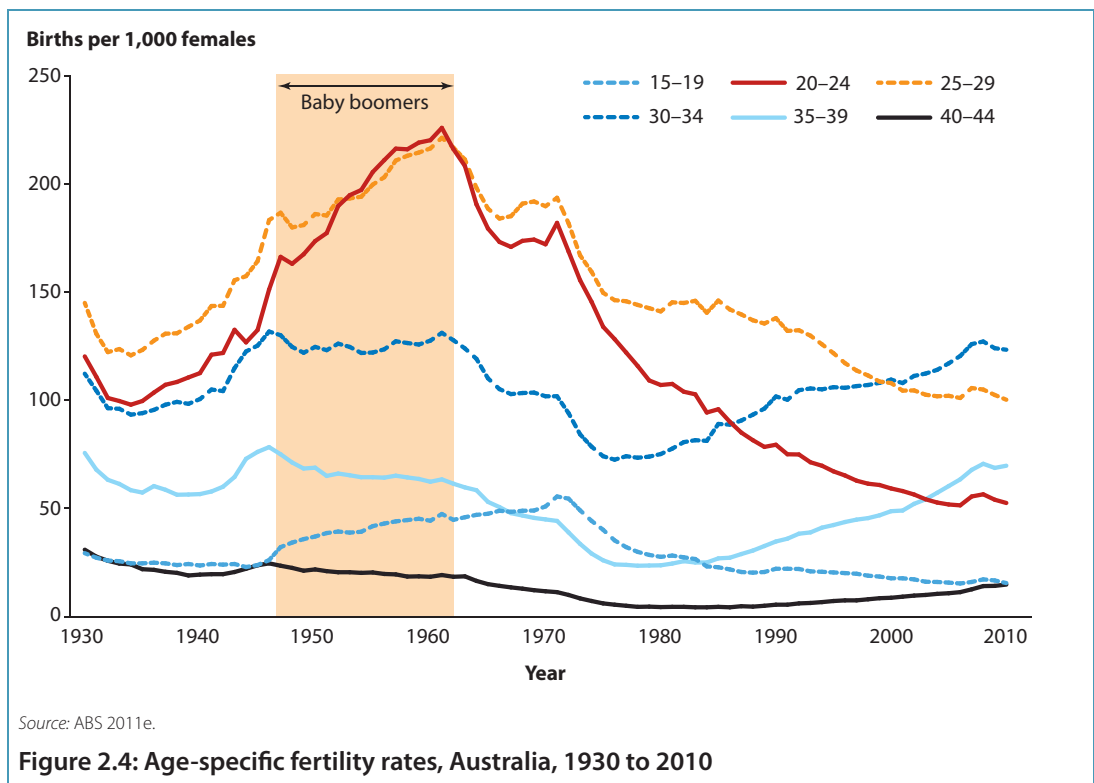
Infertility is increasingly being overcome through a range of medical interventions known as ART. ART has resulted in the birth of more than 4.3 million children worldwide (ESHRE 2010). The most recent estimates are that 3% of all women who gave birth in Australia in 2009 conceived by ART treatment (Li et al. 2011).

What do we know about fertility in Australia?

Fertility rates

Historically, Australia experienced a decline in fertility in the 1920s and 1930s, before rebounding to more than three births per woman in the 1950s and early 1960s (the 'baby boom'). The TFR then showed a marked decline, reaching a low of 1.73 babies per woman in 2001 before increasing to a 30-year high of 1.96 babies per woman in 2008. The TFR has since declined to 1.89 babies per woman in 2010 (ABS 2011e).

Over the past 80 years fertility has also fluctuated across age groups, with the 20–24 and 25–29 age groups experiencing the highest fertility rates for most of this period (Figure 2.4). But from the mid-1970s fertility has risen in the 30–34 and 35–39 age groups, such that since the year 2000 the highest fertility rate has been among women aged 30–34.



The slight decrease in Australia's TFR between 2008 and 2010 was the result of the decline in the age-specific fertility rates for all age groups under 35 (ABS 2011e). Fertility rates for women aged 35–39 and 40–45 increased, while fertility rates for women aged 45–49 remained stable.

The decline in fertility rates observed over the past few decades is also a reflection of the rising age at which women are giving birth to their first child. The average age of first-time mothers was 27.9 in 2009, an increase of 2.1 years from 25.8 in 1991 (Day et al. 1998; Li et al. 2011). For more information on maternal age, see 'Section 2.3 Mothers and babies'.

Women of different backgrounds

Fertility rates differ among women of different backgrounds. In particular, Aboriginal and Torres Strait Islander women, women from areas of low socioeconomic status, and women with lower educational qualifications, have higher fertility rates than the general population.

In 2010, the TFR for Indigenous women was 2.57 babies per woman, compared with 1.89 for all women. This has increased from 2.16 babies per Indigenous woman in 2000.

The high overall fertility rate among Indigenous women can be partly attributed to the relatively high fertility rates at younger ages. In 2010, births to women aged 15–19 accounted for 20% of births to Indigenous women, compared with 4% of births for all women. The teenage fertility rate for Indigenous women is almost five times that for all women (76 babies per 1,000 Indigenous women compared with 16 babies per 1,000 women aged 15–19 in 2010) (ABS 2011e).

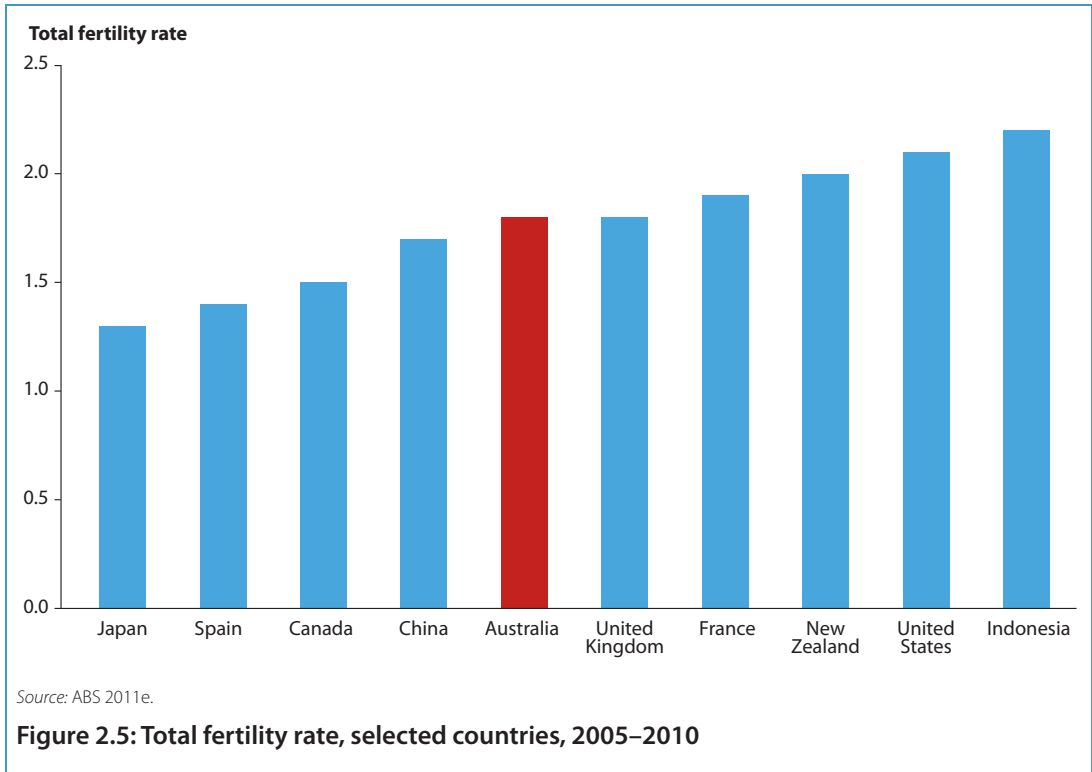
In 2009, women living in areas of greatest socioeconomic disadvantage had a TFR of 2.3 babies per woman. This compared with 1.5 babies per woman living in areas of least socioeconomic disadvantage (ABS 2010a).

At the time of the 2006 Census, of women considered to be completing their fertility (women aged 40–44), those with no educational qualifications had 2.5 children on average, those with a bachelor degree had 2.0 children, and those with a higher degree had 1.7 children (DPMC 2008).

International comparisons

According to medium-level projections for 2005–2010 by the United Nations, Australia's TFR for this period (1.9) was lower than those of the United States (2.1) and New Zealand (2.1) (ABS 2011e) (Figure 2.5). Many developing countries had TFRs of 6.0 or more babies per woman, and the world average is 2.5.





Assisted reproductive technology

The Australian and New Zealand Assisted Reproduction Database (ANZARD) collects information on ART treatments and procedures, and resulting pregnancy and birth outcomes. ART is a group of procedures that involves the *in vitro* ('in glass', that is, outside the body) handling of human eggs and sperm or embryos for the purposes of establishing a pregnancy (Zegers-Hochschild et al. 2009).

There were 65,200 ART treatment cycles undertaken in Australian clinics in 2009, an increase of 15% on 2008 and of almost 50% since 2005 (Wang et al. 2011). This represents about 3% of all women who gave birth in Australia in 2009; a rate of 14.2 cycles per 1,000 women of reproductive age (15–44).

Of the ART treatment cycles undertaken in Australia in 2009, almost 23% resulted in a clinical pregnancy and 17% resulted in a live delivery.

Assisted pregnancies are much more common among women in their thirties than in any other age group. The average age of women undergoing ART treatment using their own eggs in 2009 was 35.8, with almost 1 in 4 aged 40 or over. Women undergoing ART using donor eggs were generally older—their average age was 40.8, with 63% over 40.



The success rate decreases with advancing woman's age. For women aged 45 and over using their own eggs, one live delivery resulted from every 800 initiated cycles in 2009, compared with one live delivery from every four initiated cycles in women aged 25–34.

One of the international challenges with ART has been the high rate of multiple pregnancies, which is primarily the result of the transfer of multiple embryos. Multiple pregnancy is associated with poorer perinatal outcomes (Ombelet et al. 2005), increased risk to mothers (Campbell & Templeton 2004) and greater economic and social burden on the parents and the health-care system (Chambers et al. 2007).

However, in Australia the rate of multiple birth deliveries has declined. The multiple delivery rate for ART treatment cycles undertaken in 2009 was 8.3%, compared with 8.5% in 2008 and 14.4% in 2005. This reduction is due to a shift in practice by clinicians and patients to single embryo transfer, with the proportion of single embryo transfer cycles increasing from 48% in 2005 to 70% in 2009. Importantly, this substantial decrease in the rate of multiple deliveries has been achieved while the rate of pregnancy has remained stable, at about 22% of initiated cycles.

What is missing from the picture?

Fertility rates for Indigenous mothers should be interpreted with caution due to incomplete identification of Indigenous births in ABS birth registration data. This may underestimate the level of Indigenous fertility in Australia.

The ANZARD only includes women or couples who have undergone ART treatment. There are no national statistics on women or couples who have sought other infertility treatment, such as gonadotropin ovulation induction, stimulated intrauterine insemination, or the use of clomiphenes citrate.

Where do I go for more information?

More information about fertility and ART is in the following annual publications:

- *ABS Births, Australia* (ABS 2011e)
- *AIHW Australia's mothers and babies* (Li et al. 2011)
- *AIHW Assisted reproduction technology in Australia and New Zealand* (Wang et al. 2011).

2.3 Mothers and babies

At a glance

- The age at which women are giving birth continues to rise: in 2009 the average age of all women who gave birth was 30.0 years, compared with 29.0 in 2000. This mainly reflects an increasing proportion of older mothers (aged 35 and over) giving birth.
- In 2009, 32% of women had a caesarean birth. The proportion of women having a caesarean birth is continuing to increase, although more slowly in recent years.
- Low birthweight is a key determinant of a baby's subsequent survival and health. In 2009, the proportion of babies born with low birthweight was twice as high for women who reported smoking in pregnancy as for women who did not.



Introduction

More than a quarter of a million babies are born in Australia each year. The health of newborn babies continues to be closely monitored because it is a sensitive, but not a specific, measure of both maternal health and wellbeing during pregnancy and the quality of maternity care. Further, the health of a baby at birth is a key determinant of subsequent health and wellbeing. A key national objective is to ensure that 'Australians are born healthy and remain healthy' (COAG 2011).

Australia is one of the safest countries in which to give birth for mothers and babies, with maternity services available to all pregnant women. More than 2.5% of the total health spending in Australia in 2004–05 was for maternity or neonatal services (AIHW 2010a).

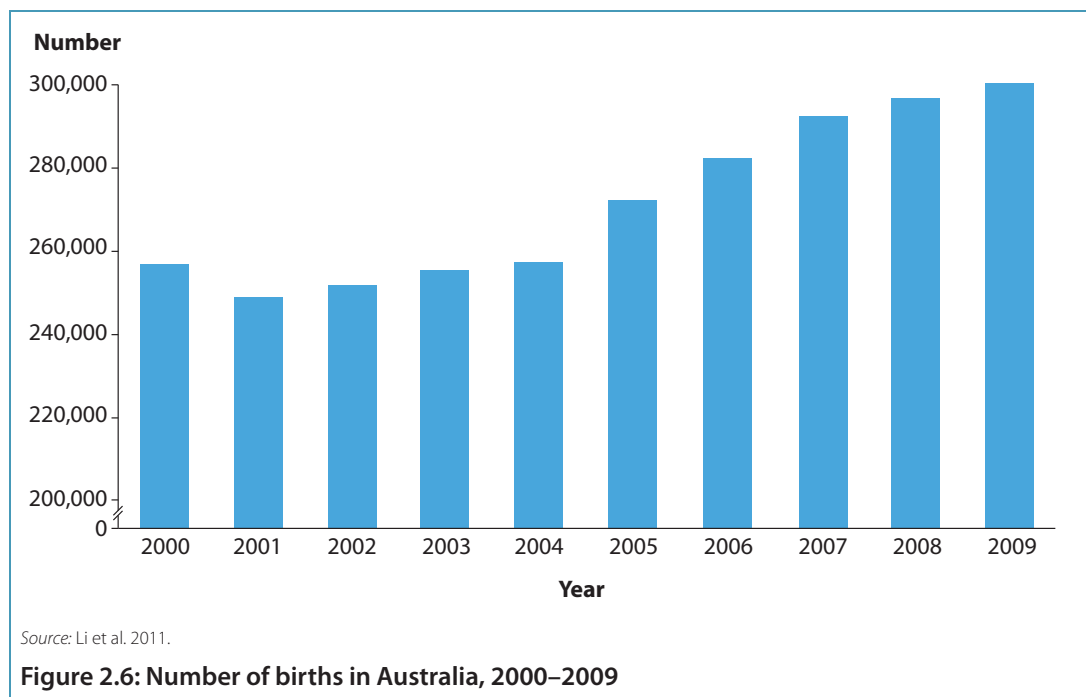
What do we know about mothers and babies?

Number of births

In 2009, there were 299,220 babies born to 294,540 women, setting a record for the number of births in Australia in a year (Li et al. 2011). Since 2005, there has been a 'baby boom' with an increase in the number of births each year, although this has been slowing since 2007 (Figure 2.6).

Over the same period, the birth rate—the number of women aged 15–44 in the population giving birth per 1,000 women—increased from 58.5 per 1,000 in 2004 to a peak of 64.9 per 1,000 in 2007, followed by a decline to 63.6 per 1,000 in 2009 (Li et al. 2011). For information on fertility rates, see 'Section 2.2 Fertility'.





Place of birth

Nearly all births in Australia take place in a hospital. In 2009, more than two-thirds of all births (70%) were in public hospitals and 29% in private hospitals (Li et al. 2011). Just 0.3% were home births. This pattern has not changed over the past decade.

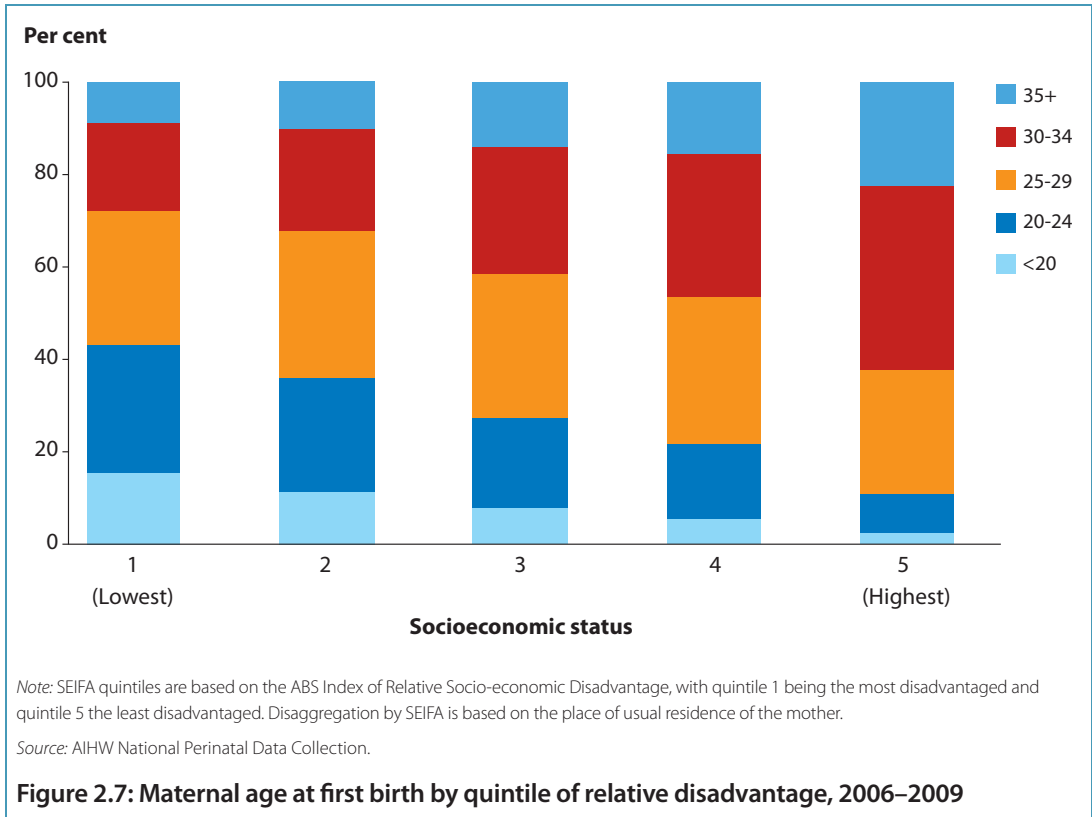
Maternal age

There has been an upward trend in maternal age in recent years: in 2009, the average age of all women who gave birth was 30.0 years, compared with 29.0 in 2000 (Li et al. 2011). This mainly reflects an increasing proportion of older mothers (aged 35 and over) giving birth, from 17% in 2000 to 23% in 2009. Further, the proportion of teenage mothers (aged under 20) has declined slightly from 5% in 2000 to 4% in 2009.

Couples are also delaying starting a family. The average age of first-time mothers increased from 27.0 in 2000 to 27.9 in 2009 (Li et al. 2011). The age at which women have their first birth is not equally distributed across the population. Women living in areas with the least socioeconomic disadvantage are least likely to have their first birth as teenagers and most likely to have a first birth over the age of 35, while the opposite applies to women living in the most disadvantaged areas (Figure 2.7).

Aboriginal and Torres Strait Islander mothers

Over the past decade, 4% of women giving birth in Australia identified as being of Aboriginal or Torres Strait Islander origin. Indigenous mothers tend to be younger than non-Indigenous mothers; the average ages among those giving birth in 2009 was 25.2 and 30.2 respectively (Li et al. 2011). One in 5 (20%) Indigenous mothers were teenagers, compared with 3% of non-Indigenous mothers.



Labour and birth

In 2009, just over half (56%) of women started labour spontaneously, 26% had labour induced, and 18% had a caesarean with no labour. In total, 31% of women gave birth by caesarean. A further 11% gave birth assisted by instruments (forceps or vacuum devices) and 58% had no instrumental or surgical intervention for birth.

Method of birth is not uniform across age groups. Caesarean birth increased with age, from 18% among teenage mothers to 47% among mothers aged 40 or older. In contrast, instrumental assisted birth is slightly more common in younger mothers.

The proportion of women having a caesarean birth has increased over the past decade from 23% in 1998 to 32% in 2009, although the rate of increase has slowed since 2006.

Among women who had a vaginal birth in 2009, 30% had no injury to the perineum (area around the birth canal) and a further 22% had minor perineal injuries that did not require surgical repair. A cut to the perineum (episiotomy) was performed for 15% of women. Fewer than 2% had serious perineal injury involving muscles or skin of the anus. Rates of episiotomy and perineal injury have remained much the same over the past decade.

Mothers are spending less time in hospital after birth. Between 2000 and 2009, the proportion of mothers discharged home by the third day after giving birth increased from 49% to 59% for all births, and from 17% to 31% for women who had a caesarean birth (Table 2.1).



Table 2.1: Proportion of mothers discharged home by the third day after giving birth, by method of birth, 2000–2009

Method of birth	2000	2003	2006	2009
No intervention	62.6	65.3	70.5	75.2
Instrumental assistance	37.9	38.9	46.1	53.5
Caesarean	17.3	19.3	23.7	31.3
All methods	48.8	48.8	52.2	58.6

Source: AIHW National Perinatal Data Collection.

Birthweight

A key indicator of population-wide infant health is the proportion of babies with low birthweight (less than 2,500 grams). Weight of the baby at birth reflects maternal pregnancy health and lifestyle choices, such as smoking, and is a predictor for subsequent health outcomes, including the period of hospitalisation after birth, the development of significant disabilities, and dying.

In 2009, there were 20,195 babies of low birthweight (6% of all babies born in Australia). Low birthweight occurred in 76% of stillborn babies and 51% of live-born babies from a multiple birth. Comparing and interpreting proportions of low birthweight is easier if low birthweight resulting from fetal death and multiple births is removed from the analysis.

Low birthweight among live-born singletons in 2009 varied with maternal age, ranging from a low of 6% in mothers aged 30–34 to 9% in teenage mothers, and 14% in mothers aged 45 or older. Low birthweight among live-born singleton babies of mothers who reported smoking during pregnancy in 2009 was 10%, twice the rate of mothers who did not smoke (5%). More information on low birthweight by socioeconomic status is in the indicator ‘Proportion of babies with low birthweight’ opposite.

Australia has stable and relatively low proportions of low birthweight babies compared with other developed countries (Figure 2.8).

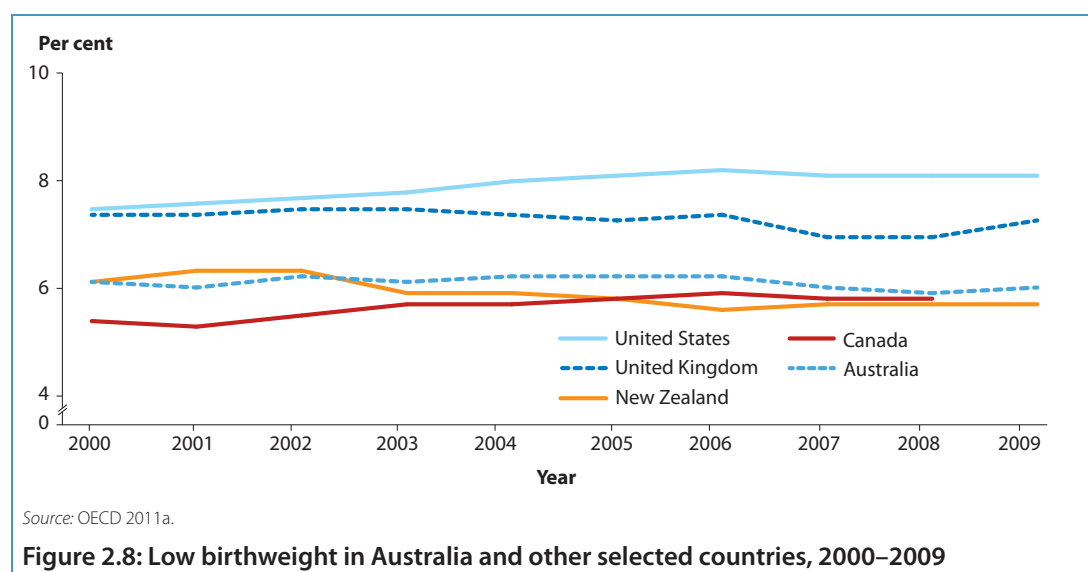
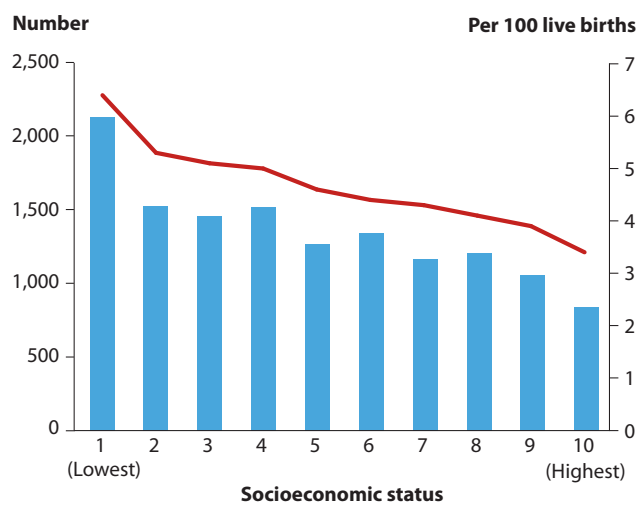


Figure 2.8: Low birthweight in Australia and other selected countries, 2000–2009

Proportion of babies born with low birthweight. Proportion of live-born singleton babies with a birthweight of less than 2,500 grams. Presented as rate per 100 live births.

- In 2009, 4.7% of live singleton babies (13,300) were of low birthweight.
- The rate has not changed markedly over the past 10 years.
- The number and proportion of low birthweight babies decline progressively with decreasing level of socioeconomic disadvantage.



Note: The number of low birthweight births in each SEIFA decile are represented as bars and the proportions of live-born singleton babies of low birthweight as a line.

Neural tube defects

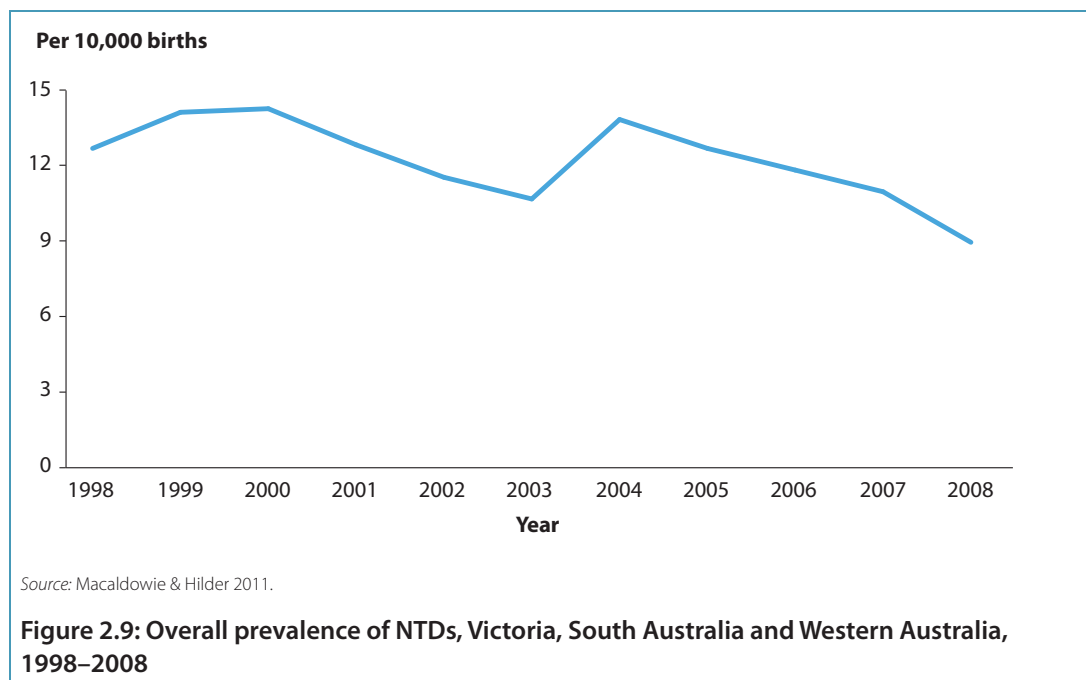
Neural tube defects (NTDs) are a group of major congenital anomalies that result from early disruption in the development of the brain and spinal cord. These conditions often lead to death of the fetus or newborn, and babies that survive frequently require intensive, lifelong health and social care.

There is strong evidence of substantial reductions in the prevalence of NTD-affected pregnancies among women given folic acid—a form of the B group vitamin folate—before and just after conception (Macaldowie & Hilder 2011).

Voluntary fortification of foods with folic acid has been permitted in Australia since 1995. From September 2009, food regulations were introduced requiring mandatory folic acid fortification of all wheat flour for bread making, with the exception of organic bread. See also ‘Section 5.2 Antenatal health’.

Based on data from the three Australian states that fully monitor NTDs, there has been a small decline in the overall prevalence of NTDs per 10,000 births between 1998 and 2008 (Figure 2.9). Data are not yet available on the effects of mandatory fortification on the NTD rate, although the experience of other countries suggests that further decline after mandatory fortification is possible (Macaldowie & Hilder 2011).





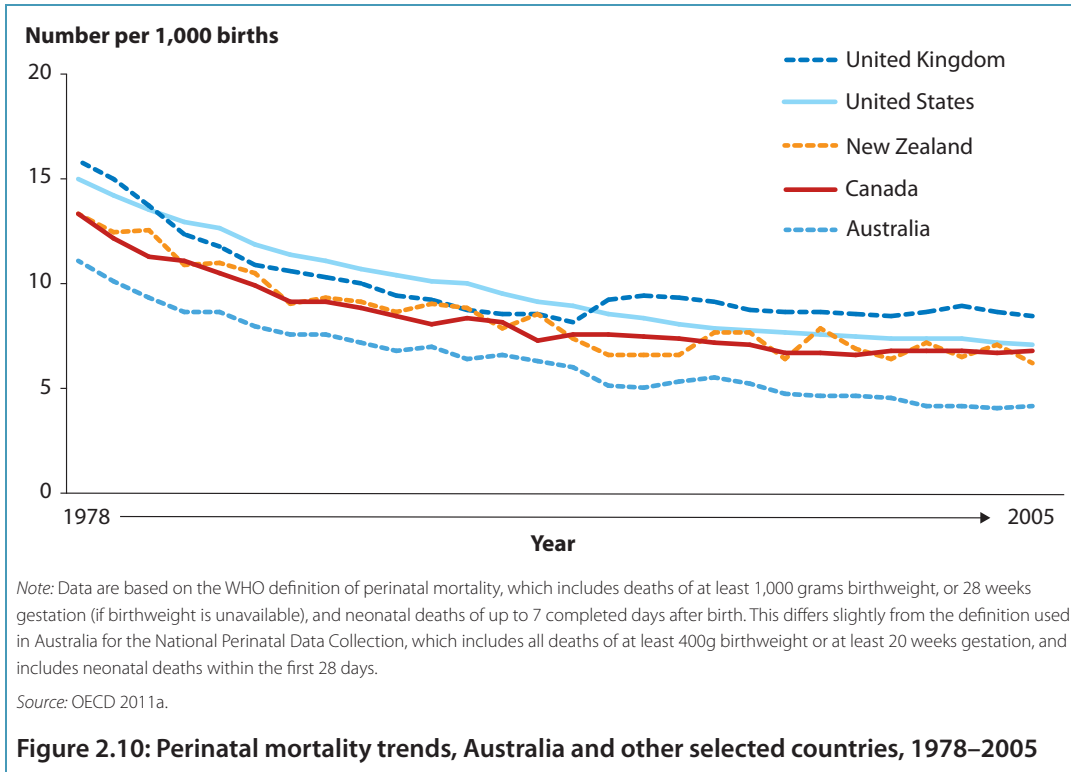
Perinatal mortality

Perinatal deaths are babies who die before birth (stillbirth or fetal death) or within the first 28 days of life (neonatal deaths). Data on perinatal deaths are available from the ABS perinatal deaths collection and the AIHW National Perinatal Data Collection. The ABS perinatal deaths collection includes all perinatal deaths that occurred and were registered in Australia. The National Perinatal Data Collection includes information on perinatal deaths that are sourced from midwives, and other staff, who collect information from mothers and perinatal administrative and clinical record systems.

In 2009, the perinatal mortality rate was estimated to be 9.2 perinatal deaths for every 1,000 births notified to perinatal collections in 2009 (Li et al. 2011) and 9.0 from information about births and deaths registered in 2009 (ABS 2011f).

Perinatal death rates per 1,000 total births ranged from 8.6 for babies of mothers aged 25–29 to 14.2 for babies of mothers aged 40 or older. The perinatal death rate for babies of teenage mothers was 12.8 per 1,000 births (Li et al. 2011). Babies born to Aboriginal or Torres Strait Islander mothers had a perinatal mortality rate twice that of babies born to non-Indigenous mothers (Li et al. 2011).

Over the past 30 years, perinatal mortality rates have reduced to almost a quarter of those observed in the 1970s. Rates are now lower in Australia than other comparable developed countries (Figure 2.10).



What is missing from the picture?

The National Maternity Services Plan (AHMC 2011) sets out a 5-year agenda for change to services for women giving birth in Australia. The plan recognises the need for good quality maternity information and a comprehensive evidence base to monitor changing practice and ensure that the outcomes for mothers and babies are maintained.

The 2008 Maternity Services Review that informed the plan noted the lack of maternal and perinatal morbidity and mortality data (Commonwealth of Australia 2009). A subsequent detailed review of data available in national and jurisdictional collections found key gaps in information about models of maternity care, maternal mortality, maternal morbidity and perinatal mortality (Walker 2011).

Reducing the impact of maternal morbidity on the health of mothers and babies is now a challenge in maternity care. Diabetes in pregnancy is associated with increased interventions in labour and birth and poorer baby outcomes (AIHW 2010b), but the impact of different types of diabetes on babies cannot be assessed because of data limitations. Some information about important maternal morbidity conditions are available in perinatal data collections, but definitions and data collection are not standardised, leading to some variation in prevalence observed from different jurisdictions (Li et al. 2011).



The AIHW is managing the National Maternity Data Development Project between 2011 and 2013 as the first step in the development of a nationally consistent and comprehensive maternity data collection in Australia. In addition to outlining national information and reporting needs in Australia, the project includes components that focus on the development of standardised description of models of maternity care; an assessment of what is required to standardise data on neonatal deaths; and the development of methods of reporting maternal deaths, which have not been reported nationally since 2005.

Where do I go for more information?

For more detailed information on mothers and babies, see the AIHW's annual report *Australia's mothers and babies* (Li et al. 2011). For more information on NTDs in the context of mandatory folic acid fortification, see the report *Neural tube defects in Australia: prevalence before mandatory folic acid fortification* (Macaldowie & Hilder 2011).

2.4 Growing up

At a glance

- In 2009–10, the majority (82%) of Australian children aged 0–17 lived in couple families, and about 1 in 6 lived in one-parent families (18%)—most (87%) of whom lived with their mother.
- Almost one-quarter (24%) of children were developmentally vulnerable (below the 10th percentile) on one or more domains at school entry, which suggests that they may have difficulty in Year 1.
- Sport and cultural activities are a part of life for most Australian children: in 2009, about three-quarters of children aged 5–14 participated in one or both activities outside school hours in the previous 12 months.



Introduction

Childhood and youth, defined here as age 0–17, are periods of rapid growth and development, spanning a number of major developmental phases—childhood, adolescence and early adulthood. These periods are crucial for establishing positive health and social behaviours, at a time when children and young people are undergoing rapid emotional, physical and intellectual changes. This section looks at the key stages of growing up in Australia, from early childhood to young adulthood.

In 2010, there were about 5.1 million children and youth aged 0–17 living in Australia, accounting for 23% of the total population (ABS 2010d). It is estimated that Aboriginal and Torres Strait Islander children and youth accounted for 5% of all children and youth in that year, but comprised 42% of the total Indigenous population (ABS 2009a).

Major policy frameworks for children and young people

Governments play a role in providing policies and programs to create supportive environments in which families can take responsibility for the wellbeing of family members. This includes support for balancing work and family responsibilities, early intervention and prevention for at-risk families, and enhancing the economic wellbeing of vulnerable families.

Australian Government policy has shown an increased focus on access to early intervention and support for children and families most at risk, along with a renewed emphasis on education as a key success factor in later life.

There are a number of major national frameworks and initiatives. These include Investing in the Early Years—A National Early Childhood Development Strategy 2009–2020 (focusing on children aged 0–8), the National Framework for Protecting Australia's Children 2009–2020, and the National Strategy for Young Australians (aged 12–24).

For more detail on these and other initiatives, see 'Chapter 4 Children and young people' in *Australia's welfare 2011* (AIHW 2011a).



What do we know about growing up in Australia?

Most of the early years of a child's life are spent in home and family environments; therefore, these environments are the most influential on children's development during this time. Factors such as family functioning and parental involvement in early learning set the foundations for children's learning, behaviour and health over the course of their lives. Family functioning relates to a family's ability to interact, communicate, make decisions, solve problems and maintain relationships. High levels of parental involvement in early learning and development are associated with better outcomes for children, such as increased educational engagement and achievement (Reynolds & Shlafer 2010).

As children grow they are introduced to broader social and community environments, such as early childhood education and care, and formal schooling. These environments help children and young people learn and develop skills needed to succeed academically and to form and maintain social relationships. The substantial and positive effects of quality early childhood education on children's social and cognitive development and school readiness, especially for children from disadvantaged families, are well established (AIHW 2011b).

The learning and development that occurs during the school years is also integral to overall health and wellbeing and a child's future success in education and employment. School attendance helps children develop the basic building blocks for lifelong learning and educational attainment, as well as social skills and healthy self-esteem. Conversely, absenteeism limits a child's opportunity to learn and can exacerbate self-esteem issues, social isolation and dissatisfaction (Bond 2004). Literacy and numeracy skills acquired in the school years are essential for further educational attainment, social development and employment. Staying in, and successfully completing, secondary school improves transitions into further study and employment.

Many children and young people also participate in cultural, sporting and other leisure activities that are important for their emotional, physical, social and intellectual development.

During these school years, spheres of influence on young people broaden to include peers, teachers, and other adults. The increasing independence can bring new challenges and risks, and this is also an important time to establish and maintain positive health behaviours. The skills developed at this time assist young people in their transitions to employment or higher education, independence and ultimately their future productivity and participation in society.

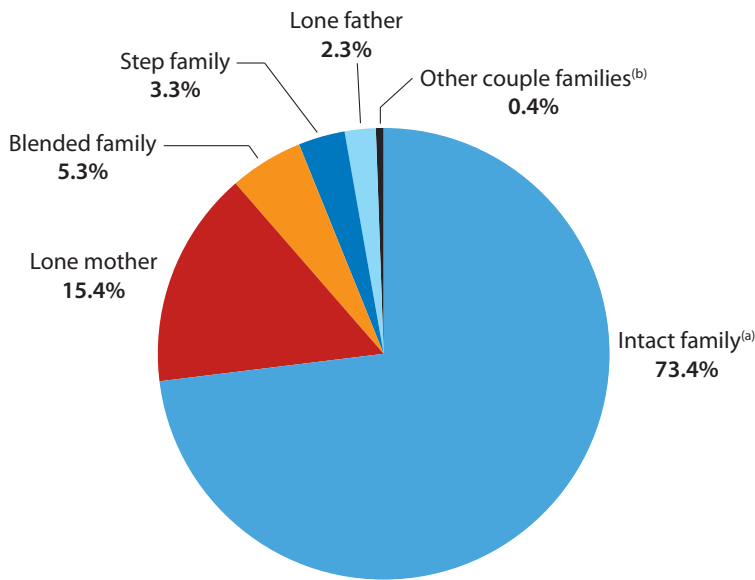
However, some children are exposed to factors that place them at risk of disadvantage. These include child abuse or neglect, violence, family joblessness, homelessness and contact with the juvenile justice system. For more information on these factors, see *Australia's welfare 2011* (AIHW 2011a).

Family environment

In 2009–10, most children aged 0–17 in Australia lived in couple families (82%). About 1 in 6 (18%) lived in one-parent families—most (87%) of whom lived with their mother (Figure 2.11).

An estimated one-quarter of children experience multiple family living arrangements before the age of 15 (de Vaus 2004). Children may encounter difficulties adjusting to changes in living arrangements (Deater-Deckard & Dunn 1999 cited in Wise 2003). These changes, however, do not always have negative outcomes for children. The quality of parenting and parent–child relationships are mediating factors that affect a child's vulnerability or resilience to change.





(a) Includes a small number of families where one or more children had a natural parent elsewhere, for example, a foster child living in an intact family.

(b) Includes 'other' couple families which are not classified as intact, step or blended, for example, grandparent families or families with only foster children present.

Note: Intact, step and blended families are types of couple families. For definitions of these family types, see the Glossary.

Source: ABS 2011g.

Figure 2.11: Family structure for children aged 0–17, 2009–10

Family functioning

There are currently no national data available on a single overarching measure of family functioning. National data are, however, available on specific components of family functioning such as family cohesion—the ability of the family to get along with one another. Growing up in Australia: the Longitudinal Study of Australian Children (LSAC) measured family cohesion in families of two cohorts of children, when they were aged 2–3 and 6–7.

According to the LSAC, family cohesion was reported to be excellent, very good or good in the vast majority of families of both cohorts—95% and 93% for families of 2–3 year olds and 6–7 year olds, respectively. The remainder of families reported fair or poor family cohesion (AIHW 2009a).

Parental involvement in early learning

The 2008 ABS Childhood Education and Care Survey found that most children aged 0–2 (92%) were involved in an informal learning activity with their parent, such as reading a book or playing a game together, in the previous week (ABS 2009b). Children were more likely to have parental involvement in a learning activity when at least one parent was employed (93%), than when no parent was employed (86%). More than half of children (52%) in couple families were involved in a reading activity every day, compared with 40% of children in one-parent families (ABS 2009b).



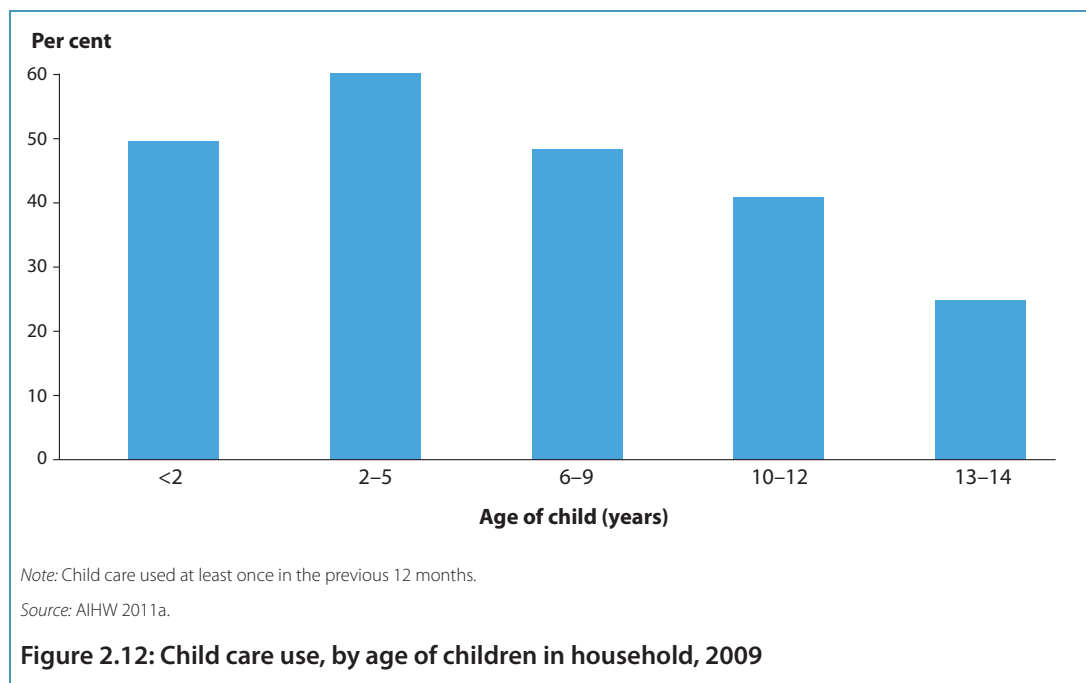
Early childhood care and education

The first major transition in life for many Australian children is their entry into formal child care arrangements or preschool.

Child care

Child care is available in various forms to cater for the differing needs of families. It may be formal—including long day care, family day care, or occasional care—or informal, which is non-regulated and often includes care by other relatives. Child care supports the labour force participation of parents and is a key form of early learning and development for children (DEEWR 2010).

Almost half (49%) of children aged under 2 had used child care at least once in the previous 12 months, according to the 2009 Household, Income and Labour Dynamics in Australia Survey (AIHW 2011a). This increased to 59% of children aged 2–5. This pattern may reflect parents staying at home in the very early stages of child rearing, and then returning to work. Once children reach school age, child care use decreases as the age of children increases—only one-quarter of all children aged 13–14 used child care in 2009 (Figure 2.12).



Early childhood education

The Early Childhood Education National Partnership aims to support universal access to quality early childhood education so that every child in the year before school has access to a preschool program. This program should be delivered by a qualified early childhood teacher for 15 hours a week, 40 weeks a year.

The ABS Childhood Education and Care Survey found that, in June 2008, among children aged 3–6 who were not yet in school, 72% usually attended preschool (including long day care preschool programs), 8% attended long day care only (with no preschool program), and 21% did not attend either preschool or long day care (ABS 2009b). Preschool program attendance was lower for children in one-parent (66%) and jobless families (57% in couple families with both parents unemployed or one parent employed part time, and 61% in unemployed one-parent families).

Ensuring access to early childhood education for all Indigenous 4 year olds in remote communities by 2013 is part of the Closing the Gap strategy. Limited data are currently available to inform progress against this target; however, the 2010 National Preschool Census reported that 90% of Indigenous children in *Remote* and *Very remote* areas were enrolled in preschool in the year before school, compared with 66% of Indigenous children Australia-wide (DEEWR 2011). However, enrolment does not necessarily equate to attendance, as evidence suggests Indigenous children enrolled in preschool attend less frequently than non-Indigenous children (Australian Government 2010a).

School years

Children in Australia are required to attend school from age 6 (except in Tasmania where they must attend in the year after they turn 5) until they complete Year 10, and then participate in full-time education, training or employment until they turn 17 (COAG 2009).

This section summarises key aspects of the school-based education of children and young people, as well as cultural and leisure activities that contribute to children's development outside the school environment.

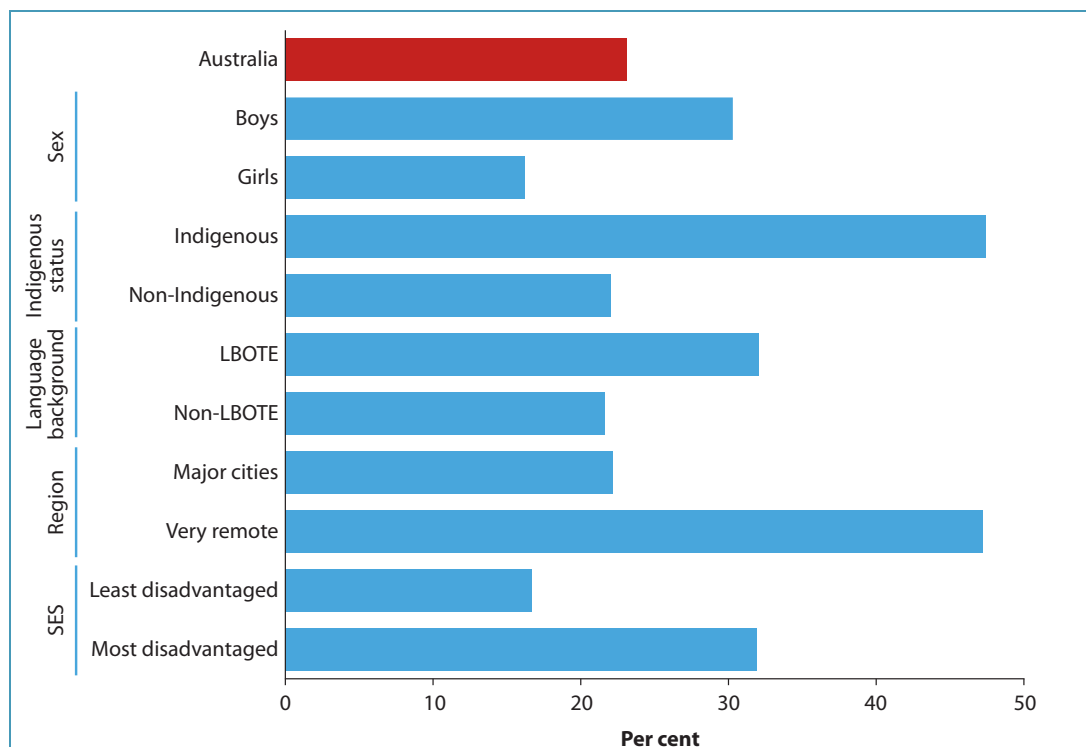
Transition to primary school

Children entering school with basic skills for life and learning have higher levels of social competence and academic achievement. COAG has endorsed the Australian Early Development Index (AEDI) as a national progress measure of early childhood development in Australia. The AEDI collects information on five developmental domains at school entry, based on a teacher-completed checklist: physical health and wellbeing, social competence, emotional maturity, language and cognitive skills, and communication skills and general knowledge.

According to the AEDI, the majority of Australian children were doing well in 2009, with about three-quarters (76%) 'on track' across all AEDI domains in their first year of full-time school. However, almost one-quarter (24%) were developmentally vulnerable (below the 10th percentile) on one or more domains, which suggests that they may have difficulty in Year 1. About 1 in 8 children (12%) were vulnerable on two or more domains—these children are considered to be at high risk developmentally (CCCH & TICHR 2009).

The proportion of children developmentally vulnerable on one or more domains varied across population groups. Groups more likely to be developmentally vulnerable included boys (30%), children living in the most socioeconomically disadvantaged areas (32%), those with a language background other than English (32%), Indigenous children (47%), and those living in *Very remote* areas (47%) (Figure 2.13).





Note: LBOTE refers to 'Language background other than English'.

Source: CCCH & TICHR 2009.

Figure 2.13: Children developmentally vulnerable on one or more domains of the AEDI, by population group, 2009

School attendance

School attendance is reported here as children who are enrolled and actually attending school, rather than just enrolments. Data are not comparable across school sectors, states and territories; ranges have therefore been presented as an overview (for more information, see ACARA 2011a).

Most children in Australia regularly attend school. In 2009, attendance rates across the six states and the Australian Capital Territory, for all three school sectors (government, Catholic and independent), were 91–96% for primary school students (Years 1 to 6), and 85–96% for junior secondary school students (Years 7 to 10). Attendance rates in the Northern Territory were considerably lower (80–92% and 80–91% respectively). Across the school sectors and states and territories, attendance rates were 52–98% for Indigenous students compared with 86–96% for non-Indigenous students in Years 1 to 10 (ACARA 2011a).

Literacy and numeracy

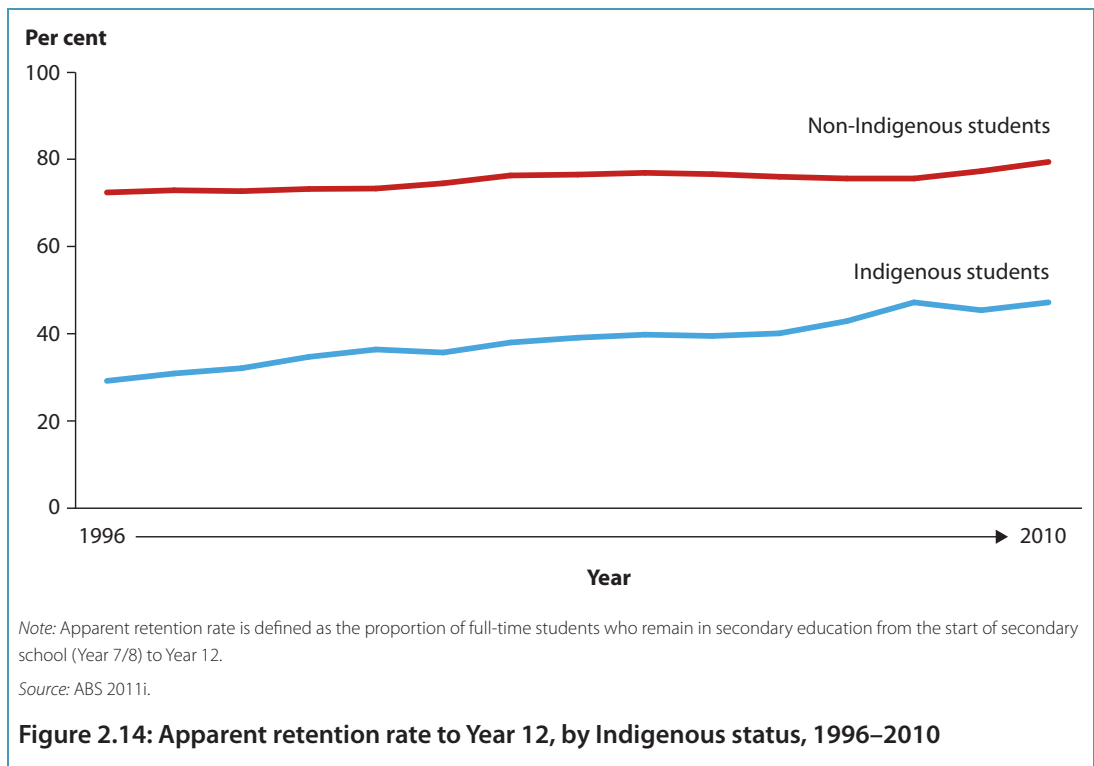
In Australia, national minimum standards have been developed for reading, writing, spelling, language conventions (grammar and punctuation) and numeracy for students in Years 3, 5, 7 and 9. In 2011, most students were achieving at or above the minimum standards (85–96%) (ACARA 2011b). This was similar to results in previous years, with the exception of writing results, which are not comparable between years (ACARA 2008, 2009, 2010).

Some groups of students do not perform well against the minimum standards. Indigenous students were less likely to have achieved the reading, writing and numeracy minimum standards for Years 3, 5, 7 and 9—in 2011, achievement was 13–31 percentage points lower than for non-Indigenous students (ACARA 2011b). However, there are some positive signs for Indigenous students—between 2008 and 2011 there was a reduction in the gaps for reading in Years 3 and 7 and for numeracy in Years 3 and 5 (gap closed by 5–7 percentage points) (ACARA 2008, 2011b).

School retention and completion

The apparent retention rate to Year 12 is a measure of secondary school engagement, and is defined as the proportion of full-time students who remain enrolled in secondary education from the start of secondary school (Year 7/8) to Year 12. In 2010, the Year 12 apparent retention rate was 78%, having gradually increased from 71% in 1996. The corresponding rate for Indigenous students was 47% and, although considerably lower than for non-Indigenous students, the rate has steadily increased from 29% in 1996 (Figure 2.14).

The apparent retention rate is an estimate of the proportion of young people who stay at school, but it is not a measure of successful completion of Year 12. Successful completion of Year 12 improves higher education and employment opportunities. In 2011, about 7 in 10 school leavers aged 15–24 had completed Year 12 (72%)—a slight increase from 68% in 2001 (ABS 2002; ABS 2011h).



Cultural and leisure activities

According to the 2009 ABS Children's Participation in Cultural and Leisure Activities Survey, about three-quarters of children aged 5–14 participated in organised sport, selected cultural activities or both, outside school hours in the previous 12 months.

Almost two-thirds (63%) of children aged 5–14 had played organised sport, 71% had attended a cultural venue or event, such as a public library or performing arts event, and 34% were involved in at least one cultural activity, such as playing a musical instrument, dancing, singing or drama (ABS 2009c).

Transition to independence

Finishing school, undertaking further education, finding paid employment, moving out of the family home, forming relationships and starting a family are just some of the milestones that young people in Australia experience as they transition to adulthood and independence.

This transition is affected by social, economic, environmental and technological changes that have occurred both nationally and internationally in recent decades. The pathways from education to work have become more varied and complex and often extend over longer periods. Decreased job security and increased housing costs are some of the reasons why young people often live in the parental home for longer. Socially, the current generation of young people has different ways of communicating than previous generations, having grown up with access to mobile phones, the internet and email. For this current generation, there are additional global challenges to face that will become more prominent as they grow older, including climate change, terrorism, global economics and ageing societies (DEEWR Office for Youth 2010; AIHW 2011c).

What is missing from the picture?

National data development is under way in several areas relating to the welfare of children and young people. These include developments in the areas of education, child protection, juvenile justice, homelessness, the Children and Youth Information Development Plan and for closing the data gap by improving the quality of information on Indigenous Australians. For more information on these developments, see Chapter 4 of *Australia's welfare 2011* (AIHW 2011a).

Despite these developments, information gaps at the national level remain in areas such as family functioning and family social network, quality of early childhood education and care services (expected to be addressed through the establishment of the National Quality Framework for Early Childhood Education and Care that started on 1 January 2012, with quality information available from the end of 2012), school relationships and bullying, social and emotional wellbeing and community participation by young people (AIHW 2009a, 2011d, 2011c).

Where do I go for more information?

For more information on the topics in this section, see *Australia's welfare 2011* (AIHW 2011a).

For information on a broad range of indicators related to children, see *A picture of Australia's children 2009* (AIHW 2009a) and *Headline indicators for children's health, development and wellbeing 2011* (AIHW 2011d). For young people, see *Young Australians: their health and wellbeing 2011* (AIHW 2011c).



2.5 Disadvantage and inequalities

At a glance

- Socioeconomic factors, including associated disadvantage, are important determinants of health.
- In 2009–10, around 1 in 8 Australians—2.6 million people—were living in low-income households.
- Almost two-thirds (64%) of adults had a non-school qualification in 2011, including 28% with a degree.



Introduction

Health and wellbeing are influenced by broad but closely related socioeconomic factors, such as education, occupation and income. These factors help to explain many of the health inequalities in Australia today. In general, relatively disadvantaged members of the community live shorter lives and have higher rates of illness, disability and death than those who are relatively advantaged (CSDH 2008). This pattern occurs consistently within countries across the world, despite vast differences in their overall wealth.

Variation in health status follows a gradient, with overall health tending to improve with each step up the socioeconomic ladder (Kawachi et al. 2002; Turrell & Mathers 2000). This is commonly known as the socioeconomic gradient of health, with those at higher rungs of the ladder tending to be healthier than those in the middle who, in turn, are healthier than those below them. Some population groups, such as Aboriginal and Torres Strait Islander people, have relatively high rates of socioeconomic disadvantage and relatively poor health.

Health inequalities are important to consider for a number of reasons (Woodward & Kawachi 2000; Mackenbach et al. 2007; Australian Government 2010b). From a statistical perspective, it is crucial to not only understand the average level of health in the community, but also how health is distributed. The very existence of health inequalities implies that there is scope for population health gain. Health inequalities impose costs on society, both in terms of health care and other burdens, such as lost productivity. They can also be of direct policy relevance, such as in efforts to close the gap in health between Indigenous and other Australians.

Although socioeconomic factors are well established as determinants of health (CSDH 2008)—see also ‘Section 1.3 Determinants of health’—the causal direction of the relationship between the two can be unclear, with poor health due to illness or injury leading to socioeconomic disadvantage in some cases (Case et al. 2005).



Despite the complexity of their causes and effects, socioeconomic inequalities can be amenable to policy action, and a society that reduces them is likely to achieve strong health gains (Woodward & Kawachi 2000).

The terms social class, socioeconomic status (SES) and socioeconomic position are often used interchangeably when referring to the set of social and economic characteristics of an individual, community, or larger population.

Although researchers may place emphasis on one term or another depending on the theoretical basis and purpose for highlighting socioeconomic differences, this report generally uses the term socioeconomic status. As encountered already in this section, other terms used in this report include socioeconomic inequalities, socioeconomic differences, socioeconomic disadvantage and socioeconomic gradient—all refer to the general effect observed in all societies that some people have greater resources, prestige and power than others in the same society.

Many sections in this report quantify health inequalities, particularly between socioeconomic groups, Indigenous and other Australians, and geographic locations. This section describes the main socioeconomic characteristics that have been shown to play a causal role in health status, with a particular emphasis on those commonly used to measure SES.

While this section focuses on education, occupation and income, there are a number of other measures or indicators of SES, such as housing, family structure and access to resources.

What do we know about the socioeconomic characteristics of Australians?

Education

The higher a person's levels of education and literacy, the better their health is likely to be (Galobardes et al. 2006). Having greater education carries better prospects of employment, occupation and income. All this serves to help people gain the knowledge and confidence throughout life to look after themselves and obtain the best health care. Again, there are potential effects in the other direction, as illness, disability or injury can interfere with education.

Education level can be summarised according to measures of school completion and highest level of educational attainment. The first of these is covered in 'Section 2.4 Growing up.' The second is covered here.

The indicator 'Educational attainment' (see opposite) shows that over the past decade, the proportion of people with a post-school qualification has increased steadily. In particular, the proportion with a bachelor degree or higher qualification has shown the strongest growth.

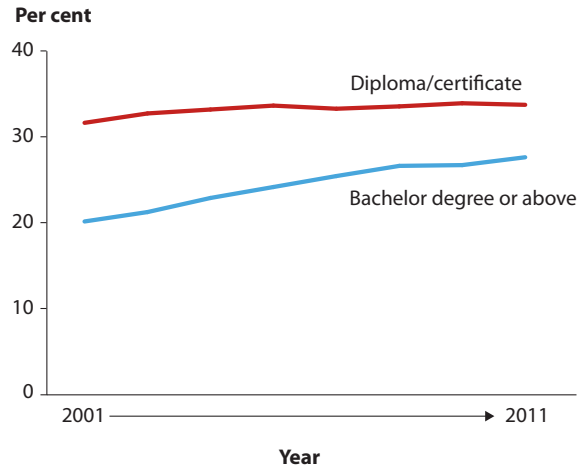
Australia's education attainment compares quite well with other OECD countries. In 2009, Australia had the seventh-highest percentage of 25–64 year olds with a tertiary qualification—37% compared with the OECD average of 30% (OECD 2011b).



Educational attainment. The percentage of people aged 25–64 with a non-school qualification (diploma, certificate or degree).



- Almost two-thirds (64%) had a non-school qualification in 2011.
- There has been strong growth in the proportion of the population with a degree, from 20% in 2001 to 28% in 2011.
- The highest attainment is among younger people: 69% of 25–34 year olds had a non-school qualification in 2011, compared with 56% of 55–64 year olds.



Source: ABS 2011h.

Occupation

An individual's occupation has a strong link to their status in society and is often, but not always, correlated with education and income (Dutton et al. 2005); that is, higher educational attainment increases the chances of a higher status occupation and these occupations usually come with higher incomes.

Occupation measures are widely used to assess inequalities, are relatively easy to collect, and have the added advantage of sometimes being available when other individual measures are not, such as in death certificate data (Galobardes et al. 2006). However, they cannot easily deal with people not in the workforce, such as retired people, people with caring responsibilities at home and students.

Income

An individual or household's access to income (either directly or from accumulated wealth) plays a major role in their health and wellbeing. Higher incomes give greater access to goods and services that provide health benefits, for example, better food and housing, health care and other healthy pursuits. A country's wealth, including the typical wealth of its people, and how evenly wealth is distributed, is also important. From a global perspective, Australia is a wealthy country and this allows its governments to provide many health services and to subsidise Australians' use of them.

The ABS measure of people's income is based on its Survey of Income and Housing and is known as the median equivalised disposable household income. It is the amount of income available per person after adjusting for household size. While there may be some differences in methodology across the years on how this is measured, it is clear that household incomes in Australia have grown considerably during the past decade and a half in real (inflation-adjusted) terms—by about 51% between 1995–96 and 2009–10 (ABS 2011j).

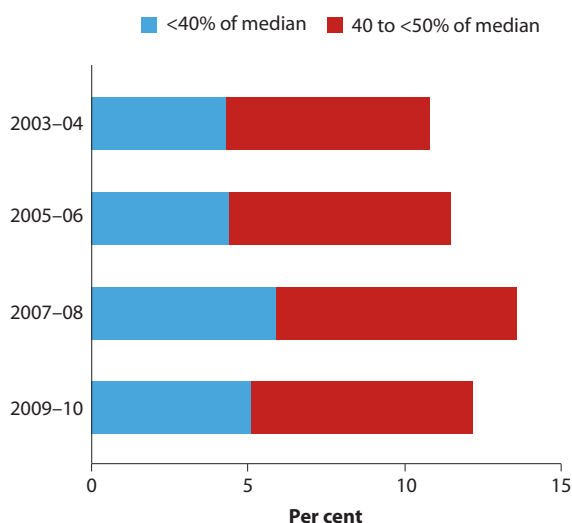
There is, however, considerable variability behind these average levels. As the following indicator 'People with low income' shows, more than 1 in 10 households are living on less than half the median weekly after-tax income, adjusted for household size.



People with low income. People living in households with an equivalised disposable household income (that is, after-tax income, adjusted for the number of people in the household) that is less than 50% of the national median. Presented as a percentage of all people.



- In 2009–10, the median equivalised disposable household income was \$715 per week.
- In 2009–10, about 2.6 million people lived on less than half the median equivalised household income, including nearly 1.1 million living on less than 40% of the median.
- The proportion of people living in low-income households generally increased between 2003–04 (10.8%) and 2009–10 (12.2%), but with a peak in 2007–08 (13.6%).



Measuring socioeconomic status

Socioeconomic status can be measured using a single characteristic, such as those described above, or it may be constructed as a composite measure using a range of information on SES. In this report, a composite measure of SES known as the Index of Relative Socio-economic Disadvantage is frequently used—see Box 2.2 for further details. Similar patterns between health and SES are generally found regardless of the measure (Adler & Ostrove 1999; Krieger et al. 2005).

Box 2.2: Socioeconomic status and the Index of Relative Socio-economic Disadvantage

The Index of Relative Socio-economic Disadvantage (IRSD) is one of four SEIFA indexes compiled by the ABS after each Census of Population and Housing. SEIFA aims to represent the SES of Australian communities and identify areas of advantage and disadvantage. The IRSD scores each area by summarising attributes of the population, such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations.

The IRSD can be used at different area levels. In this report, many analyses based on the IRSD are done at the Statistical Local Area level, as this is the smallest area contained in many national health data sources. The areas are ranked by their IRSD score, and can then be divided in two ways: the first produces groups that represent equal proportions of the total Australian population, and the second produces groups representing equal proportions of the total geographical area. Usually the grouping is in fifths but there can be others, such as fourths or tenths. The groups can then be compared for matters of interest, for example, according to their rates of smoking, obesity, deaths, and so on.

In this report, the population living in the 20% of areas with the greatest overall level of disadvantage is described as the 'most disadvantaged'. The 20% at the other end of the scale—the top fifth—is described as the 'least disadvantaged'.

It is important to note that the IRSD reflects the overall or average level of disadvantage of the population of an area; it does not show how individuals living in the same area differ from each other in their socioeconomic status. Being an average, the score is also likely to reduce the apparent differences between areas (Dutton et al. 2005).

What is missing from the picture?

Most health data collections in Australia do not include measures of socioeconomic status, so analysis relies on proxy measures such as the IRSD described above. This limits the extent of analysis regarding the relationship between SES and health.

While other sections in this report look at the associations between SES and health measures, comprehensive ongoing monitoring is needed to measure the strength and extent of these relationships over time.

Where do I go for more information?

For more information about disadvantage and social inequalities, see the AIHW report *Australia's welfare 2011* (AIHW 2011a).

The ABS publishes regular reports on the socioeconomic characteristics of Australians, including *Education and work, Australia* (ABS 2011h), *Household income and income distribution, Australia* (ABS 2011j) and *Labour force, Australia* (ABS 2011k).



2.6 Caring for others

At a glance

- Informal caring for another person is a common and important role. In 2009, 2.6 million Australians (12% of the population) were informal carers of a person with disability or a person who was ageing.
- Providing informal care can affect the health and wellbeing of informal carers, with 29% of carers experiencing changes in physical or mental health directly due to their caring role.
- In 2009, 89% of primary carers had never used respite. The reasons for this are complex, and may include lack of available services and inflexibility of service delivery.



Introduction

Informal caring is a common and important role filled by many Australians. It involves providing personal care, support and assistance to another person who needs it because of disability, health conditions or ageing (Commonwealth of Australia 2010). The role is unpaid and exceeds the demands that would usually exist in the relationship between carer and care recipient. (For technical definitions see Box 2.3 and the Glossary.)

As the population ages there is increasing demand for informal care, however, sociodemographic factors, such as increased labour-market participation by women and smaller families, are effectively reducing the available supply (Hill et al. 2011; PC 2011a). At the same time, the economic contribution of informal caring is substantial and increasing; it was estimated in 2010 to be worth \$40.9 billion to Australia, in replacement terms, an increase of 33% in 5 years (Access Economics 2005, 2010). It is therefore critical that the health and wellbeing of informal carers be maintained so that they are able to continue in that role as long as possible.

Box 2.3: Who is an informal carer?

There is no single definition of what makes someone an informal carer. The 2009 ABS Survey of Disability, Ageing and Carers (SDAC) defines a carer as 'a person of any age who provides any informal assistance, in terms of help or supervision, to persons with disabilities or long-term conditions or people who are elderly (that is, aged 60 or over). This assistance has to be ongoing, or likely to be ongoing, for at least six months.'

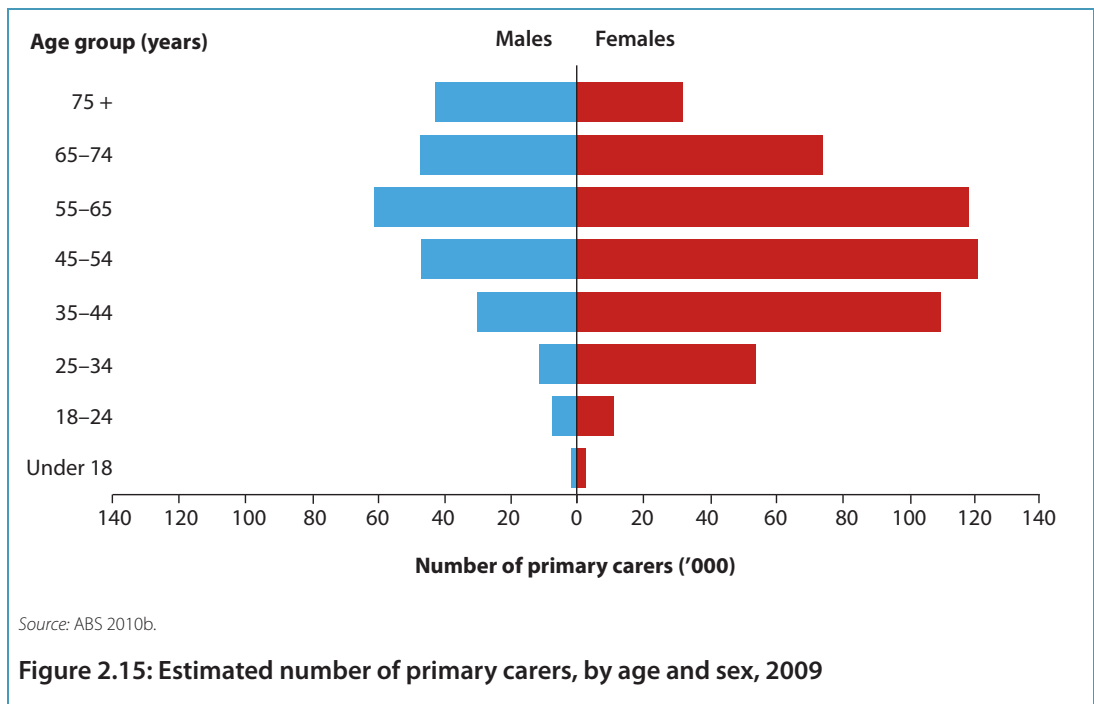
A person is a primary carer if they provide 'the most informal assistance, in terms of help or supervision, to a person with one or more disabilities or aged 60 years and over' in one or more of the core activities (communication, mobility and self-care). In the 2009 SDAC, only carers aged 15 or over with whom a personal interview was conducted were included as primary carers.

What do we know about caring for others?

In 2009, more than 2.6 million Australians (12% of the population) were informal carers. About one-third of these carers (771,400 people, or 3.6% of the population) were primary carers; two-thirds of primary carers were women (ABS 2010b) (Figure 2.15).

Consistent with changes in the Australian community generally, the population of informal carers is ageing. Primary carers aged 55 and over increased from 60% of all primary carers in 1998, to 74% in 2009 (ABS 2010b).

Informal carers provide assistance in both core activities (self-care, mobility and communication) and non-core activities (including, for example, meal preparation, transport and health care). For example, the 2009 SDAC reports that 71% of people with a severe or profound disability received assistance with self-care, while 43% received assistance with health care, from informal carers only (AIHW 2011a). As a further example, the Productivity Commission reports that more than 350,000 primary carers provide informal care for people who are ageing, assisting with both personal and everyday activities (PC 2011a). Informal care is also provided to people with mental health disorders. The emotional and practical support provided is significant to wellbeing, coping and the likelihood of recovery (Pirkis et al. 2010).



The most common care relationship among primary carers is one spouse caring for another (45%), followed by parents of care recipients (23%), and children of care recipients (22%) (ABS 2010b). Among primary carers aged 15–24, the most common care relationship is a son or daughter caring for a parent, while among primary carers aged 25–44, the relationship is most frequently a parent caring for a child.

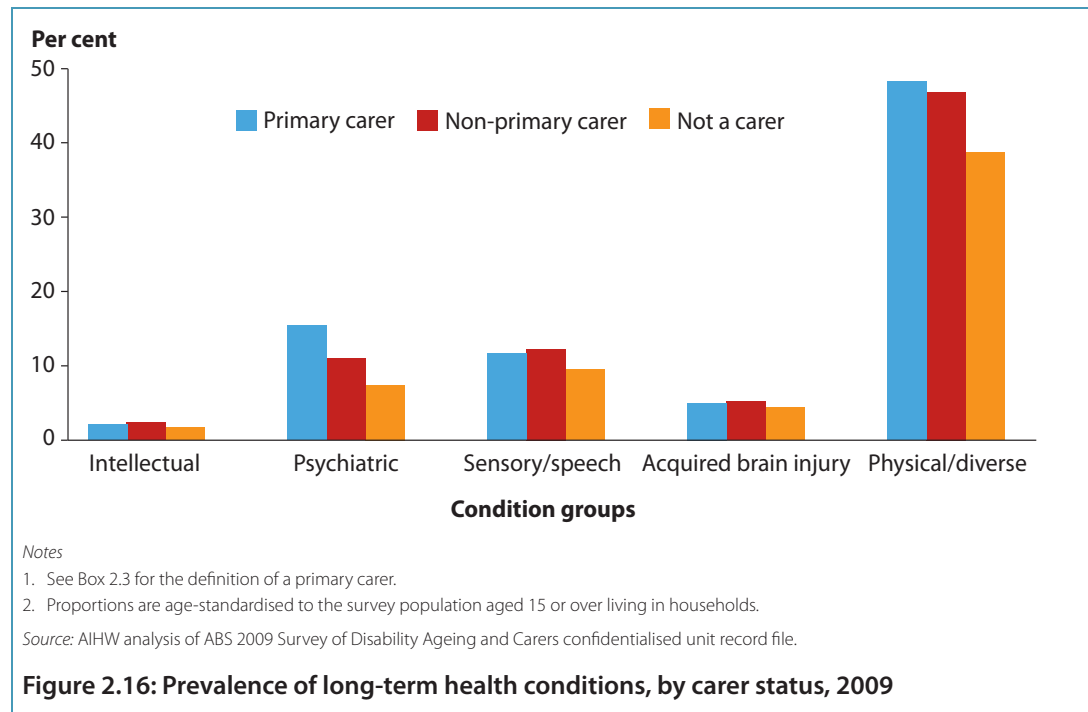


The health of informal carers

While informal carers provide support to others with disability and health conditions, they themselves frequently experience disability and health conditions, some pre-existing, others developing with age. The 2009 SDAC reveals that informal carers overall have higher rates of long-term health conditions and disabilities than non-carers (Figure 2.16). For example, an estimated 39% of primary carers have a disability, compared with 21% of the non-carer population aged 18 and over. In particular, physical and diverse disabilities are experienced by 47% of primary carers and 46% of other carers, compared with 38% of non-carers (Figure 2.16).

Some long-term health conditions and disability appear to be a direct effect of informal caring. The ABS estimates that the physical or emotional wellbeing of 29% of primary carers has changed due specifically to their caring role (ABS 2012). Effects of caring may include anxiety and depression, weariness, anger and resentment, sleep interruption and stress-related illness. Each of these possible effects is influenced by factors such as the period of time spent caring each week, the nature of the activity limitation, and age of the care recipient.

Informal carers are particularly at risk for mental health disorders. Pirkis et. al. (2010) analysed data from the 2007–08 National Survey of Mental Health and Well Being and found that highly elevated levels of distress were significantly associated with care-giving. This is consistent with the 2009 SDAC, which shows that the prevalence of psychiatric conditions is far higher among primary carers than non-carers (Figure 2.16). Finally, Buschkens, Graham and Cottrell's (2008) research investigating primary carer stress, distress and subjective wellbeing, along with sleep and stress hormones, concluded that maintaining psychological wellbeing was a struggle for primary carers. It is noteworthy that in the 2009 SDAC, almost half of all informal carers reported some degree of sleep interruption due to their caring role (ABS 2012).



Support for informal carers

Services and supports for informal carers are usually provided in the context of care for the care recipient. Services such as personal care, domestic assistance and meal preparation support both the carer and the care recipient. Other services specific to informal carers include respite, information and counselling. However, the 2009 SDAC shows that 89% of primary carers had never used respite (AIHW 2011a). The reasons for this are complex, although evidence at two recent Productivity Commission inquiries (PC 2011a, 2011b) suggests lack of available services and inflexibility of service delivery are major factors.

What is missing from the picture?

There are difficulties related to developing a comprehensive picture of informal carers, the services and supports they receive and their outcomes. For example:

- informal carer data are often collected as a by-product of services provided to a care recipient, and in that sense are not person-centred and can restrict what is known about informal carers
- data about services and supports that extend to informal carers often do not report on their effectiveness
- data are not available directly linking support for informal carers with the health and wellbeing of those carers.

Where do I go for further information?

Australia's welfare 2011 (AIHW 2011a) includes a chapter on informal carers, detailing the assistance informal carers provide and to whom, the impact of caring on employment, finances and wellbeing, along with services and supports received.

The ABS report *Caring in the community, Australia* includes findings from the 2009 SDAC in relation to informal carers (ABS 2012).

In 2009, the Department of Health and Ageing (DoHA) commissioned the AIHW to investigate the feasibility of establishing a Carers National Data Repository. The report of this scoping study details the variety of informal carer data available and the repository models explored (AIHW 2009b).



2.7 Adding years to life and life to years

At a glance

- Healthy life expectancy is increasing for older Australians: in 2009, at age 65, females could expect to live a further 16.1 years without requiring assistance with core activities, and males could expect another 15.2 years without requiring assistance.
- Healthy ageing is both a state (that is, health status) and a process (for example, adapting effectively to life's circumstances and engaging in healthy behaviours).
- Although many older Australians have good mental and physical health, nearly half of those aged 65–74 have five or more long-term physical health conditions.



Introduction

Australians continue to live longer lives than at any time in history. This has led to a growing focus on the extent to which these additional years are lived in good health. Importantly, good health comprises wellbeing in numerous areas, including physical, mental and social health (WHO 2006). Box 2.4 provides a snapshot of older Australians.

Regarding later life, much literature has explored the nature and determinants of 'healthy ageing' or 'ageing well' (Depp et al. 2010; Engberg et al. 2009; Ferri et al. 2009; Fiocco & Yaffe 2010). There is growing consensus that healthy ageing is not only a state but also a process, for example, adapting successfully to life's circumstances and engaging in health-promoting behaviours. This perspective is particularly important for older adults (people aged 65 or over). Later life is often associated with many losses, including physical decline; yet, older adults typically report high levels of life satisfaction, suggesting that ageing well is about both health status and adapting successfully to life's challenges (Carstensen et al. 2011).

Box 2.4: Older Australians

- At 30 June 2011, more than three million Australians (14% of the population) were aged 65 or over (ABS 2011a).
- By 2031, older Australians are projected to grow to 19–21% of the population (ABS 2008b).
- In 2009, 94% of older Australians lived in the community in private homes or self-care accommodation (AIHW analysis of the ABS 2009 Survey of Disability, Ageing and Carers).
- In 2010–11, 11% were employed, with 53% of these working part time (ABS 2011k).
- In 2006, 27% participated in voluntary work (ABS 2006b).
- In 2009, at age 65, females could expect to live another 21.8 years and males another 18.7 (ABS 2011l).

See Chapter 6 in *Australia's welfare 2011* for more information about older Australians (AIHW 2011a).

What do we know about the health and wellbeing of older people?

Physical health

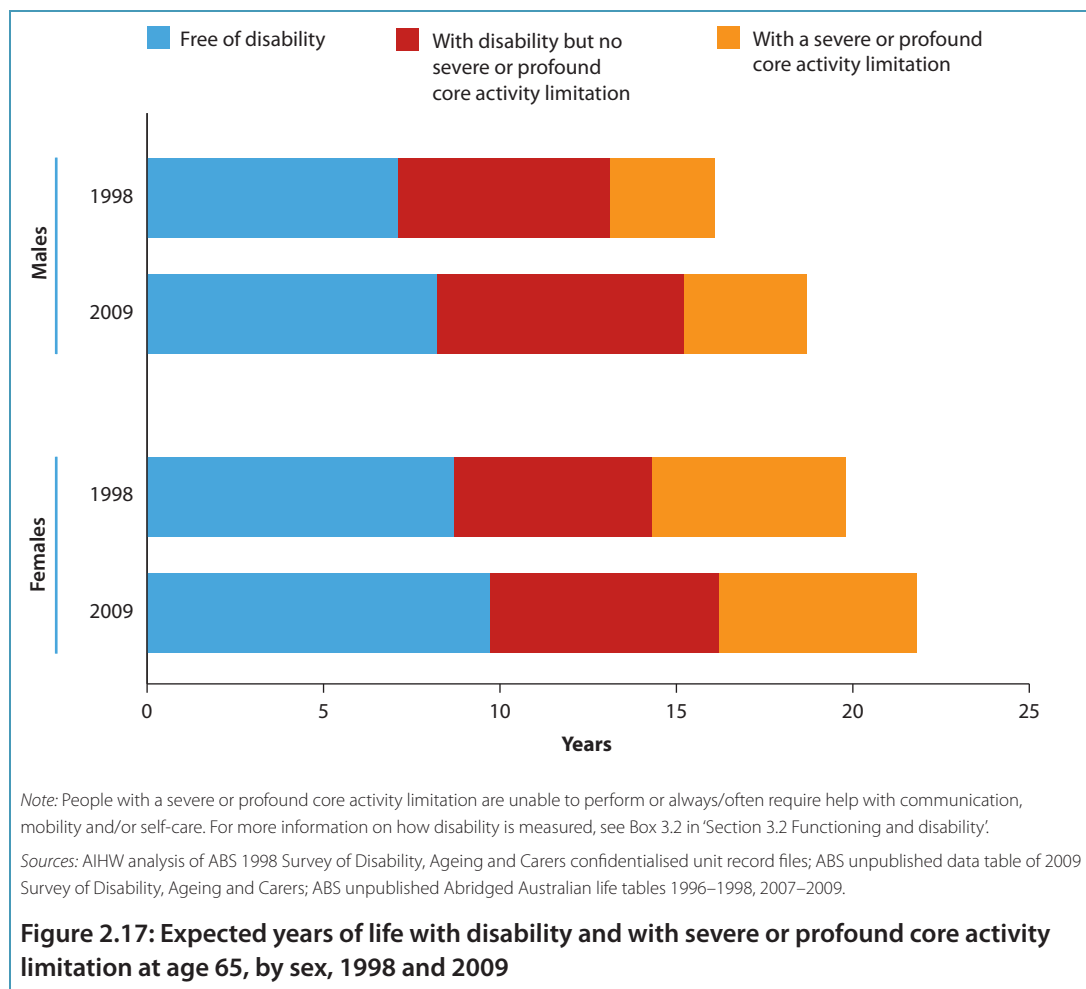
Although many older Australians are generally in good health, the extent of disability and disease, often involving multiple conditions, tends to increase with age:

- 44% of those aged 65–74 have disability, of whom 11% have a severe or profound core activity limitation (that is, always or sometimes requiring assistance with activities relating to communication, mobility and/or self-care)
- 81% of those aged 85 and over have disability, of whom 54% have a severe or profound core activity limitation
- 49% of Australians aged 65–74 have five or more long-term health conditions, increasing to 70% of those aged 85 and over (AIHW analysis of 2009 SDAC) (see 'Section 3.2 Functioning and disability' for more discussion about how disability relates to age).

The most common diseases and/or disabling conditions among older Australians are some degree of vision or hearing loss, arthritis or other musculoskeletal problems, and elevated blood pressure or cholesterol levels (AIHW 2010c). Despite the prevalence of disease and disability in later life, two-thirds of older Australians rate their health as good, very good or excellent (AIHW 2011a). This suggests that older Australians, in particular, view their own health in the context of their peers' health and what is expected for their age.

Between 1988 and 2003, prevalence rates of disability among older Australians remained fairly stable (AIHW 2006). More recent information, however, suggests that the physical health of older Australians in some age groups may be improving, although longer-term trends need to be observed before any firm conclusions may be drawn (AIHW 2011a). At age 65, females can now expect to live another 21.8 years, including 16.1 years without a severe or profound core activity limitation, and males another 18.7 years, including 15.2 years without a severe or profound core activity limitation. Comparison with 1998 indicates that both groups of older Australians have gained more years without than with a severe or profound core activity limitation (Figure 2.17).





Mental health

Results from the 2007–08 ABS National Health Survey support the view that mental wellbeing may improve with age. Respondents aged 65 or over living in the community were less likely than younger respondents to have high levels of psychological distress, with about three-quarters of older people having the lowest distress level rating (AIHW analysis of ABS 2007–08 National Health Survey).

However, there is still a substantial proportion of older adults with a mental illness. In 2007, 8% of older people living in the community had a mental disorder (ABS 2009d). Available evidence suggests that prevalence rates of mental disorders may be even higher among residential aged care residents (Snowdon & Fleming 2008). At 30 June 2010, 25% of permanent residential aged care residents had a diagnosed mental disorder, not including dementia (AIHW 2011e). Reasons for the higher levels of mental disorders among this group are not clear, although some studies suggest that the greater severity of disability, a risk factor for mental illnesses such as depression, may be a factor (Davison et al. 2007; Snowdon & Fleming 2008).

Social wellbeing

Social wellbeing is highly valued by older people as a component of health (Faber et al. 2001). The majority of older Australians living in households maintain good social relations with their family and friends. In 2009, 8 in 10 had at least weekly face-to-face contact with their family and friends, with this decreasing only slightly with age (AIHW 2011a). However, disability is often associated with decreased social contact. In 2009, 81% of older adults without disability had weekly face-to-face contact with their family and friends, compared with 75% of those with a severe/profound core activity limitation.

Health determinants

As with other age groups, healthy behaviours are important for promoting and maintaining good health for older Australians. Over the past two decades, the main improvement in healthy behaviours among older adults has been the reduction in smoking rates—the proportion of older people who are daily smokers declined from 14% in 1995 to 7% in 2010 (AIHW analysis of 2010 National Drug Strategy Household Survey). In contrast, the proportion of overweight and obese older adults increased from 66% in 1995 to 71% in 2007–08 (ABS 2009e). Trends in other areas, such as alcohol consumption and dietary habits, are less clear (AIHW 2010c).

Recent research shows that the influence of health determinants differs across the lifespan. For example, several Australian studies show that mortality risk is lowest for older adults in the overweight body mass index (BMI) range, leading some researchers to question whether the national BMI guidelines may be too restrictive for this age group (Jagger 2011). There is a need for more research into the complex relationships between health risk factors and outcomes in later life.

What is missing from the picture?

There are several information gaps relating to healthy ageing among older Australians.

- The process of healthy ageing is not well understood and its measurement is still under development (Huber et al. 2011).
- While quality information exists about the health status of older Australians, much less is known about the interaction of different components, such as the interdependent relationships between physical, mental and social wellbeing.
- The complex relationships between health determinants and outcomes over the life course, and how these may change over time, have yet to be fully explored (Jagger 2011).
- Most health surveys do not collect data from people living in residential aged care, reflecting the methodological difficulties associated with data collection in this population.

Further research using data from Australian longitudinal studies will contribute to our understanding in all four of these areas.

Where do I go for more information?

More information and analysis on the health of older people is in *Australia's welfare 2011* (AIHW 2011a) and *Older Australia at a glance* (AIHW 2007). More information on older people, life expectancy trends and disability is in the publication *Changes in life expectancy and disability in Australia 1988 to 2009* (AIHW forthcoming) and *Disability in Australia: multiple disabilities and need for assistance* (AIHW 2009c).



2.8 Mortality

At a glance

- In 2010, there were more than 140,000 deaths reported in Australia, with the majority (65%) among people aged 75 or over.
- After adjusting for age, the death rate for males in 2010 was 45% higher than the rate for females.
- Coronary heart disease was the leading causes of death for both males and females in 2009, followed by lung cancer for males and stroke for females.



Introduction

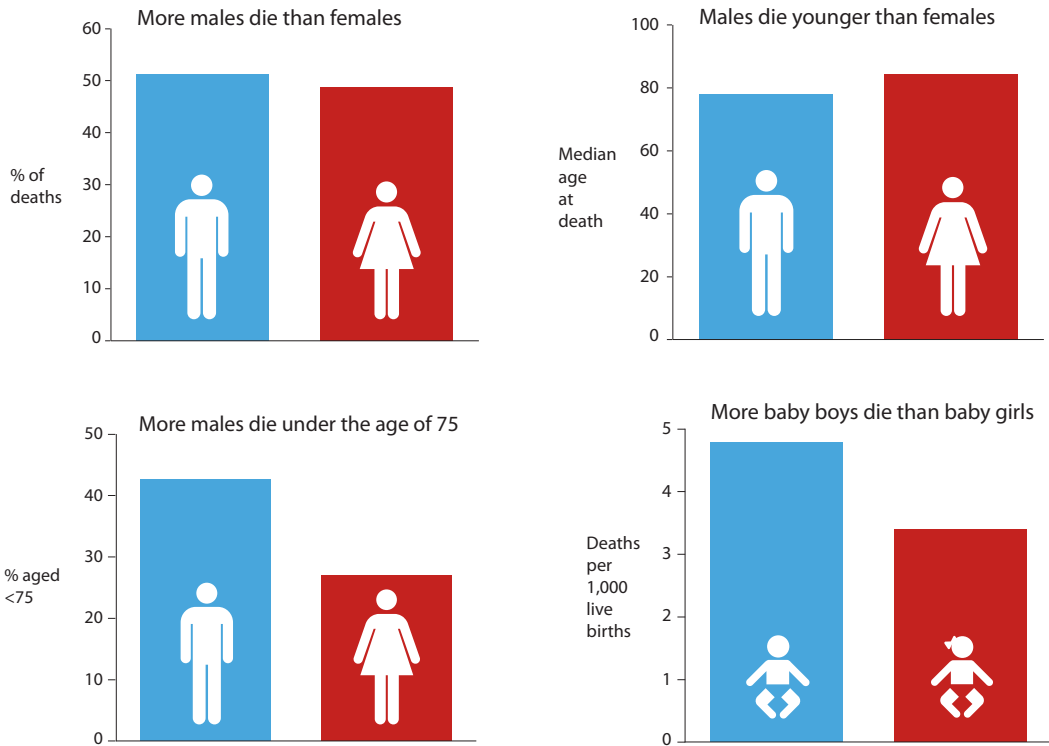
Data on death and its causes are vital measures of a population's health. Examining trends and patterns in mortality can help explain differences and changes in health status, evaluate health strategies, and guide planning and policy-making. Cause-specific mortality provides further insight into the events contributing to deaths and the burden of disease. Changes in the pattern of causes may reflect changes in behaviours, exposures, health interventions, social and environmental circumstances and the effects of medical and technological advances.

What do we know about deaths in Australia?

There were 143,473 deaths registered in Australia in 2010 (ABS 2011). On any measure of overall mortality, males fare worse than females (Figure 2.18).

The crude (unstandardised) death rates in Australia were 660 deaths per 100,000 males and 630 per 100,000 females in 2010. Put another way, for every 100 female deaths, there were 105 male deaths. Crude rates, however, do not account for any differences in the age and sex composition of the population (see Box 2.5), nor do they account for the reality that the chance of dying varies with age.

Age-specific rates allow for separate comparisons between each age group. For deaths reported in 2010, rates were higher for males than females for all age groups. For ages 15–24 and 25–34, male death rates were more than twice as high as female rates (Table 2.2). Age-standardised rates for deaths reported in 2010 show that the male rate was 1.4 times as high as the female rate: 680 per 100,000 compared with 470 per 100,000 (Table 2.2).



Source: ABS 2011.

Figure 2.18: Deaths in Australia, selected characteristic, by sex, 2010

Box 2.5: Comparing rates—age-standardisation

A fundamental aim of disease and mortality surveillance is to determine whether levels of mortality are increasing or decreasing over time, or whether they differ between population groups. Numbers alone are insufficient for measuring differences because they do not account for population size. Rates, on the other hand, are measures that are scaled to the size of the population.

The simplest rate is the crude rate. For deaths, this reflects the number of deaths in a year divided by the size of the population being measured (and typically multiplied by 100,000). It is an average death rate for the whole population without taking into account any factors that influence mortality.

However, the risk of disease and dying varies with many factors, but predominantly with age. A population that has, for example, a larger proportion of older people will experience more deaths than a younger population. Consequently, the usefulness of the crude rate is limited as it does not account for differences in the age composition of the populations being compared, or for changes in the age composition that occur over time.

(continued)



Box 2.5 (continued): Comparing rates—age-standardisation

A statistical method called age-standardisation is used to adjust for these age variations. This method imposes a common (standard) age structure on the populations being compared. The resulting rates reflect those that would have occurred if each population being compared had the same age structure as the standard population, thereby allowing rates to be compared on an equal age basis.

Age-standardised rates are only comparable between different populations, or time periods, if they are determined using the same standard population. The choice of a standard population is somewhat arbitrary and depends on the purpose of the comparison. The AIHW and ABS have agreed to adopt the Australian estimated resident population for 30 June 2001 as the national standard population. The national standard population will be revised to the estimated resident population from the 2011 Census when it becomes available. The advantage of a common standard population is that it enables comparisons of age-standardised rates with other studies and over time.

Table 2.2: Deaths by age and sex, 2010

Age (years)	Males		Females		Sex ratio	
	Number	Rate ^(a)	Number	Rate ^(a)	Death ratio ^(b)	Rate ratio ^(c)
Under 1 ^(d)	738	4.8	491	3.4	150	1.41
1–14	298	14.8	209	10.9	143	1.36
15–24	904	55.8	361	23.6	250	2.36
25–34	1,299	80.6	549	34.7	237	2.33
35–44	2,188	139.1	1,208	75.8	181	1.84
45–54	4,348	288.6	2,687	174.8	162	1.65
55–64	8,105	643.7	4,935	386.2	164	1.67
65–74	13,386	1,686.7	8,350	1,011.5	160	1.67
75–84	22,300	5,011.3	18,346	3,361.1	122	1.49
85 or over	19,911	14,427.6	32,846	12,627.6	61	1.14
All ages^(e)	73,484	660.0	69,989	630.0	105	
Age-standardised rate^(f)		680.0		470.0		1.45

(a) Numbers of deaths per 100,000 population based on the estimated mid-year population for each age group.

(b) The number of male deaths that occur for every 100 female deaths. It is calculated by dividing male deaths by female deaths, and then multiplying by 100.

(c) The ratio of the male death rate to the female death rate.

(d) The rate represents the infant mortality rate and is deaths of infants aged under 1 per 1,000 live births.

(e) The sum of deaths at individual ages does not equal the total for all ages due to the confidentialisation process. The rate for all ages is the crude death rate.

(f) Rates are age-standardised to the Australian estimated resident population for 2001.

Source: ABS 2011i.

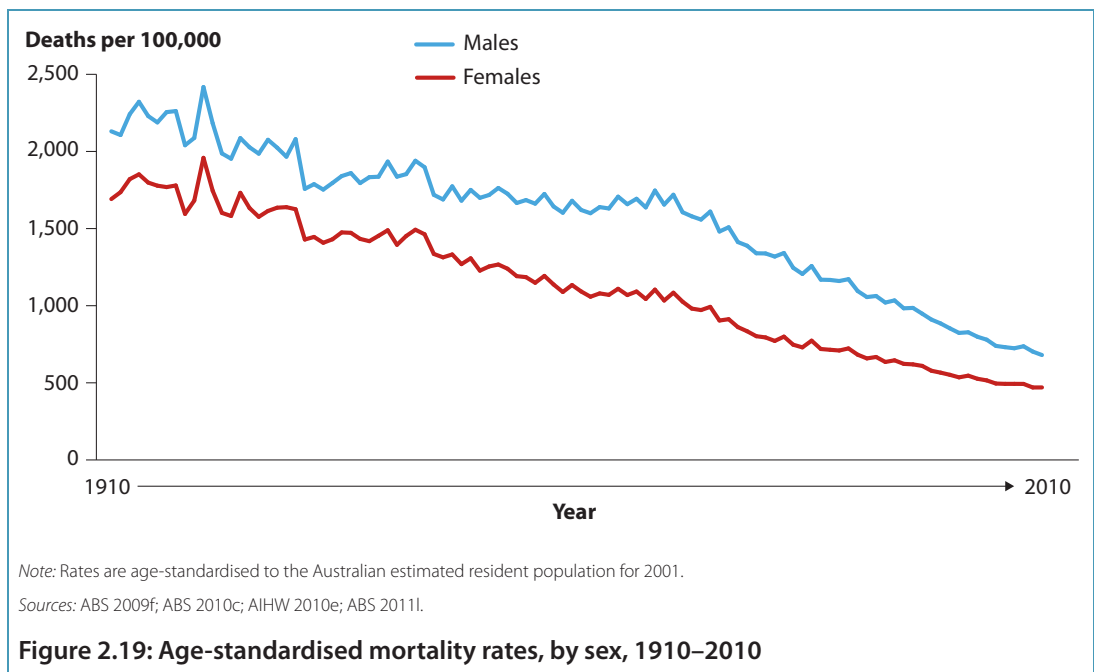
Estimates of mortality among Indigenous Australians rely on the identification of the Indigenous status of people who die and of people in the Australian population as a whole. Although it is likely that most deaths of Indigenous Australians are registered, a proportion of these deaths are not registered as Indigenous (ABS 2011i). To provide the most accurate estimates of mortality levels among Indigenous Australians, mortality data from New South Wales, Queensland, South Australia and Northern Territory are used in the performance indicator 'Infant and child mortality'.

In 2010, there were 2,767 deaths among Aboriginal and Torres Strait Islander people in Australia, representing 1.9% of all deaths. There were also 1,220 deaths (0.9% of all deaths) where Indigenous status was not stated (ABS 2011i). The age-standardised death rates for Indigenous males was 1,255 deaths per 100,000 and for females it was 979 (ABS unpublished).

Over the period 2006–2010, in New South Wales, Queensland, South Australia and Northern Territory, 18% of Indigenous deaths were among people aged 75 or over (ABS unpublished).

Trends in deaths

There has been a long and continuing decline in the mortality rates in Australia (Figure 2.19). The age-standardised death rate for males fell by 68% between 1910 and 2010, from 2,100 to 680 deaths per 100,000. For females, the corresponding rate fell by 73% from 1,740 to 470 deaths per 100,000. The decline in mortality in the first half of the last century was associated with factors such as control of infectious diseases and better hygiene and nutrition. The decline in later years was associated with improvements in road safety measures, falls in smoking rates, and improvements in prevention, detection and treatment of diseases such as cardiovascular disease.



Dying early

The majority of deaths in Australia, like other developed countries, occur among older people. As a result, the profile of our mortality is largely influenced by the disease process among older Australians. Specific measures used to describe deaths at younger ages include infant and child mortality rates, potential years of life lost, and potentially avoidable deaths.

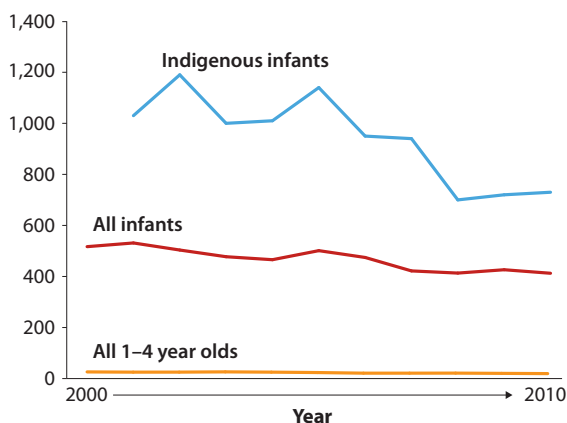
Infant mortality (under the age of 1) is one of many factors that influence premature mortality (considered here as deaths before age 75) and life expectancy (see 'Section 3.4 Life expectancy'). It is also one measure of the effectiveness of a health system—see the indicator 'Infant/young child mortality' below.

Infant/young child mortality (including the gap between Indigenous and non-Indigenous people). The number of deaths of infants (those aged under 1) divided by the number of live births, and the number of deaths of young children (those aged 1–4) divided by the population of the same age.



- Infant mortality was 413 deaths per 100,000 live births in 2010—a fall of 21% over a decade.
- Mortality rates for Indigenous infants (730 per 100,000 live births in 2010) were much higher than the overall Australian rate.
- The 2010 mortality rate for children aged 1–4 was 19.5 per 100,000 population—25% lower than in 2000.

Deaths per 100,000



Sources: ABS 2011i; ABS unpublished.

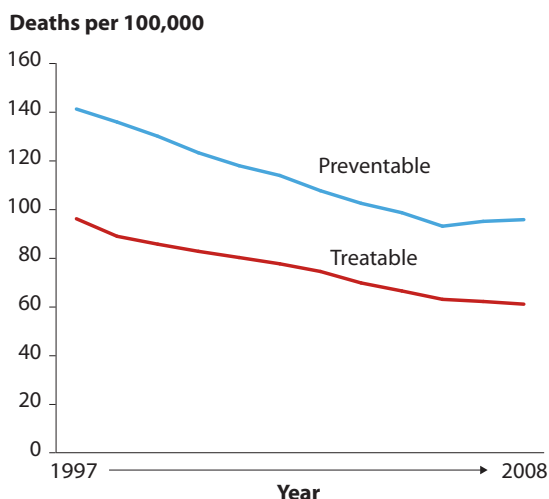
Premature mortality is usually summarised in terms of potential years of life lost (PYLLs), and provides an indicator of the social and economic impact of premature deaths, that is, the burden of mortality. PYLLs are determined by the age at death and take into account only deaths that occur before a particular age. There is no standard age cut-off, however, death before the age of 75 is commonly used. In 2010, male deaths contributed 62% of total PYLLs (AIHW analysis of ABS 2011i). In 2007, for males and females combined, chronic diseases contributed 65% of total PYLLs (AIHW 2010e).

Potentially avoidable deaths comprise premature deaths (defined for this purpose as deaths before the age of 75) caused by conditions or diseases that are commonly accepted as being potentially avoidable within the present health system. They are further divided into deaths that are potentially preventable (that is, those due to conditions that are amenable to screening and primary prevention, such as immunisation) and deaths that are due to potentially treatable conditions (that is, conditions that are amenable to therapeutic interventions). In 2008, 66% of premature deaths were potentially avoidable. See the performance indicator 'Potentially avoidable deaths' opposite. For a list of conditions that are considered potentially avoidable within the health system, see *National Healthcare Agreement: P20—Potentially avoidable deaths, 2010* (AIHW 2011f).

Potentially avoidable deaths. The number of deaths each year of people aged under 75 that are potentially avoidable within the present health system. Divided into preventable deaths (those cases amenable to primary prevention and screening) and treatable deaths (those amenable to therapeutic interventions). Presented as an age-standardised rate (per 100,000 population).



- In 2008 there were more than 33,000 potentially avoidable deaths.
- This equates to 157 potentially avoidable deaths per 100,000 people: 61% were classified as preventable and 39% as treatable.
- Preventable death rates fell by 32% between 1997 and 2008 (from 141 to 96 deaths per 100,000).
- Treatable death rates fell by 36% between 1997 and 2008 (from 96 to 61 deaths per 100,000).



Sources: SCRGSP 2010b; Analysis of the AIHW National Mortality Database.

Place of death

National death registration data in Australia do not indicate the place of death (for example, whether the person died in a hospital, a nursing home or at home). There is also no other single source that provides information on where people die in Australia.

However, data from the National Hospital Morbidity Database can be used to determine the proportion of all deaths that occurred among people admitted in hospital (AIHW 2011g). Of all people who died during 2009–10, 52% died while admitted to hospital.

Leading causes of death

Cause of death data lag behind general data on the number of deaths because of the time required to code the cause of the death (see Box 2.6). Data on causes of death reported in the rest of this section are for 2009, while the information previously has been based on counts of deaths for 2010.



Box 2.6: Cause of death data

In Australia, either a medical practitioner or a coroner determines the cause of death. They report on all medical conditions that directly led to death, the antecedent causes, and other significant conditions that contributed to the death but were not related to the disease or condition that caused it. Important demographic information, such as the sex of the person and their age at death, is also reported.

All deaths are registered with the Registry of Births, Deaths and Marriages in the relevant state or territory, and additional information about coroner-certified deaths is maintained by the National Coroners Information System.

The ABS sources information about deaths and their causes from the registry offices and the National Coroners Information System. The ABS uses an automated process to apply an international coding standard, called the International Classification of Disease and Related Health Problems 10th revision (ICD-10), to each death record. The coding produces an underlying cause—that is, the disease or injury that initiated the train of morbid events leading directly to death—and, for many deaths, one or more associated causes (that is, other conditions that intervened or conditions that may have contributed to the death but were not related to the diseases or conditions causing death).

Once coded, causes of death can be categorised into disease groupings. A common method of grouping is by ICD chapters. The chapters are arranged according to the type of disease (for example, 'Certain infectious or parasitic diseases'), the body system affected by the disease (for example, 'Diseases of the circulatory system') or the circumstance causing death (for example, 'External causes of morbidity and mortality', which include injury and poisoning). For some public health purposes, information about causes of death needs to be more specific, such as influenza, stroke or motor vehicle accident.

Historically, coroner-certified deaths where the cause remained unknown at the time of the ABS coding of the cause of death were coded to a non-specific cause (usually 'unknown'). Beginning with the 2007 reference year, the ABS introduced additional processing to improve the accuracy of these cause of death codes. Under this method, coroner-certified deaths can be revised once the cause of death has been determined by the Coroner. As a result, for each year of death registrations, the ABS produces a preliminary version of the causes of death data, followed by a final version 2 years later.

In 2009, the leading causes of death were coronary heart disease for both males and females, followed by lung cancer for males and stroke for females (Table 2.3).

The leading causes of death in Australia are mainly chronic diseases. In 2007, chronic diseases were also the cause of 83% of all premature deaths (that is, deaths under the age of 75) (AIHW 2010d).

Trends in leading causes of death are shown in Figure 2.20. While coronary heart disease has been the leading cause of death for both sexes since 1979, rates have decreased by 72% for males and 69% for females in the past 30 years.



For males, land transport accidents were the fifth-leading cause of death in 1979, but were not among the 10 leading causes of death for males in 2009, decreasing from 38 to 10 deaths per 100,000.

For females, death rates due to heart failure decreased by 75% since 1979, while death rates due to Dementia and Alzheimer disease increased sixfold.

Table 2.3: Leading causes of death, by sex, 2009

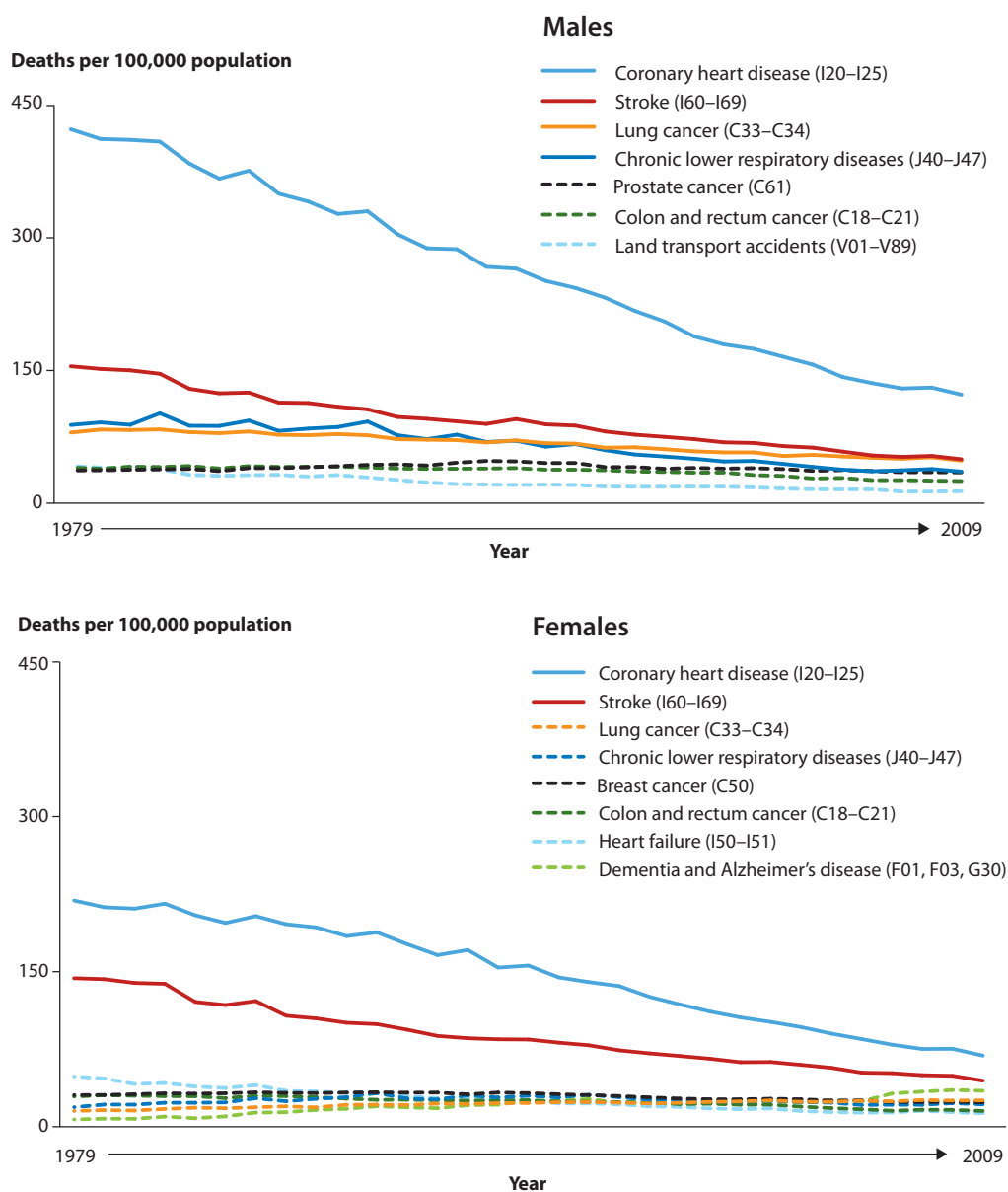
Rank	Males			Females		
	Cause of death (code)	Number of deaths	% of all male deaths	Cause of death (code)	Number of deaths	% of all female deaths
1	Coronary heart disease (I20–25)	12,047	16.7	Coronary heart disease (I20–25)	10,476	15.3
2	Lung cancer (C33–C34)	4,761	6.6	Stroke (I60–I69)	6,706	9.8
3	Stroke (I60–I69)	4,514	6.2	Dementia and Alzheimer's disease (F01, F03, G30)	5,491	8.0
4	Chronic lower respiratory diseases (J40–J47)	3,209	4.4	Lung cancer (C33–C34)	3,025	4.4
5	Prostate cancer (C61)	3,111	4.3	Breast cancer (C50)	2,772	4.1
6	Dementia and Alzheimer's disease (F01, F03, G30)	2,786	3.9	Chronic lower respiratory diseases (J40–J47)	2,769	4.0
7	Colon and rectum cancer (C18–C21)	2,253	3.1	Diabetes (E10–E14)	2,050	3.0
8	Blood and lymph cancer (including leukaemia) (C81–C96)	2,175	3.0	Heart failure (I50–51)	1,884	2.8
9	Diabetes (E10–E14)	2,120	2.9	Diseases of the kidney and urinary system (N00–N39)	1,818	2.7
10	Suicide (X60–X84)	1,631	2.3	Colon and rectum cancer (C18–C21)	1,812	2.6
	Total 10 leading	38,607	53.4	Total 10 leading	38,803	56.7
	Total all causes	72,320		Total all causes	68,440	

Notes

1. Causes of death for 2009 are derived using preliminary data and are subject to a revision process. For more information about revisions to mortality data, refer to ABS 2010e.
2. Codes refer to the ICD-10.
3. ABS tabulations of leading causes are based on Becker, Silvi, Ma Fat et al. 2006. Cause groups based on this methodology are determined according to the level of cause detail available across a broad range of countries. There are other methods of grouping causes that are more relevant to individual countries, such as grouping causes for relevance to prevention strategies.

Source: ABS 2011m.





(a) Causes selected to reflect the leading causes of death, by sex, from 1979–2009.

Notes

1. Leading causes groupings based on Becker, Silvi, Ma Fat et al. 2006.
2. Leading causes are determined by number of deaths by sex, each year. Causes that were consistently among the 5 leading causes of death by sex every year from 1979–2009 are indicated by a solid line. Causes that were among the 5 leading causes of death by sex for any one of the years from 1979 to 2009 are indicated by a dashed line.
3. Rates are age-standardised to the Australian population at 30 June 2001.

Sources: AIHW analysis of the AIHW National Mortality Database; ABS 2010e; ABS 2011m.

Figure 2.20: Trends in selected^(a) leading causes of death, by sex, 1979–2009

International comparisons of mortality can provide a broader picture and assist in guiding health policies and evaluating health outcomes. Mortality rates for selected leading causes of death in Australia, when presented in an international context, show that mortality from these conditions is generally lower than the OECD average (Table 2.4). Australian males had lower mortality rates compared with the OECD average for all selected leading causes in Table 2.4, except for prostate cancer. Among Australian females, mortality rates for all selected causes were lower than the OECD average, except lung cancer and chronic lower respiratory diseases.

There is no standard methodology for making international comparisons. To guide the interpretation of these comparisons, refer to the AIHW publication *A working guide to international comparisons of health* (AIHW 2012).

Table 2.4: Mortality rates for Australia and the average among OECD countries, for selected causes of death^(a), by sex, 2009^(b) (deaths per 100,000 population)

Cause of death	Males		Females	
	Australia ^(c)	OECD Average ^(d)	Australia ^(c)	OECD Average ^(d)
Coronary heart disease	98.9	117.5	52.3	60.4
Stroke	36.0	54.8	33.9	42.3
Lung cancer	39.9	51.9	19.5	19.0
Chronic lower respiratory diseases	4.6	4.8	3.4	2.5
Diabetes	15.1	18.4	10.4	14.1
Colon and rectum cancer	18.1	24.7	11.2	14.0
Prostate cancer	24.3	22.5	..	..
Breast cancer	..	..	18.5	20.1
Suicide	11.9	18.2	3.3	5.1
All causes	568.8	739.5	368.3	448.8

OECD Organisation for Economic Co-operation and Development.

(a) Causes selected to reflect the leading causes of death in Australia and where data were available.

(b) Refers to the latest year of data available to the OECD between 2005 and 2009. For 23 OECD member countries, the latest mortality data were for 2008 or 2009. Deaths for Australia are for 2006. As a result of counting deaths by year of occurrence and the OECD standardisation methods, the rates presented here for Australia are different to those in Table 2.3, and may be different to those presented elsewhere in this report.

(c) Rates are age-standardised to the OECD standard population for 1980.

(d) The OECD average is the average age-standardised rate for the 32 member countries where data were available, except for chronic lower respiratory diseases where data were available for 31 OECD member countries.

.. not applicable or not available for international comparison.

Source: AIHW analysis of OECD.Stat 2011.



What is missing from the picture?

The most recent mortality data for Australia are readily available in tabulated format (ABS 2011m). However, for some analyses of mortality, data are required at the unit-record level, that is, where information about each individual death is available for analysis. This enables grouping of records by specific causes, specific age categories and other characteristics, such as Indigenous status. Due to changes in the process for releasing unit-record mortality data to users (including the AIHW), the most recent unit-record-level data available at the time of writing were for deaths reported in 2007. As a result, the timeliness of some mortality analyses has diminished substantially in Australia.

Information about an individual's socioeconomic status is not available in Australian mortality data. Where possible, national profiles of differences in mortality by socioeconomic status are undertaken using a proxy measure that describes the socioeconomic status of the area that the deceased person usually lived in rather than the socioeconomic status of the individual.

Where do I go for more information?

The annual ABS publications *Deaths, Australia* (ABS 2011l) and *Causes of death, Australia* (ABS 2011m) provide more information on mortality in Australia.

For information about mortality and life expectancy among Indigenous Australians, see the AIHW's *Indigenous observatory* <www.aihw.gov.au/indigenous-observatory>.

A detailed account of the method and other considerations for age-standardisation is in the AIHW report *Principles on the use of direct age-standardisation in administrative data collections* (AIHW 2011h).

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There is a general perception in Australia that we are a healthy nation. While most people have good health and there are improvements on many fronts, it is clear that Australia is not healthy in every way, and there are some concerning patterns and trends.

This chapter examines key measures that help determine how healthy we are as a nation, including disability, burden of disease and life expectancy. It also features a profile of the health of Australia's prisoners.

CHAPTER 3

HOW HEALTHY ARE AUSTRALIANS?



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3.1 Self-assessed health status

At a glance

- Self-assessed health status is often used in population health surveys. It provides information on how healthy people think they are and is a good predictor of subsequent illness, future health-care use and premature mortality.
- The majority (85%) of Australians aged 15 and over rate their health as good or better, but this assessment decreases with age.
- The proportion of people rating their health highly is not the same across all population groups. For example, those living in the least disadvantaged areas are more likely to rate their health as excellent or very good, compared with those living in the most disadvantaged areas.



Introduction

Self-assessed health status is a commonly used measure that provides insight into how people perceive their own health. Respondents in health surveys (such as the ABS National Health Survey, see Box 3.1) are often asked to rate their health according to a five-point scale, for example, as poor, fair, good, very good or excellent.

Although self-assessed health status may appear to be subjective, this measure has been found to be a good predictor of subsequent illness, future health-care use and premature mortality (Bond et al. 2006; Ernstsen et al. 2011). It may incorporate aspects of health such as disease severity or undiagnosed conditions that would not be captured by a more objective or biological measure of health status. When linked with other health measures, self-assessed health status can also show the extent to which chronic conditions affect people's health and wellbeing in a general sense. For example, in 2007–08, 16% of people reporting a long-term health condition rated their health as fair or poor, compared with 4% who did not report a long-term health condition (AIHW 2010a).

Box 3.1: National Health Survey

The National Health Survey is a face-to-face survey run every 3 years by the ABS. It is designed to obtain information on the health of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. The survey aims to be nationally representative, but it does not include information from people living in non-private dwellings or institutions (such as nursing homes, hospitals or prisons).

The most recent survey was run in 2007–08, with previous surveys run in 2004–05, 2001, 1995, 1989–90, 1983 and 1977. The 2011–13 ABS Australian Health Survey, which incorporates elements from the National Health Survey, is currently being conducted.

The National Health Survey covers the self-reported presence of various long-term conditions, health risk factors and the use of health services. For some conditions, information is also collected about age at diagnosis, medications used and other actions taken for treatment or management. The 2007–08 survey also asked about a person's disability level and associated restrictions in everyday activities. Respondents aged 18 and over were also asked a series of questions about their feelings and emotions, called the Kessler Psychological Distress Scale, which gives an indication of their psychological distress levels over the past month.

What do we know about self-assessed health status?

Most Australians consider themselves to be in good health, but this assessment decreases with age. In 2007–08, 56% of people aged 15 and over reported their health as excellent or very good, 29% as good and 15% as fair or poor. The proportions of males and females rating their health positively (that is, good, very good or excellent) were generally similar, even though males do more poorly than females on many other indicators of health status (AIHW 2010a).

Australia's health 2010 presented self-assessed health status according to health indicators such as disability level, presence of long-term conditions, health risk factors and behaviours. In this edition, health status is reported by a selection of demographic and socioeconomic characteristics (Table 3.1).

The proportion of people rating their health highly is not the same across all population groups. As well as underlying poor health, this may be due to cultural norms regarding the discussion of health, and comparisons with peers. For example, the proportion of people who rate their health as excellent or very good is relatively low for those who:

- live in the most disadvantaged areas
- are unemployed, particularly those who are unemployed for 1 year or more
- identify as Aboriginal or Torres Strait Islander.



Table 3.1: Self-assessed health status, by demographic and socioeconomic characteristics, people aged 15 and over, 2007–08

Selected characteristic	Self-assessed health status		
	Excellent/ very good	Good	Fair/poor
Proficiency in English among people who speak a language other than English in the home^(a)			
Very good	66.3	25.9	7.8
Good	45.4	36.5	18.1
Not good/not at all	45.3	32.0	22.6
Socioeconomic disadvantage^(a)			
First quintile (most disadvantaged)	46.1	30.4	23.5
Fifth quintile (least disadvantaged)	63.6	25.7	10.7
Employment status^(a)			
Employed	61.9	29.0	9.1
Unemployed	44.6	41.1	19.7
Unemployed for less than 1 year	51.2	31.7	17.1
Unemployed for more than 1 year	25.4	35.7	38.9
Geographic location^(a)			
Major cities	56.5	29.1	14.4
Inner regional	55.2	28.8	16.0
Outer regional/Remote	51.8	30.4	17.9
Indigenous status^(b)			
Indigenous	37.9	33.9	28.2
Non-Indigenous	56.6	28.8	14.5

(a) Rates are age-standardised to the 2007–08 ABS National Health Survey population.

(b) Rates are age-standardised to the Australian population at 30 June 2001.

Sources: AIHW analysis of the 2007–08 ABS National Health Survey; AIHW 2011a.



Levels of self-assessed health status have been similar since 1995, when the ABS started collecting this item consistently in national health surveys. This information is a performance indicator (see 'Self-assessed health status' below).

Self-assessed health status. The percentage of people aged 15 or over who self-assess their health as excellent or very good.



- Overall, 56% of these Australians describe their health as excellent or very good.
- Patterns in self-assessed health status have remained similar over time; patterns are similar for males and females.
- Older people are more likely than younger people to rate their health as only fair or poor.



What is missing from the picture?

The information presented about self-assessed health status is from one point in time, and shows differences in how people perceive their health by various characteristics. What is missing is data on how and when people change their perception of their health status as they move in and out of different health states (such as having an injury, or developing a chronic disease).

Where do I go for more information?

Other sections in *Australia's health 2012* include information on self-assessed health status, for example, 'Section 3.5 Quality of life' and 'Section 5.1 Health literacy'.

Self-assessed health status is one of several indicators used to define the health domain in the ABS publication *Measures of Australia's progress* (ABS 2011a).



3.2 Functioning and disability

At a glance

- In 2009, 4 million people in Australia (18.5%) reported having a disability. The prevalence of disability fell from 20% in 2003.
- In 2007–08, 46% of people aged 15–64 with severe or profound disability reported poor or fair health, compared with 5% for those without disability.
- Australians with severe or profound disability are more likely than other Australians to be extensive users of professional health services. This relatively high use is associated with a high prevalence of multiple long-term health conditions, and comorbidity of mental disorders and physical conditions.



Introduction

Disability refers to the impairments, activity limitations or participation restrictions resulting from an individual's health conditions. It can be the result of genetic disorders, illnesses, accidents, ageing, or a combination of these factors. A person's experience of disability is the result of the nature and severity of their health condition as well as their own personal attributes and the environmental circumstances in which they live (AIHW 2011b; WHO 2011). Increasingly, disability is recognised as something that affects most people at different stages of their lives, and is best understood as a continuum from having no impairment or limitation to the complete loss of functioning or ability to complete a task (Box 3.2).

Box 3.2: How is disability measured?

Population statistics about disability in Australia are collected by the ABS in the SDAC, which was last conducted in 2009. In this survey, disability is defined as having at least one of 17 impairments, health conditions or limitations that had lasted, or were likely to last, for at least 6 months, and that restricted everyday activities.

The survey collected information about whether or not respondents needed help with various activities, had difficulty undertaking activities or used aids or equipment. Activities related to mobility, communication and self-care are referred to as 'core activities of daily living,' and a person who sometimes or always needs help with one or more of these activities is referred to as having a 'severe or profound core activity limitation.' Sometimes shortened to 'severe or profound limitation' in this report, this is a commonly used measure to describe disability at the higher end of the scale.

The 2007–08 ABS National Health Survey also collected information on people with disability. It was one of the first surveys to include the short disability identification module—a version of the longer SDAC questionnaire modified for use in general population surveys. It should be noted that the range of conditions collected in this survey reflects its health focus, that people in institutions are excluded and that it does not provide information about some disability-related long-term health conditions, such as dementia, autism, Down syndrome, attention deficit hyperactivity disorder and cerebral palsy.

When a person with disability has more than one health condition, the main condition is the one they nominate as causing the most problems.

What do we know about disability?

In 2009, more than 4 million people (18.5%) were estimated to have a disability in Australia (ABS 2010a). This is a decrease from 20% in 2003, much of which can be attributed to a decline in the proportion of Australians reporting disability due to physical health conditions such as arthritis and back problems (ABS 2010a). The number of people with a severe or profound disability, that is, those who often or always require help or assistance with the core activities of daily living, is presented as a performance indicator below.

Severe or profound core activity limitation. The percentage of people who sometimes or always need help with core activities of daily living (mobility, self-care or communication).

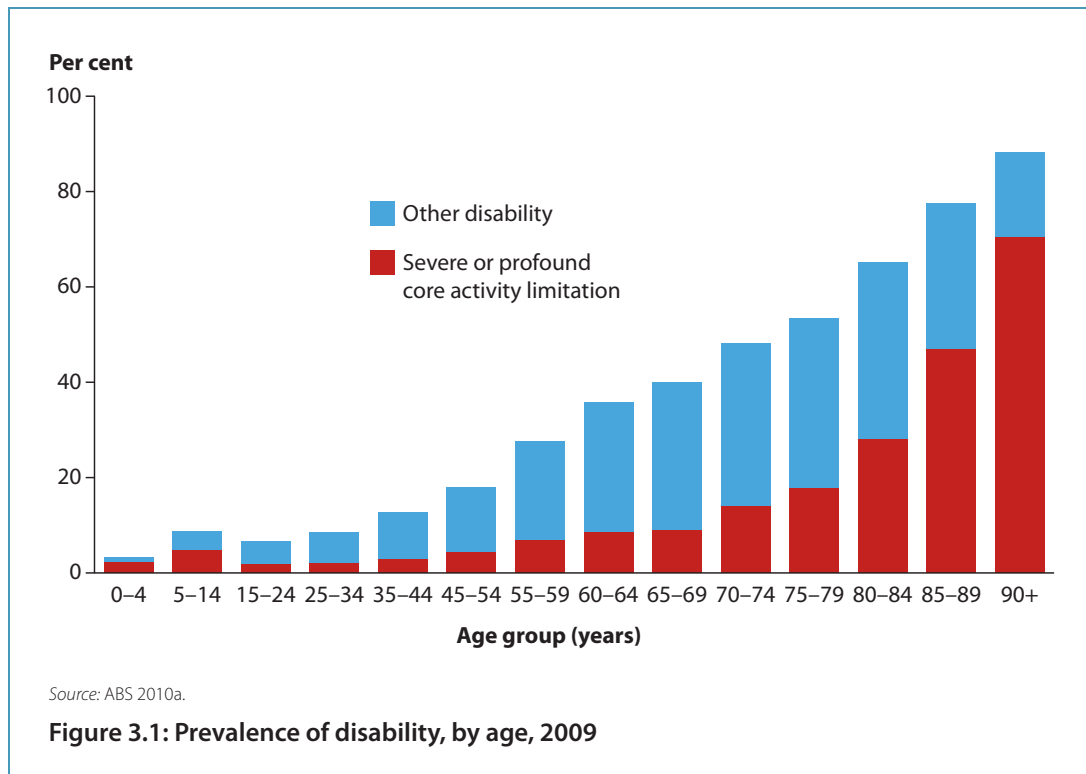


- In 2009, 1.3 million people—5.8% of the population—had a severe or profound core activity limitation.
- Females (6.5%) were more likely than males (5.2%) to have a limitation of this type.
- The rate declined from 6.3% in 2003 to 5.8% in 2009. Much of this decrease is due to a decline in physical health conditions such as asthma and heart disease.

Source: ABS 2010a.

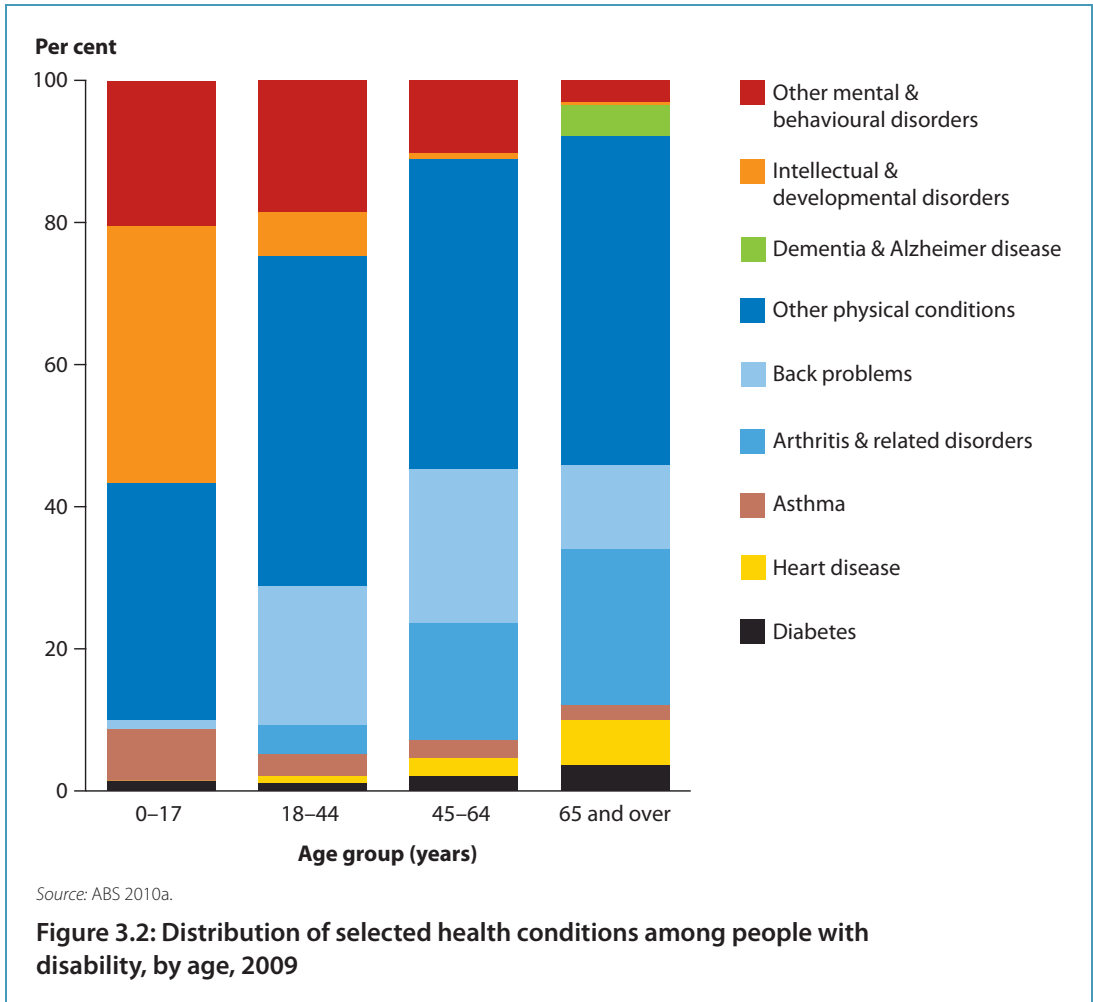


Disability rates and the type of disability reported vary significantly with age (Figure 3.1). For example, 88% of people aged 90 and over had a disability, compared with 40% of those aged 65–69 and 3% of those aged 0–4 (ABS 2010a).



Many health conditions among people with disability are strongly age related, with prevalence increasing significantly as people get older, such as for arthritis, back problems, dementia and Alzheimer disease (Figure 3.2). The most commonly reported condition in childhood (those under 15) was intellectual and developmental delay, which is typically diagnosed around the time of entry into the education system. For adults (those 18 and over), the most common conditions causing disability were those which were acquired, including physical conditions such as back problems and acquired brain injury.





Disability and health service use

Recent evidence both in Australia and internationally shows that people with disability experience significantly worse health outcomes than the general population (WHO 2011). In 2007–08, data from the National Health Survey show that 46% of people aged 15–64 with a severe or profound disability reported poor or fair health, compared with 5% for those without disability (AIHW 2010b).

Australians with severe or profound disability can be extensive users of health services (Table 3.2). This high use is associated with a high prevalence of multiple long-term health conditions, and comorbidity of mental disorders and physical conditions (AIHW 2011c).



Table 3.2: Health service use for people under 65, by disability status, 2007–08 (per cent)

Health service	With severe or profound disability	Without disability
Check-up with GPs at least once a month	29	3
Consult specialist doctors in the 12 months before the survey period	56	16
Consult both specialist doctors and other health professionals in the 12 months before the survey period	41	8

Source: AIHW 2011c.

Of people with comorbidity of mental disorders and physical conditions, 58% of those with a severe or profound disability consulted both specialist doctors and other professionals, compared with 26% of those without disability.

These results are similar to findings from the 2007 National Survey of Mental Health and Wellbeing: during the 12 months before the survey, among all people aged 16–64 with mental disorders, those with a severe or profound disability were more than twice as likely as those without disability to access health services and consult health professionals about mental health issues (59% compared with 24%) (Table 3.3).

Table 3.3: Health service use for people aged 16–64 with mental disorders, by disability status, 2007 (per cent)

Health service ^(a)	With severe or profound disability	Without disability
Access health services (including hospital admissions) for mental health	59	24
Consult health professionals (including GPs) for mental health	56	24
Consult health professionals (including GPs) 5 or more times for mental health	31	12
Consult mental health professionals	41	15
Consult GPs for mental health	32	15

(a) Services in 12 months before survey interview.

Source: AIHW 2011c.

What is missing from the picture?

In 2010 the Australian Government introduced the National Disability Strategy to drive reforms to improve the lives of people with disabilities, their families and carers. One of the strategy's objectives is to improve performance of mainstream services in delivering outcomes for people with disability. At present, despite the substantial overall disparity in health status for people with disability, mainstream administrative health data collections do not identify whether service recipients have a disability.

To assist understanding of the use of mainstream services by people with disability, the AIHW is developing a standard identifier to determine whether people accessing health and related services have a disability.

Where do I go for more information?

Information on specialised disability service provision is in *Australia's welfare 2011* (AIHW 2011b) and *Disability support services 2009–10* (AIHW 2011d).

More information and analysis on the health of people with disabilities is in *The use of health services among Australians with disability* (AIHW 2011c) and in *Health of Australians with disability: health status and risk factors* (AIHW 2010b).



3.3 Burden of disease and risk factors

At a glance

- Burden of disease provides an estimate of healthy life lost due to premature death, and prolonged illness or disability. It can also quantify the impact of certain risk factors.
- Cancer is the major disease group causing the greatest burden in Australia, followed by cardiovascular disease. In terms of specific diseases, heart disease causes the greatest burden, followed by anxiety/depression and Type 2 diabetes.
- Out of 14 risk factors examined, tobacco smoking, high blood pressure and high body mass accounted for the greatest disease burden in 2003.



Introduction

Burden of disease analysis is a technique used to assess and compare the fatal and non-fatal effects of different diseases and injuries on population groups. It combines a wide range of data sources into a summary measure called the DALY (disability-adjusted life year). This allows the effects of different diseases and injuries to be compared on an equal basis and the contribution of various risk factors to be assessed.

One DALY is 1 year of 'healthy life' lost due to premature death, prolonged illness or disability, or a combination of these factors. The more DALYs, the greater the burden, whether applied to an individual or a population. Using information about the duration and severity of diseases and injuries in individuals, and the pattern of these conditions among the community, DALYs can be estimated for each problem and combined to give a grand total. A description of how DALYs are calculated is in *Australia's health 2010*.

The main advantage of DALYs is that they give weight to health problems that cause substantial illness and disability even if they are not fatal, and also to conditions that may not cause many deaths but, when they do, those deaths are of younger people.

It has a number of other advantages. The technique uses data from a range of sources to construct a comparable measure for all diseases, something that cannot be done when separate studies of disease effects are conducted. This characteristic makes it possible to add together the effects from each disease to estimate the total disease burden. Burden of disease analysis also allows the contribution of various risk factors to be calculated—valuable information to inform prevention policies.



The most recent national burden of disease analysis, based on 2003 data, was conducted by the AIHW and the University of Queensland (Begg et al. 2007). A separate Aboriginal and Torres Strait Islander burden of disease report was also compiled (Vos et al. 2007). Since then no updates have been made to the national data. However, projections that were calculated as part of the 2003 study have been used to provide an estimate of updated national burden of disease. The 2003 study also included estimates of the disease burden by state and territory, and some states have updated these estimates where new data were available (Hoad et al. 2010; Queensland Health 2010; South Australia Health 2011).

What do we know about the burden of disease and risk factors?

This section presents a summary of both the 2003 results—the latest directly estimated national results for Australia—and the projections for 2010, which were estimated as part of the 2003 study.

Cancer is the major disease group causing the greatest disease burden in Australia, followed by cardiovascular disease—each of these were responsible for more than 400,000 DALYs in 2003 and 2010 (Figure 3.3). Nervous system/sense disorders and mental disorders follow, both having a similar estimated burden in 2010 of between 370,000 and 380,000 DALYs. The next group of three diseases also have similar burdens to each other at just under 200,000 DALYs: chronic respiratory diseases, diabetes and injuries.

The estimated changes between 2003 and 2010 are based on the trends that were projected for each disease when the 2003 study was done. From these projections, it is expected that the cancer burden will increase and the cardiovascular burden will decrease slightly (Figure 3.3). Other notable changes are projected increases in nervous system/sense disorders and diabetes.

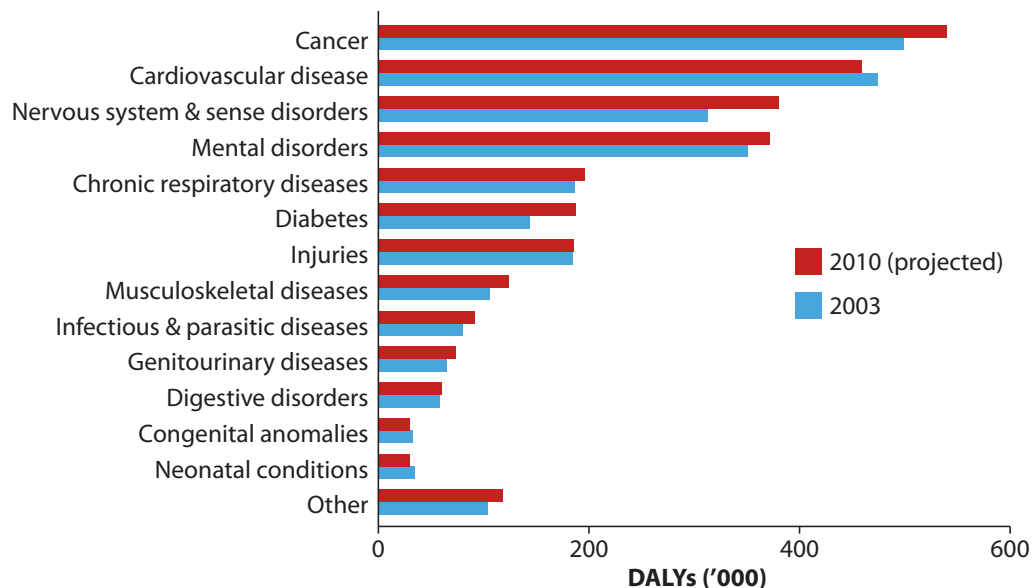
The disease groups differ in the proportion of the burden coming from the fatal or non-fatal components. For example, among the first four disease groups, cancer and cardiovascular disease are dominated by the fatal burden, and nervous/sense disorders and mental disorders by the non-fatal burden.

When looking at the specific diseases that make up these major disease groups, ischaemic heart diseases causes the most burden (about 250,000 DALYs), followed by anxiety/depression and Type 2 diabetes (Begg et al. 2007). The ranking among these three diseases did not change between the 2003 and 2010 estimates.

A useful part of the burden of disease analysis is being able to quantify the impact that certain risk factors have on the burden of disease. The 14 risk factors examined are largely preventable or treatable, and the results show the potential to lower the disease burden if the number of people with these risk factors or the level of risk could be reduced.



Major disease group



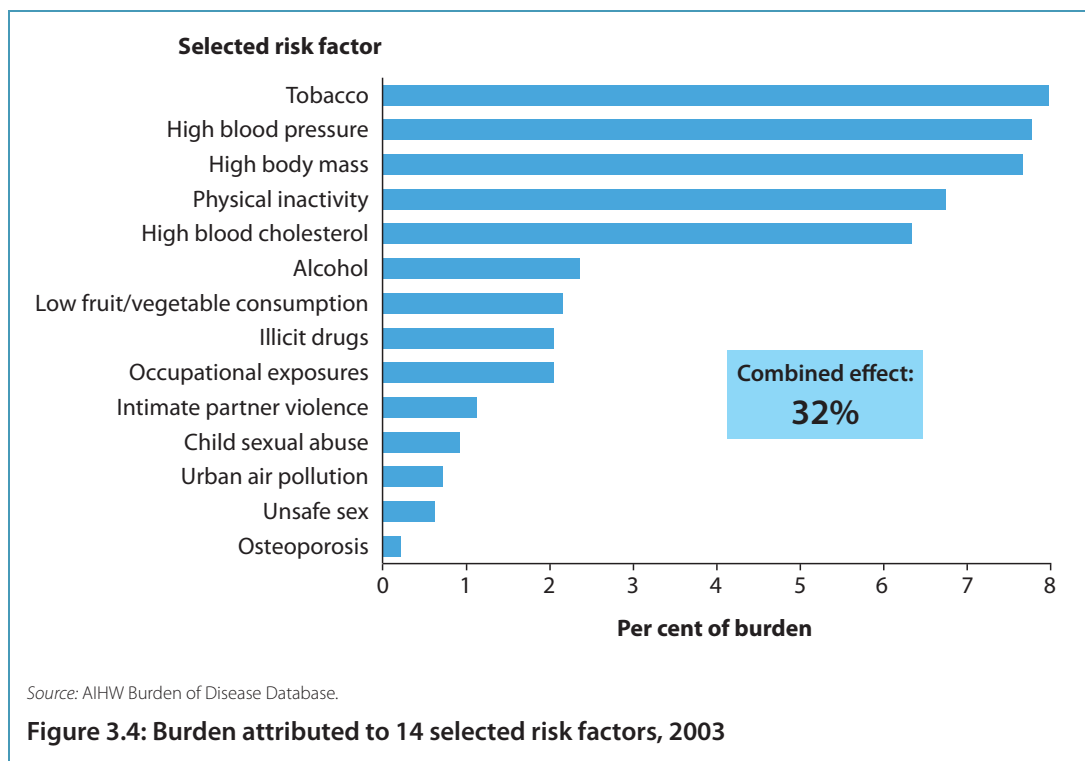
Source: AIHW Burden of Disease Database.

Figure 3.3: Estimated and projected total burden (DALYs) of major disease groups, 2003 and 2010

In 2003, the three leading causes of disease burden out of the risk factors examined—tobacco smoking, high blood pressure and high body mass—each caused between 7.5% and 7.8% of the disease burden (Figure 3.4). The next leading group of risk factors are physical inactivity and high blood cholesterol, which are estimated to have caused 6.6% and 6.2% of the burden respectively. Note that it is not possible to add these proportions directly as some of their effects overlap. However, the joint effect of the 14 risk factors is estimated to be about 32%, indicating that the total disease burden could be reduced by about one-third if these risk factors could be eliminated.

Global burden of disease analysis found the same top four risk factors for high-income countries in 2004 as the Australian 2003 study: tobacco smoking, high blood pressure, overweight and obesity, and physical inactivity (WHO 2009).





Burden of disease analysis allows total life expectancy to be divided into healthy years (health-adjusted life expectancy) and those lived with disability (Begg et al. 2007). Overall, life expectancy at birth was 80.7 in 2003, with 7.8 years, or 9.7% of total life expectancy, estimated to be lived with disability.

What is missing from the picture?

The key limitation with the national burden of disease information is that it is now becoming out of date, with the latest study based on 2003 data. Although sophisticated statistical methods were used to produce the projected results reported here, some caution should be taken when interpreting the projected results because of uncertainties about how incidence, mortality and other factors might change over time.

Where do I go for more information?

Some sections of 'Chapter 6 Causes of ill health' feature burden of disease measures for specific diseases and conditions. For more information on the 2003 study, see the AIHW report *The burden of disease and injury in Australia 2003* (Begg et al. 2007). Results from this study were also in various sections of *Australia's health 2010* (AIHW 2010a).



3.4 Life expectancy

At a glance

- Life expectancy has increased dramatically over the last century and continues to increase. A boy born in 2008–2010 can expect to live 79.5 years and a girl 84.0 years.
- Life expectancy at birth for Aboriginal and Torres Strait Islander people is much lower than for non-Indigenous Australians—12 years lower for boys and 10 years for girls.
- Among OECD countries, Australia has the sixth-longest life expectancy for both males and females.



Introduction

Life expectancy is a measure of how long, on average, a person is expected to live; it is often expressed as the number of years of life remaining for a person at a given age (see Box 3.3).

Life expectancy can be used as a summary measure of the health and wellbeing of the population. It varies between population groups and over time, and can be used to highlight inequalities between population groups and geographical regions.

Box 3.3: Calculating life expectancy

Life expectancy for a person is based on mortality patterns in the population, and the calculation assumes that current death rates will persist throughout that person's life. For example, the life expectancy of newborns is based on age-specific death rates in their year of birth.

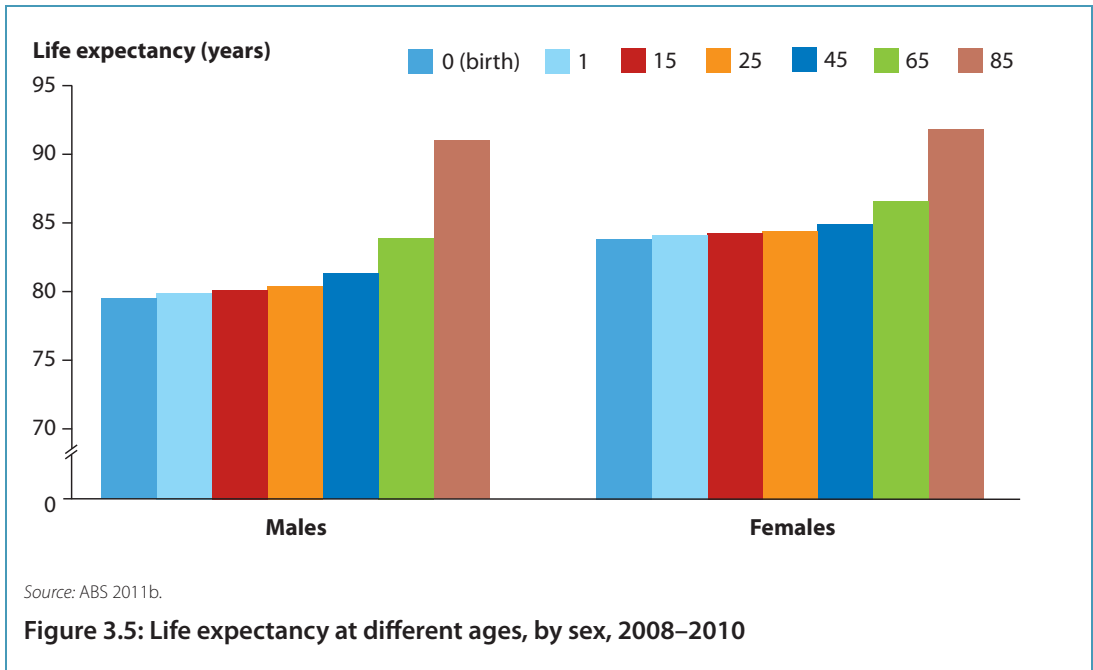
The ABS calculates life expectancy for the Australian population and for some groups of the population. These measures are based on 3 years of data to reduce the effect of variations in death rates from year to year.

Throughout this section, life expectancy is generally expressed as the age a person may expect to live to, rather than the additional number of years after achieving a particular age. For example, the life expectancy of a 65 year old male is presented as 83.9, rather than 18.9 years.

What do we know about life expectancy?

Life expectancy in Australia continues to be among the best in the world: a boy born in 2008–2010 can expect to live 79.5 years and a girl 84.0 years (ABS 2011b). Over the last century, the overall life expectancy at birth for Australians has increased dramatically. For Australians born between 1901 and 1910, life expectancy was 55 for boys and 59 for girls—a generation less than a baby born today (ABS 2008).

Life expectancy changes over the course of a person's life, due to changing patterns of mortality in the population as time goes by. It also reflects that once a person survives the risky periods of birth, childhood and adolescence, their chance of reaching older age increases. Based on data from 2008–2010, a male aged 65 could expect to live another 18.9 years (to 83.9) and a female another 21.8 years (to 86.8) (Figure 3.5).

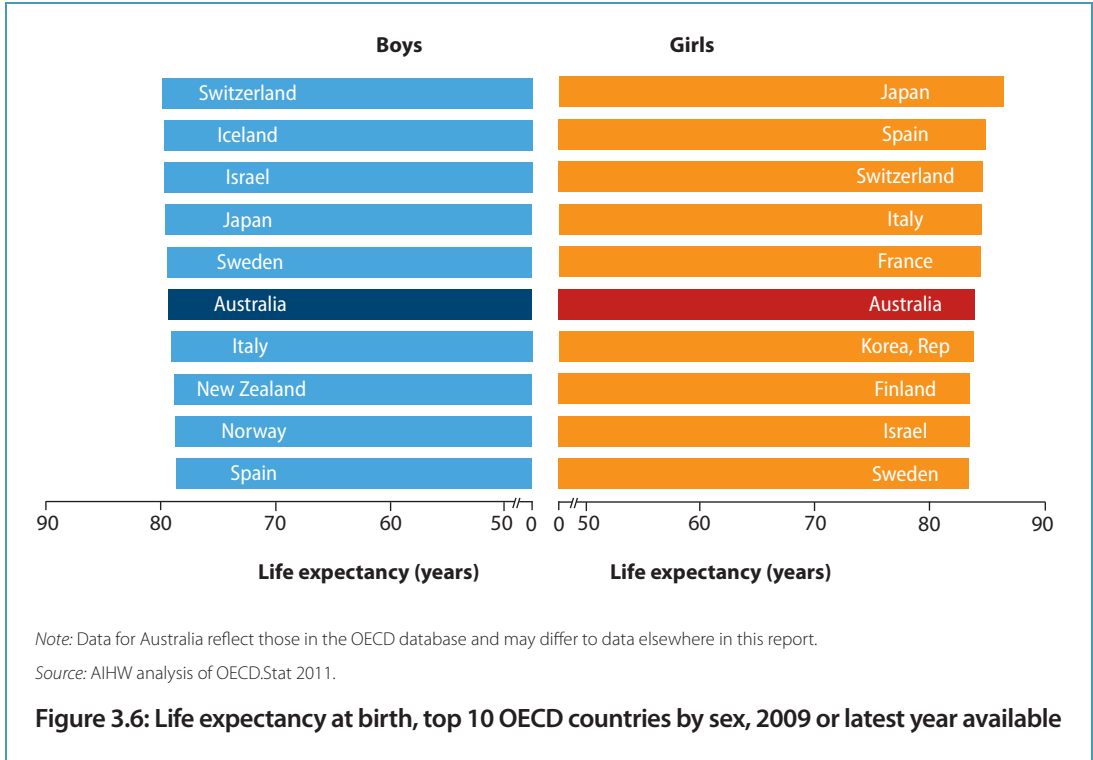


For the Aboriginal and Torres Strait Islander population in 2005–2007, life expectancy was estimated to be 11.5 years lower than that of the non-Indigenous population for males (67.2 years compared with 78.7) and 9.7 years lower for females (72.9 years compared with 82.6) (ABS 2011b).



International comparisons

Australia enjoys one of the highest life expectancies of any country in the world, including comparable countries in the OECD (Figure 3.6). In 2009, Australia was ranked sixth among OECD countries for life expectancy at birth for both males and females. The highest life expectancy at birth was 79.9 for males in Switzerland, and 86.4 for females in Japan.



Why is life expectancy increasing?

There are many reasons for the increase in Australian life expectancy over the past century, including the control of many infectious diseases, improvements in hygiene and sanitation, advances in medical care, rising living standards and better working conditions, better nutrition and health education, and reductions in smoking. See the AIHW publication *Mortality over the twentieth century in Australia* for more information (Magnus & Sadkowsky 2006).

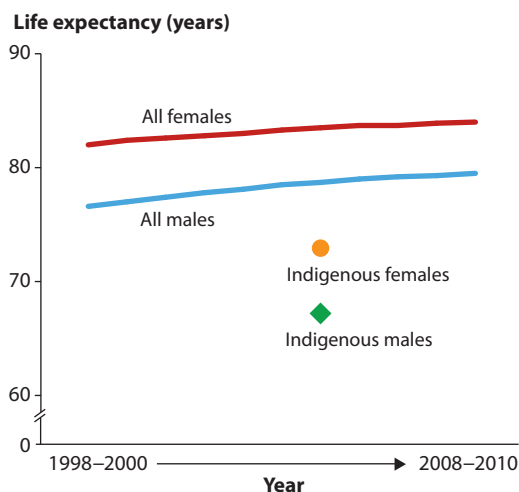
As life expectancy is a good measure of a population's health, it is shown here as a performance indicator (opposite).

Life expectancy (including the gap between Indigenous and non-Indigenous people).



The average number of years a person can expect to live from birth.

- Average life expectancy for girls born between 2008 and 2010 was 84.0; for boys it was 79.5.
- Male and female life expectancy continues to increase.
- Average life expectancy for Indigenous girls born between 2005 and 2007 was 72.9; for Indigenous boys it was 67.9.
- Substantial changes in the methods used to calculate Indigenous life expectancy mean that trend data are not available.



Source: ABS 2011b.

For information about the main diseases contributing to ill health and mortality in Australia, refer to the previous section 'Burden of disease and risk factors' and 'Section 2.8 Mortality'. For information on additional measures of health and wellbeing, refer to the next section '3.5 Quality of life' and 'Section 2.7 Adding years to life and life to years'.

What is missing from the picture?

There are no national data to describe the relationship between life expectancy and lifestyle behaviours, for example, to compare life expectancy of smokers with non-smokers. Similarly, data are not available to look at life expectancy by specific socioeconomic factors, such as employment or level of education.

Life expectancy for the Indigenous population is much lower than non-Indigenous Australians across all age groups. However, Indigenous status is not reported accurately on all death registrations, making it difficult to fully assess the magnitude of this disparity. To improve estimates of Indigenous mortality, the AIHW is undertaking a project using alternative data sources on Indigenous status to enhance data from death registrations.

Where do I go for more information?

Information about life expectancy is published in other AIHW reports, for example, *Australia's health* (AIHW 2008, 2010a), *The health of Australia's males* (AIHW 2011e) and *The health and welfare of Australia's Aboriginal and Torres Strait Islander people: an overview 2011* (AIHW 2011f). For Indigenous information, refer to the AIHW's *Indigenous Observatory* <www.aihw.gov.au/indigenous-observatory>.

International comparisons of life expectancy are in the OECD's biennial publication *Health at a glance 2011* (OECD 2011a). Life tables are published by the ABS; see *Deaths, Australia* (ABS 2011b).



3.5 Quality of life

At a glance

- Quality of life is a broad concept that can be used to summarise the wellbeing of individuals and societies.
- There is no universally agreed definition of what constitutes a 'good' quality of life. Its interpretation differs between individuals based on personal preferences and circumstances, and wider social and cultural norms.
- Australia performs well on many international measures of quality of life. For example, it ranks second out of 187 countries according to the Human Development Index—a summary measure based on life expectancy, literacy, education and gross domestic product.



Introduction

Quality of life is increasingly recognised as an important concept in health and other contexts. There is a growing awareness that health is not merely the absence of disease, but a combination of factors related to physical, mental and social wellbeing (see 'Section 1.1 Understanding health and illness'). Further, the health and wellbeing of individuals is influenced by conditions in the society around them. Single measures, such as life expectancy or the prevalence of disease and risk factors, do not always capture this complexity.

Health professionals, policy makers, researchers and the public are often interested in measures that summarise a wide range of factors and draw out this broad concept known as quality of life. In health care, quality of life measures can be used to assess the impact a condition or treatment has on patient wellbeing. More broadly, quality of life measures are used to summarise the wellbeing of societies, and their social, economic and environmental conditions.

Despite the popularity of these measures, there is no universally agreed definition of what constitutes a 'good' quality of life. Its interpretation differs between individuals based on personal preferences and circumstances, and wider social and cultural norms.

Factors that can affect a person's perception of their quality of life include physical health, psychological wellbeing, levels of independence and functioning, social support networks, material resources and personal beliefs. Broader policies, social inequalities and economic factors can also contribute and are the focus of several quality of life measures used outside health care.



How is quality of life measured?

As there is no agreed definition for quality of life, there are many ways to measure this concept. The questions included in a survey (or variables included in an index) will depend on the research purpose and whether individual or population-level quality of life is being measured.

One way of measuring an individual's quality of life is to ask them how they feel about their life in general. Although questions of this type are based on a personal opinion, the answers reflect a combination of physical, psychological and cultural factors. For example, in the ABS 2007 National Survey of Mental Health and Wellbeing, respondents were asked how they felt about their life as a whole, taking into account what had happened in the past year and what was expected to happen in the future. Respondents were asked for a rating on a seven-point scale ranging from delighted to terrible; results for this question are summarised in Figure 3.7 later in this section.

Other approaches combine responses from several questions to summarise quality of life. For example, the WHO Quality of Life project developed an instrument called the WHOQOL-BREF that uses multiple measures to assess health-related quality of life across cultures (WHO 1996). Respondents are asked to rate their overall health; how satisfied they are with their relationships, work and living environment; and how often they have negative feelings (such as anxiety and depression). Answers for 26 items are summed across four broad domains: physical health, psychological health, social relationships, and environment.

Quality of life measured at a population level can be used to summarise (and compare) quality of life between countries. One indicator (such as gross domestic product) may be chosen as a proxy measure, or several indicators grouped together to form a composite index. The Human Development Index (HDI), for example, is a composite index that summarises a country's development by their achievement along three key dimensions: health, knowledge and general standard of living (UNDP 2011). Health is measured by life expectancy at birth; knowledge by the adult literacy rate and combined primary, secondary and tertiary gross enrolment ratio; and standard of living by gross domestic product per capita. Countries are ranked by an overall value with higher scores representing higher human development (and assumed higher quality of life for citizens).

In Australia, policy makers, researchers and the general public are often interested to know if our quality of life is improving over time. The ABS has developed a framework containing a suite of 17 headline indicators that measure progress and change (ABS 2011a). Called Measures of Australia's Progress, these indicators are grouped under three broad domains: society, economy and environment. Within these broad domains, several dimensions are assessed. Health appears under the 'society' domain, and is measured by life expectancy at birth, infant mortality and self-assessed health status.

Other quality of life indexes are summarised in Box 3.4 over the page.



Box 3.4: Selected quality of life indexes

The OECD Better Life Index is an interactive tool that shows how 34 OECD countries perform on 11 topics (including, for example, housing, income, health, education and environment) that contribute to a better life (OECD 2011b). Australia's performance in this index is shown in Figure 3.8.

The Happy Planet Index combines three indicators: life expectancy at birth, self-reported health status, and ecological footprint, to measure the ecological efficiency with which human wellbeing is being delivered in each country (Abdallah et al. 2009). The nations that top the index are not necessarily the 'happiest' places in the world, but are achieving long, happy lives without over-stretching the planet's resources.

The Australian Unity Wellbeing Index measures quality of life as experienced by the average Australian (Cummins et al. 2010). The index yields two major numbers: the Personal Wellbeing Index (that is, satisfaction in personal areas, such as health, relationships, safety and future security) and the National Wellbeing Index (that is, satisfaction with national life, such as the economy, environment, social conditions, governance, business, and national security).

The Economist Intelligence Unit's quality-of-life index takes a unique approach that links the results of subjective life satisfaction surveys to objective determinants of quality of life across 111 countries and territories (Economist Intelligence Unit 2005). The index includes measures on health, family life, community life, material wellbeing, political stability and security, climate and geography, job security, political freedom and gender equality.

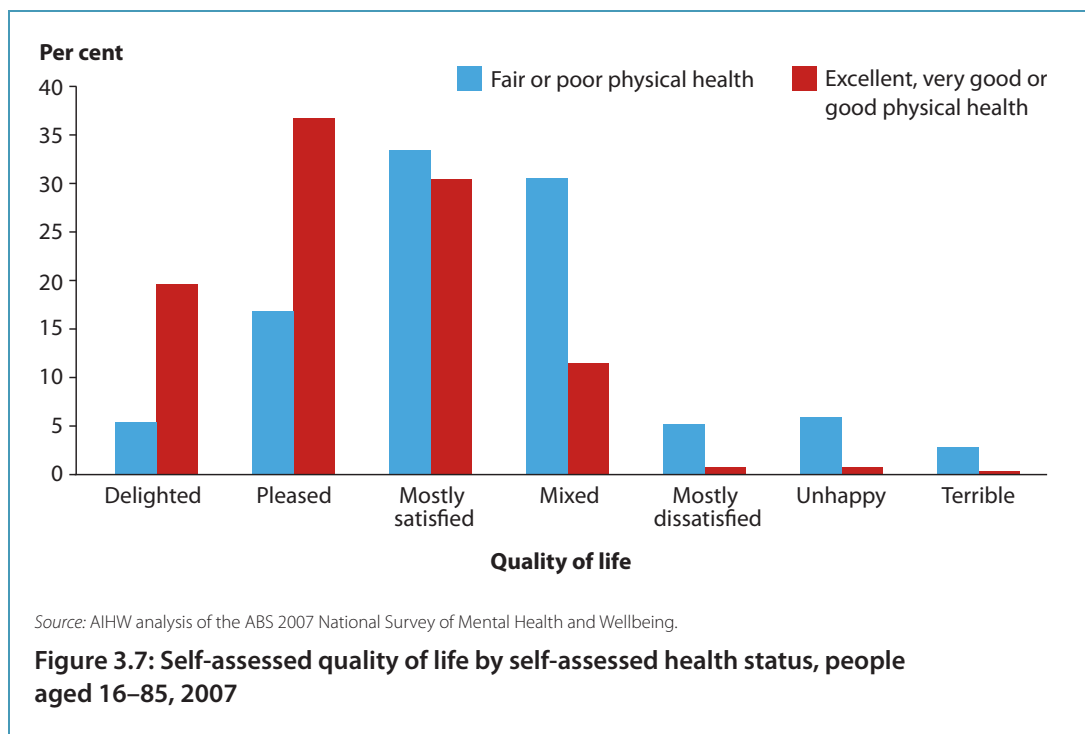
What do we know about quality of life in Australia?

The diversity of approaches to quality of life has produced a wide range of values for Australia. This section examines a number of data sources that tell us about the quality of life of Australians and Australia overall.

National Survey of Mental Health and Wellbeing

When asked in the 2007 National Survey of Mental Health and Wellbeing about their quality of life over the previous year and how they felt about the future, most respondents said they were mostly satisfied, pleased or delighted (AIHW analysis of the SMHWB). About 14% said they had mixed feelings about their life, while 4% felt mostly dissatisfied, unhappy or terrible.

Most respondents who rated their physical health as good, very good or excellent were satisfied with their quality of life, whereas those rating their health as fair or poor were more likely to report mixed feelings (Figure 3.7).



Measures of Australia's progress

In 2011, the ABS reported that of the 17 headline indicators in Measures of Australia's Progress, improvements have generally been made on six indicators: health, education and training, work, national income, national wealth, and household economic wellbeing. For example:

- male life expectancy increased slightly more than female life expectancy (3.1 years compared with 2.1), which resulted in the gap between male and females decreasing by 1 year to 4.6
- between 1998 and 2008, the male infant mortality rate decreased from 5.5 to 4.6 deaths per 1,000 live births, while the female rate declined from 4.5 to 3.6
- the proportion of 25–64 year olds with a vocational or higher education qualification rose from 50% in 2000 to 63% in 2010
- from 1999–00 to 2009–10, Australia's real net national disposable income per capita grew from \$37,400 to \$45,600, in 2008–09 dollars (ABS 2011a).

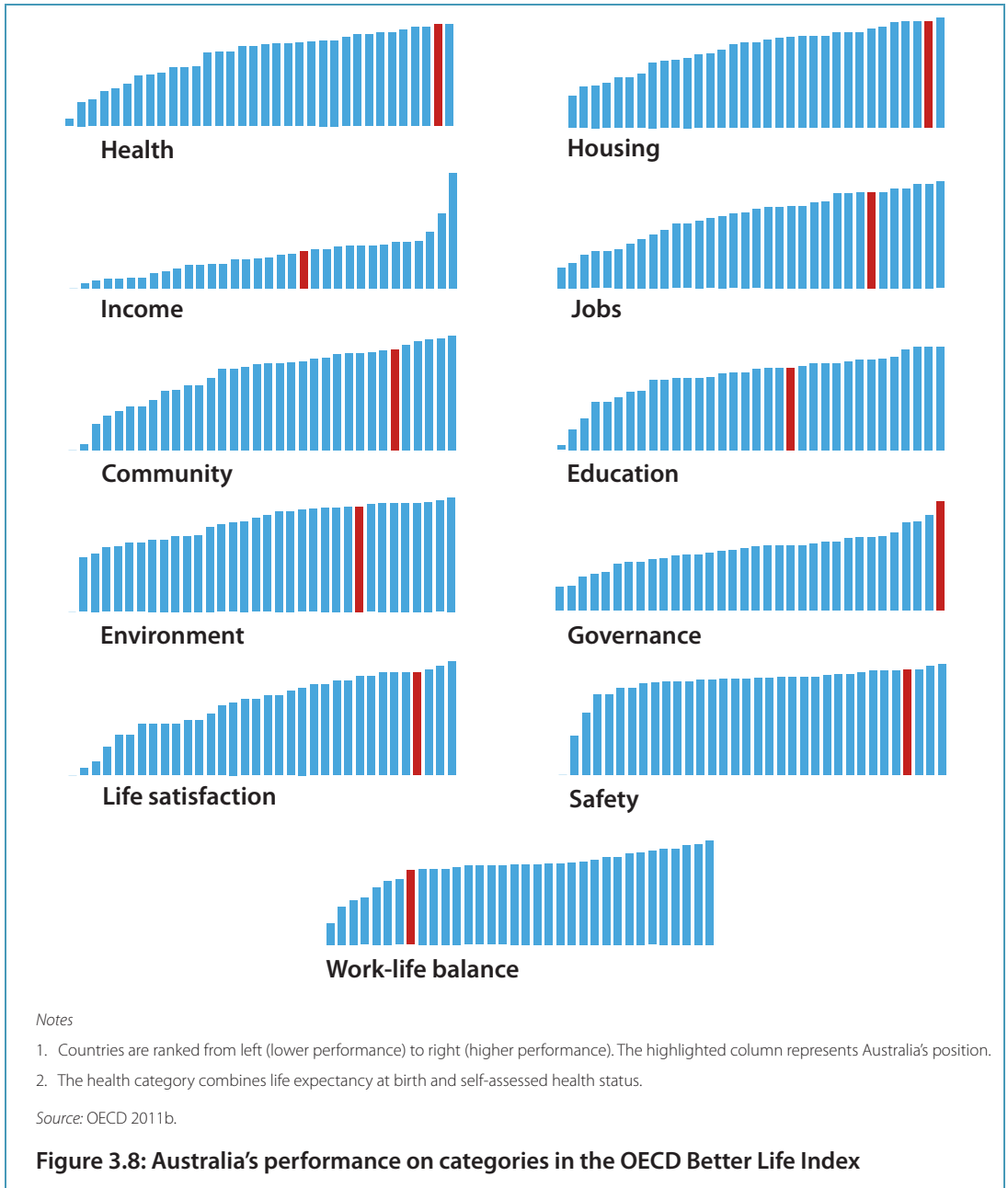
However, Australia has generally regressed compared with 10 years ago on two indicators: biodiversity and atmosphere.

- There was an increase in the number of threatened fauna species from 312 in 2000 to 427 in 2009.
- Australia's greenhouse gas emissions increased by 16% from 473 million tonnes of carbon dioxide equivalent gases in 1998 to 550 million tonnes in 2008 (ABS 2011b).



OECD Better Life Index

Australia performs very well and ranks among the top OECD countries for many of the 11 categories of the OECD's Better Life Index (OECD 2011b). Based on the information in the index, Australia ranks in the top two countries in the categories of health, housing and governance. Australia's performance is broadly summarised in Figure 3.8.



The Human Development Index

The 2011 *Human development report* presents 2011 HDI values and ranks for 187 countries and territories based on a summary measure of life expectancy, literacy, education and standards of living (UNDP 2011). Australia's HDI value for 2011 is 0.929—in the very high human development category. This positioned it second of all countries globally, behind Norway, and ahead of the Netherlands, the United States and New Zealand (UNDP 2011).

Between 1980 and 2011, Australia's HDI value increased from 0.850 to 0.929, an increase of 9.3%. There have also been increases in the global average, suggesting improvements in the key indicators that comprise the HDI.

Care should be taken when comparing countries based on a composite index such as the HDI. For example, there is a consistent criticism of the HDI in its failure to include ecological considerations (Anderson 2009). Further, measuring average wellbeing across entire populations may overlook poorer wellbeing among segments of populations, or the effects of increasing global inequality.

What is missing from the picture?

As noted above, there is no universally agreed definition of what constitutes a 'good' quality of life, and there are no internationally agreed measures. This means it is more difficult to compare populations across and between countries, taking into account the various factors contributing to different experiences of quality of life.

Where do I go for more information?

For the United Nations Development Programme's *Human development report 2011*, visit:
<www.hdr.undp.org/en/reports/global/hdr2011>.

Detailed information on major domains of progress that are included in *Measure of Australia's progress* (ABS 2011a), and their underlying dimensions are available at:
<www.abs.gov.au/ausstats/abs@.nsf/mf/1370.0>.

Australia's full report card for the OECD Better Life Index is available at:
<www.oecdbetterlifeindex.org/countries/australia>.



3.6 The health of Australia's prisoners

At a glance

- As they entered prison, Australia's prisoners reported high rates of chronic health conditions (1 in 4 had at least one) and a history of mental health disorders (31%) compared with the general population. Female prisoners were more likely than male prisoners to report mental health disorders.
- Large proportions of prison entrants engaged in risky health behaviours before entering prison, including smoking daily (74%) and high-risk alcohol consumption (58%). These proportions were substantially higher than those reported in the general population.
- Prison entrants were substantially more likely than the general population to have used illicit drugs in the previous 12 months (66% compared with 16%).



Introduction

At 30 June 2010, there were nearly 30,000 people in prisons throughout Australia (ABS 2010b). Many of these were on remand (awaiting trial or sentencing) or on short sentences, meaning that the prison population is a fluid one. The median time expected to be served for a sentenced prisoner is 2 years, and the median time spent on remand is 3 months (ABS 2010b). Each year, an estimated 50,000 prisoners are released back into the community (Martire & Larney 2009; AIHW analysis of 2010 Prisoner Health Census). The health issues and concerns of prisoners are therefore intrinsically linked to those of the general community.

A range of national and international research has indicated that prisoners have far greater health needs than the general population, with high levels of mental illness, chronic health conditions, injury, communicable disease and disability (Hockings et al. 2002; Butler et al. 2004; Condon et al. 2007; AIHW 2010c).

What do we know about the health of Australia's prisoners?

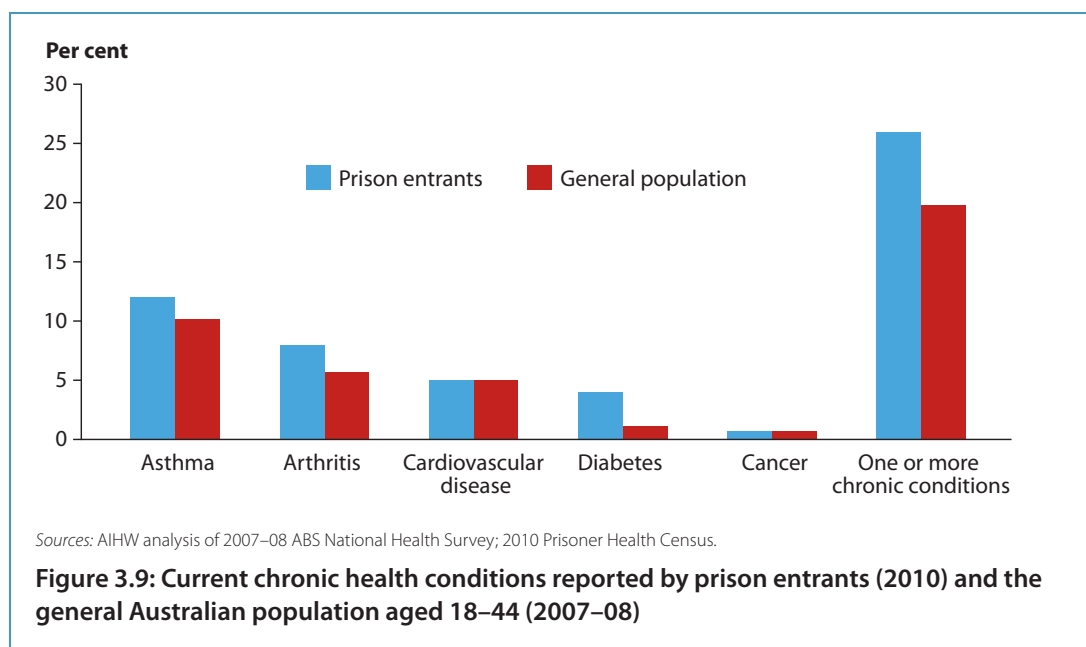
The National Prisoner Health Data Collection includes a broad set of indicators relating to key health issues in the four stages of a prisoner's cycle: at prison entry (reception), while in custody, on release from prison, and post-release. The 2010 Prisoner Health Census included a range of measures relating to the health of prison entrants over a 2-week snapshot period, along with details of clinic visits, and medications used. Indicators relating to release (discharge) and post-release are planned for the future. The 2010 Census confirmed findings of the first Prisoner Health Census in 2009: people entering prison tended to report relatively high rates of chronic and communicable disease, mental illness and risky health behaviours compared with the general Australian population (AIHW 2010c).

Profile of prison entrants in 2010

There were 610 prison entrants in the 2010 Census, from six states and territories across Australia (excluding New South Wales and Victoria). The profile of entrants was similar to that of the general prison population—predominantly male (86%), relatively young (median age of 31), with a large proportion of those identifying as Indigenous (43%). However, compared with the general prison population, there was a larger proportion of women in the 2010 Census (14% of entrants compared with 8% of prisoners in custody) and of Indigenous entrants (43% of entrants compared with 35% of prisoners in custody). Prison entrants also had low educational attainment rates compared with the general Australian population—35% had not completed Year 10 schooling. More than two-thirds (69%) had been in prison previously.

Chronic health conditions

More than a quarter (26%) of all prison entrants reported that they had one or more chronic conditions, compared with fewer than 20% in the general Australian population aged 18–44 (Figure 3.9). Prison entrants were more likely than those of a comparable age in the general population to report currently having diabetes (4% compared with 1%), arthritis (8% compared with 6%) and asthma (12% compared with 10%). Medications for arthritis were taken by 1 in 10 prisoners during the Census period, and asthma and diabetes medications by 1 in 20 for each.



Communicable disease

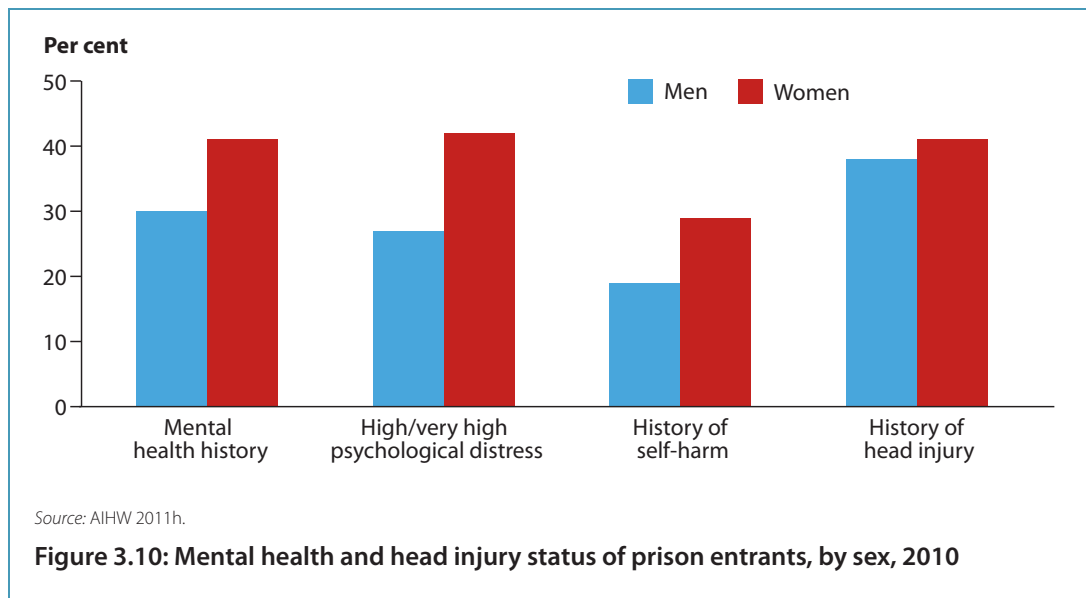
The National Prison Entrants' Bloodborne Virus & Risk Behaviour Survey found substantially higher rates of communicable disease among prison entrants compared with the general population. In 2010, almost 1 in 5 (19%) entrants tested positive to hepatitis B, and an even higher proportion (22%) to hepatitis C; these rates are below 1% in the general population (Butler et al. 2011; AIHW 2011g).



Mental health and head injury

Overall, almost a third (31%) of prison entrants reported a history of mental health disorders; as measured by the proportion that reported having been told at some time by a doctor, psychiatrist, psychologist or nurse that they have a mental health disorder (Figure 3.10; AIHW 2011h). This is higher than the self-reported prevalence of mental and behavioural problems recorded in the general population (11%) (ABS 2009). A similar proportion reported high or very high levels of psychological distress in the previous 4 weeks (29%) and more than 1 in 5 (21%) a history of self-harm. Further, almost 2 in 5 (39%) reported that they had received a head injury at some time in their lives that led to a loss of consciousness—this indicates the possibility of traumatic brain injury, which has been found to be highly prevalent among prisoners (Slaughter et al. 2003).

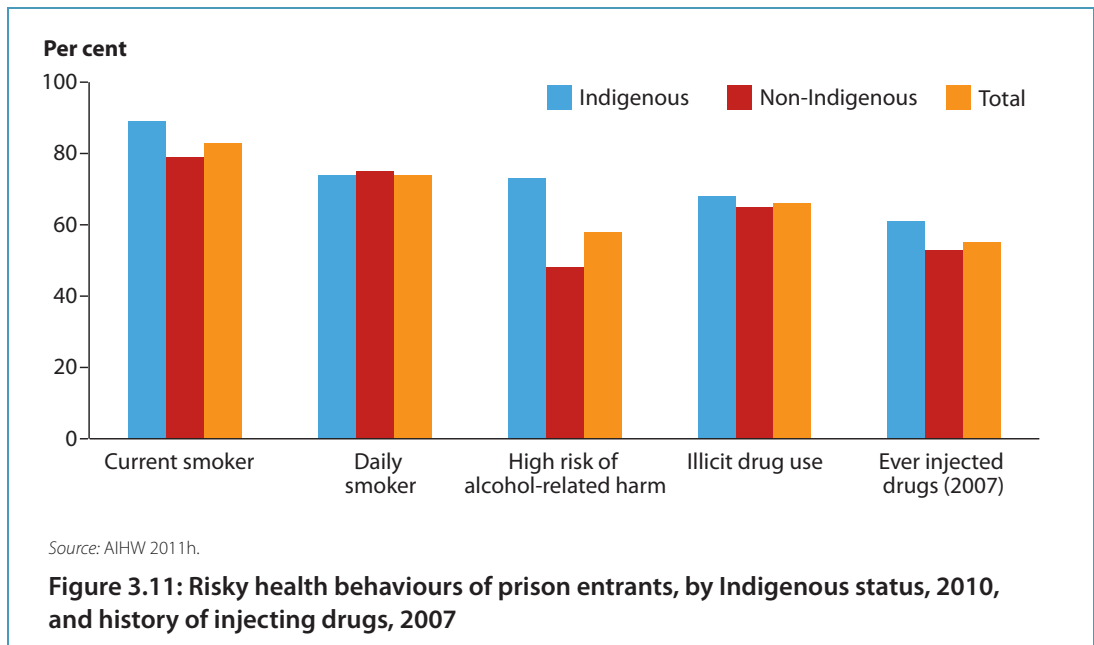
Medications for mental health disorders were the most common of all medications used by prisoners (20% overall)—this included 15% of prisoners taking antidepressants and 8% anxiety medication. Female prison entrants were more likely to report various mental health issues than their male counterparts, most notably in relation to high/very high levels of psychological distress (42%, compared with 27% for men) and having a history of mental illness (41% compared with 30%) or self-harm (29% compared with 19%) (Figure 3.10).



Risky health behaviours

More than 4 in 5 (83%) prison entrants reported that they currently smoked, including nearly three-quarters (74%) on a daily basis (Figure 3.11). This was substantially higher than the general adult (18+) population, which had a daily smoking rate of 16% in 2010 (AIHW 2011g, 2011h). High-risk alcohol use over the 12 months before imprisonment was reported by 58% of prison entrants.

In 2007, more than half of all prison entrants (55%) had injected drugs at some time, with Indigenous entrants (61%) more likely than non-Indigenous (53%) to report this history (Figure 3.11). Indigenous entrants in the 2010 Census were also more likely than their non-Indigenous counterparts to report being current smokers (89% compared with 79%) and consuming alcohol that placed them at high risk of harm (73% compared with 48%).



Previous illicit drug use among prison entrants was also substantially higher than that reported in the general population, with 66% of prison entrants reporting taking illicit drugs in the previous 12 months, compared with 15% of Australian adults overall (AIHW 2011g, 2011h). While the main reported illicit drugs were similar to those reported in the general population of comparable age, rates of prior use of all specific drugs were consistently higher among prison entrants of comparable age (18–44) (Table 3.4). In particular, 51% of prison entrants reported previously using cannabis/marijuana compared with 16% of the general community aged 18–44; 30% previously used meth/amphetamines compared with only 4%; and 10% previously used heroin (compared with 0.4%). Use of multiple drugs was also common; for example, more than 1 in 10 prison entrants reported using at least six different drug types in the past 12 months (AIHW 2011h).



Table 3.4: Types of drugs used for non-medical purposes in the past 12 months, prison entrants and general population, 2010 (per cent)

Substance used	Prison entrants	General population aged 18–44
Cannabis/marijuana	51	16.4
Meth/amphetamines	30	4.0
Analgesics/pain-killers	16	3.2
Tranquillisers/sleeping pills	12	2.0
Heroin	10	0.4
Ecstasy	10	5.9
Cocaine	7	4.3
Hallucinogens	4	2.8
GHB	2	0.3
Ketamine	2	0.5

Sources: AIHW 2011h; AIHW analysis of 2010 National Drug Strategy Household Survey.

What is missing from the picture?

The 2009 and 2010 Prisoner Health Census collections reported on a range of indicators relating to prison entrants, prison establishments and prison clinics. Relevant measures relating to prisoners upon discharge and post-release are currently missing from this picture.

The 2012 Prisoner Health Census will, for the first time, capture information relating to prisoners as they are released from prisons across Australia. This information will be used to complement and compare the health status of prison entrants with those being prepared for release, and will include information relating to the plans of current prisoners when they are discharged. The 2012 Census will include prisons from every state and territory, meaning for the first time a 2-week Census will be run across the country.

Given recent research findings around the increased risk of death among recently released prisoners (see, for example, Kinner et al. 2011), further developmental work is also progressing in relation to deaths post-prison release, and some of this research is expected to be available for reporting as part of the 2012 Census report.

Where do I go for more information?

For detailed information relating to the health of Australia’s prisoners and the National Prisoner Health Census, see <www.aihw.gov.au/prisoner-health>.



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There are many actions that can be taken, by individuals and governments, to prevent or reduce ill health. Australia has a long history of organised efforts in this area and continues to find new ways to tackle health problems.

This chapter describes actions taken to promote good health in the community, for example, environmental monitoring, health promotion activities, vaccination programs and cancer screening. Some of these activities cover the whole population, such as environmental monitoring, while others, such as screening and vaccination, target particular groups based on age or other risk factors.



CHAPTER 4

PROTECTING AND PROMOTING HEALTH



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4.1 Health and the environment

At a glance

- The environment—including natural features, structures created by people and climate change—can have serious consequences for our physical and mental health.
- There is increasing awareness that the way people interact with the environment can be critical to exacerbating or reducing health risks.
- Actions can be taken to prevent ill health, or minimise the impact if an outbreak of disease occurs. This can involve routine monitoring of environmental factors such as air and water quality, or planning for future events such as extreme weather or pandemics.



Introduction

The 'environment' covers all of the external elements that surround, influence and affect life. This includes natural features, such as temperature and ultraviolet radiation; structures created by people, such as homes and transport; and climate change—a prominent example of the relationship between humans and their environment.

There is increasing awareness that our health and the environment in which we live are closely linked. This is reflected in initiatives from governments and other organisations and an abundance of literature covering some environmental factors. Some of the findings that suggest close connections between health and the environment are discussed in this section.

There is also growing awareness that people, through their intervention in the environment, can play a vital role in exacerbating or reducing health risks. This section examines some of the actions taken in Australia to prevent ill health related to the environment; for example, monitoring air, food and water quality; forecasting and warning about extreme weather; controlling vector populations; enforcing quarantine; and planning for pandemics.

How is the environment connected to health?

Based on data from 2002, the WHO estimated that 24% of the global burden of disease and 23% of all deaths were due to modifiable environmental factors (for example, air pollution, sanitation and occupational risks) (Prüss-Üstün & Corvalán 2006). Global estimates are likely to be conservative because it is not always possible to determine whether an environmental factor directly causes a specific health outcome. Nonetheless, the estimates suggest that the environment contributes in a substantial way to death, illness and disability that could otherwise be avoided.

This section highlights some of the findings reported by Australian and overseas studies. These findings represent only part of a vast and emerging area of literature, and in some cases definitive conclusions cannot be drawn.



The natural environment

The natural environment refers to all species, habitats and landscapes on earth, excluding aspects of the environment that originate from human activities (referred to here as the built environment). It includes air, water and climate, as well as micro-organisms, vegetation and animals.

A range of associations between the natural environment and physical and mental health have been examined. The following are examples of findings related to the natural environment.

- From official records, bushfires killed 658 people in Australia between 1900 and 2011 (Emergency Management Australia 2011).
- A survey of Australians living in rural regions found that drought-affected areas had twice the rate of self-reported mental health problems and slightly higher rates of self-reported poor health compared with areas not in drought in 2007 (Edwards et al. 2008).
- During a week-long heatwave in Victoria during January 2009, ambulance attendances increased by 25%, hospital emergency department presentations by 12% and deaths by 62%, when compared with an equivalent period over previous years (State Government of Victoria 2009).
- A survey of Australians found that on an average summer weekend in 2006–07, 24% of adolescents and 14% of adults were sunburnt (Cancer Council of South Australia 2008).
- Australian and overseas research has found that asthma epidemics can occur during thunderstorms as outflows of colder air sweep up pollen grains and concentrate them in a shallow band of air at ground level (Marks et al. 2001; Pulimood et al. 2007).

The built environment

The built environment refers to aspects of our surroundings that are created or modified by people. It includes our homes, schools and workplaces, recreation areas, and infrastructure for transport, energy and waste disposal.

Researchers have examined direct associations between the built environment and ill health, and indirect associations with lifestyle behaviours. The impact of the built environment also reaches beyond health in physical terms and may affect mental health, child development and the quality of social relationships.

Australian studies are not available to examine all aspects of the built environment; therefore, some knowledge in this field has been drawn from large-scale studies conducted overseas. Different social, demographic and geographic characteristics may reduce the ability of some findings to be transferred to the Australian context. The following are examples of findings related to the built environment from Australia and overseas.

- Mortality data show that Australia has one of the highest rates of asbestos-related death in the world (Safe Work Australia 2010). In the first decade of the twenty-first century, there were 5,258 deaths from mesothelioma and 770 deaths from asbestosis.
- A study using Australian data from the 2001 National Health Survey suggested that overcrowding in housing was responsible for 30% of the gap in self-assessed health status between Indigenous adults living in remote areas and the non-Indigenous population (Booth & Carroll 2005). In 2008, 25% of Indigenous Australians aged 15 and over were living in overcrowded households, compared with 4% of non-Indigenous Australians (AIHW 2011a).



- In one study of neighbourhoods near Sydney Airport, residents who were chronically exposed to high aircraft noise were more likely to report stress and high blood pressure than those living in a matched suburb unaffected by aircraft noise (Black et al. 2007).
- A meta-analysis of 33 studies found that living in a damp and mouldy home increases (by 30–52%) the risk of developing respiratory and asthma-related symptoms, such as coughing, wheezing and irritation of the upper respiratory tract (Fisk et al. 2007).
- A 2008 study in the United States found that people living in more walkable neighbourhoods reported a higher quality of life, more involvement in their communities and better health than those in less walkable neighbourhoods (Rogers et al. 2011).
- In a 2001 Dutch study, the annual prevalence for 15 out of 24 diseases was lower for people living in environments with more green space within a 1 kilometre radius of where they lived (Maas et al. 2009).

Climate change

Climate change refers to changes in weather patterns that persist for extended periods, typically decades or longer. Evidence for global climate change is growing, with increases observed in global average air and ocean temperatures, rising sea levels, and widespread melting of snow and ice (IPCC 2007; Garnaut 2011). The scientific consensus is that human activities, particularly those associated with emissions of greenhouse gases, are the primary cause of these environmental changes.

Global warming and increased climate variability are likely to have both direct and indirect effects on the health of Australians (McMichael et al. 2006; McMichael 2011; Climate Commission 2011). Direct effects in the literature include ill health, injury and mortality associated with extreme temperatures, such as during a heatwave, and natural disasters, such as bushfires, floods and cyclones. Indirect effects may include:

- increased rates of diseases such as Ross River virus infection and dengue fever due to changes in the geographic range and abundance of the insect populations that spread the diseases
- changes in food quality and availability due to climate variability and poorer crop yields
- increased rates of foodborne diseases, such as salmonellosis and campylobacteriosis, caused by rising temperatures
- increased rates of post-traumatic stress disorder in communities exposed to more frequent and severe natural disasters.

The impact of climate change will differ according to geographic location, local conditions and by how well individuals and groups are able to adapt. This may magnify existing disparities and public health concerns, as well as create new ones. The literature suggests that the most vulnerable groups will be those living in remote areas, on lower incomes or with poor housing; the young and elderly; and the sick (Climate Commission 2011). Aboriginal and Torres Strait Islanders living in remote communities are also likely to be disproportionately affected by climate change because of their relative isolation and limited access to support facilities (Green 2008).

In response to the weight of evidence, many Australian and international institutions have proposed strategies that aim to mitigate, or help adaptation to, the effects of climate change. For example, the National Climate Change Adaptation Framework outlines the agenda for long-term adaptation to climate change in Australia (DCCEE 2011). Adaptation activities may contribute to preventing further climate change while providing a benefit to individuals' health. For example, riding a bicycle or walking, instead of driving, not only decreases greenhouse gas emissions but improves overall health and fitness.

What actions can protect the health of Australians?

Humans play an important role in exacerbating or reducing health risks related to the environment. As discussed above, many individuals and organisations are now alert to climate change and the importance of strategies that aim to mitigate, or help Australia adapt to, its future effects. Actions are also being taken to monitor aspects of our environment (both related and unrelated to climate change) and their effects on health.

This section examines selected actions taken at a population level to prevent or reduce ill health among Australians. While some involve long-term, routine monitoring of environmental factors, such as air and water quality, others involve planning for future events, such as preparing for extreme weather or pandemics.

Monitoring air quality

Air quality can be monitored for both 'outdoor air' in the atmosphere and 'indoor air' inside homes, workplaces and commercial premises. It may be affected by natural factors, such as bushfires, dust storms and vegetation, and human factors, such as the use of cars, industrial processes and construction materials. Air pollution is most commonly found in towns and cities, particularly in high-density built environments.

Some of the main pollutants that are known for their health effects and monitored include nitrogen dioxide, carbon monoxide, sulfur dioxide, ozone, lead, particulate matter and biological allergens such as pollen. The health effects of these pollutants vary but can include discomfort while breathing, asthmatic and allergic reactions, general irritation of the airways and eyes, aggravation of existing cardiovascular and respiratory conditions, and reduced immunity to infections (Anderson et al. 2004; BTRE 2005; DEH 2005).

In recognition of the effects of these pollutants on health and climate, a range of standards and systems for monitoring air quality have been introduced across Australia. For example, the New South Wales Department of Environment, Climate Change and Water publishes an hourly Air Quality Index value based on data from monitoring stations around New South Wales. Ranging from 'very good' to 'hazardous', the index provides an indication of how clean or polluted the air is, whether outdoor activities should be limited for sensitive groups, and what health effects may occur (DECCW 2011). A health alert is issued when pollution levels are likely to be unhealthy. Other states and territories have implemented similar programs.



Monitoring has shown that outdoor air quality in Australia’s urban areas is generally good and national health-based standards are rarely exceeded for prolonged periods (Australian State of the Environment Committee 2011). Despite growth in population, industry and motor vehicle use, levels of carbon monoxide, lead, nitrogen dioxide and sulfur dioxide have declined in urban areas over the past 10 years. Monitoring results show that levels of particulates and ozone have not decreased over the same period. Research in Australia and overseas has shown that poor air quality continues to be a substantial cause of ill health and mortality (see AIHW 2011b for a summary of findings).

Assessing water quality

Water of adequate quality and quantity is a fundamental requirement for personal and public health. Water quality relates to its physical, chemical and biological properties, including colour, clarity, chemical contaminants (such as pesticide residues and heavy metals) and microbial contaminants (such as bacteria, viruses and protozoa). The standards used to assess water quality depend upon the purpose of the water supply, for example, drinking, bathing, recreation or agriculture.

In Australia, most water sources require some form of treatment to ensure that the water is safe to drink. Water supplied through utilities is required to meet guidelines for chemical and microbial contamination. While states and territories are largely responsible for managing water supplies, national (and some international) organisations provide recommendations and guidelines; for example, the NHMRC’s Australian Drinking Water Guidelines (2004) and the WHO’s Guidelines for Drinking-water Quality (2011).

Water quality in Australia is generally of a high standard, accessible to the majority of the population, and free from contamination (National Water Commission 2011)—see the performance indicator ‘Water quality’ below. Satisfaction with the quality of tap water for drinking has increased among the Australian population—64% indicated they were satisfied in 1994 and 78% in 2010 (Australian State of the Environment Committee 2011).

Water quality. The percentage of households connected to mains or town water.



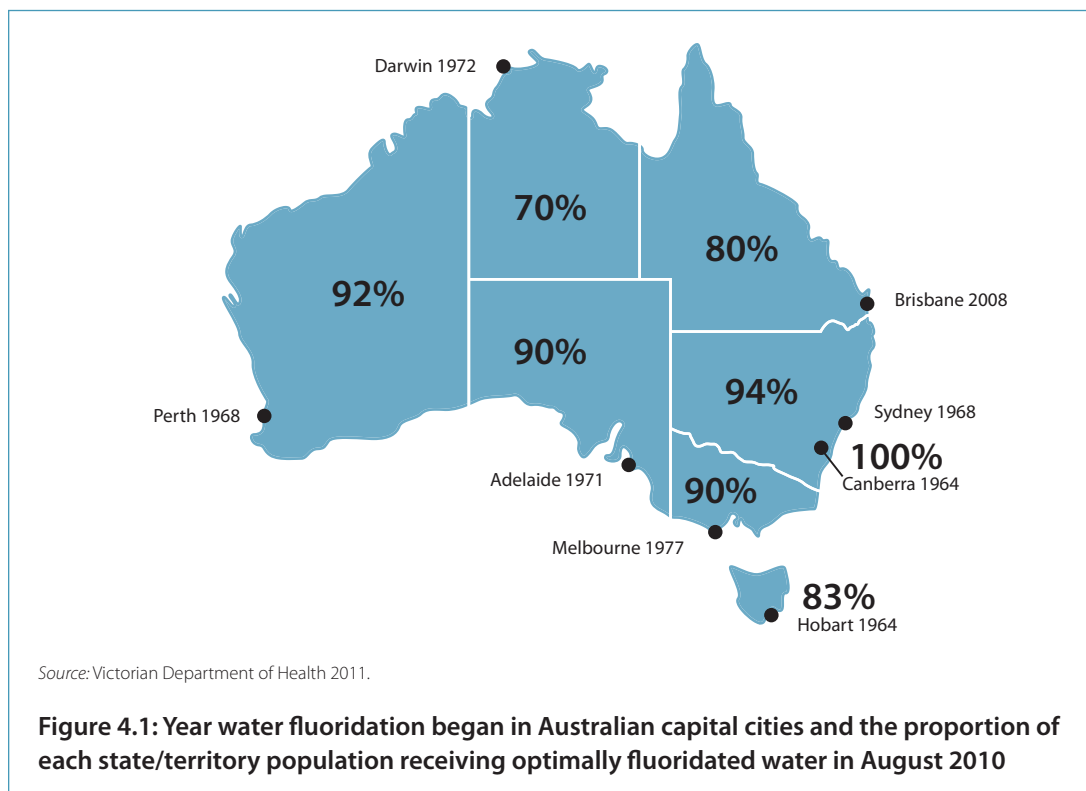
- In 2007–08, 94% of all Australian households had access to mains or town water.
- Water utilities that provide services to more than 10,000 households are regularly tested to ensure compliance with national water quality standards. In 2009–10, 90% of assessed utility providers recorded full compliance.
- The Community Housing and Infrastructure Needs Survey collects data from discrete Aboriginal and Torres Strait Islander communities. Of the 1,187 communities surveyed in 2006, 9 reported no organised water supply compared with 21 communities in 2001.

Sources: ABS 2011a; National Water Commission 2011.



Monitoring water quality involves more than just removing contaminants. Water fluoridation adjusts the level of fluoride in drinking water to achieve a concentration of about one part fluoride per million parts water (AIHW DSRU 2007). This concentration helps prevent dental decay by making teeth less susceptible to the acids formed by micro-organisms living on and around teeth (NHMRC 2007).

Water fluoridation has been practised for more than 60 years internationally and more than 55 years in Australia. Figure 4.1 shows when it began in each capital city and the proportion of the population in each state and territory receiving optimally fluoridated water in August 2010. At that time, more than three-quarters of the population in each state and territory had access to fluoridated water, with the exception of the Northern Territory (70%). Non-fluoridated water supplies are generally more likely to be found in regional and remote areas (AIHW DSRU 2009).



Surveillance of foodborne disease

Foodborne disease places a considerable burden on Australian society—it is estimated there are between 4.0 million and 6.9 million cases of foodborne gastroenteritis every year (Hall & Kirk 2005). Common causes of foodborne disease include bacteria (such as *Campylobacter* and *Salmonella*), viruses (such as norovirus) and toxins (such as ciguatoxin). Children, the elderly, travellers, pregnant women and those with weakened immune systems are at higher risk and may also suffer more severely.



Surveillance of foodborne disease, particularly outbreaks of disease due to one food source, is important for its prevention. OzFoodNet was established by the Australian Government in 2000, in collaboration with state and territory health authorities, to provide better information about the incidence and causes of foodborne disease, and to use this as an evidence base for policy development.

In 2009, 163 foodborne disease outbreaks were reported in Australia and they affected 2,679 people (Table 4.1). Of these, 342 were hospitalised and eight died (The OzFoodNet Working Group 2010). The number of recorded outbreaks increased from 104 in 2008 (affecting 1,454 people) (The OzFoodNet Working Group 2009). Of particular note, there was an increase in the number of hepatitis A infections reported in 2009, due to a large outbreak associated with the consumption of semi-dried tomatoes.

A variety of other foods were also responsible for the 2009 outbreaks. Eggs were most commonly associated with outbreaks, although fish/seafood, poultry, meat and mixed dishes were also implicated. Most reported outbreaks occurred when food was prepared in restaurants (39% of all outbreaks), aged care facilities (12%) and by commercial caterers (11%) (The OzFoodNet Working Group 2010).

Table 4.1: Foodborne disease outbreaks, selected characteristics, 2009

Agent category	Number of outbreaks	People affected	Average outbreak size (people)	People hospitalised
<i>Salmonella</i> Typhimurium	47	646	13.7	110
Norovirus	30	731	24.4	7
Other <i>Salmonella</i> serotypes	12	119	9.9	22
Foodborne intoxication	10	139	13.9	2
Ciguatera/histamine poisoning	5	15	3.0	6
Hepatitis A	4	411	102.8	170
<i>Campylobacter</i>	3	44	14.7	0
Shiga toxin-producing <i>Escherichia coli</i>	2	37	18.5	8
<i>Listeria monocytogenes</i>	2	38	19.0	4
Fish wax ester	2	30	15.0	0
<i>Escherichia coli</i>	1	Unknown	Unknown	0
<i>Yersinia enterocolitica</i>	1	3	3.0	0
Unknown	44	466	10.6	13
Total	163	2,679	16.4	342

Source: The OzFoodNet Working Group 2010.

Controlling vector populations

A vector is an agent that transmits a disease-causing micro-organism from one host to another. The largest group of vectors is insects and other arthropods, most commonly mosquitoes, ticks, flies, lice and fleas. The abundance and distribution of vector populations (and hence the spread of vectorborne diseases) is closely intertwined with environmental conditions that encourage their survival.

Climate change is predicted to affect the abundance and geographic range of vector populations in Australia (Climate Commission 2011). Global warming, increased rainfall (leading to more stagnant pools of water) and tidal changes may increase mosquito populations. The Garnaut Climate Change Review suggested that with global warming, mosquitoes would move into previously inhospitable regions and higher altitudes, and disease transmission seasons might last longer (Garnaut 2011).

Strategies to control vector populations (particularly mosquitoes) are vital for the prevention of vectorborne diseases. Strategies include reducing or eliminating vector breeding grounds, biological controls that target and kill vector larvae, and chemical methods, such as insecticide sprays. Personal protection methods may include the use of insect repellent, house screens or bed nets, appropriate clothing and preventive drugs.

While the overall burden of vectorborne disease is higher among developing countries than in the developed world, health risks for the Australian population still exist. Rates of vectorborne disease fluctuate from year to year depending on environmental conditions. During 2011, there were 8,319 notifications of vectorborne diseases in Australia (DoHA 2012a). Ross River virus infection (5,151 notifications in 2011), Barmah Forest virus infection (1,865) and dengue virus infection (812) were the most commonly reported vectorborne diseases, and notifications included cases acquired in Australia. Other diseases, such as malaria (16 notifications in 2011), are very rarely acquired in Australia. However, they still pose a risk in light of increasing travel to countries where these diseases are present.

Enforcing quarantine

Quarantine is a precautionary measure that involves restricting the movement of people, animals or materials to prevent the introduction, establishment or spread of pests and diseases (AQIS 2011). This section focuses on human quarantine, although other measures related to plants and animals may help secure the Australian food supply, indirectly contributing to good health.

More than 1 million people arrive in Australia by aircraft or ship each month (ABS 2011b). The health status of arriving passengers is monitored by officers of the Australian Quarantine and Inspection Service. The *Quarantine Act 1908* provides officials with the authority to investigate suspected cases and, if required, place people under quarantine. This works by limiting the number of people exposed to an infectious disease and interrupting its transmission to the wider community.



Quarantine measures are also incorporated into the health system for each state and territory. This is particularly relevant for diseases with long incubation periods that may not show symptoms until after people have arrived in Australia. Australian travellers are also encouraged to visit a general practitioner before they travel and to receive the appropriate vaccinations for their destination (DoHA 2011a).

Human diseases covered by the *Quarantine Act*, and notifiable in Australia in 2009, were cholera, plague, rabies, yellow fever, smallpox, avian influenza, severe acute respiratory syndrome (SARS), human swine influenza (H1N1) and four viral haemorrhagic fevers (Ebola, Marburg, Lassa and Crimean–Congo) (DoHA 2011b). In 2009, there were four notifications of cholera (each acquired overseas) and 37,750 notifications of H1N1 influenza associated with a worldwide pandemic.

Planning for pandemics

The term pandemic is used to describe a new disease that spreads worldwide (WHO 2010). Pandemics have the potential to cause widespread illness and mortality, and greatly increased demand on health services. The effects extend beyond health because education, employment, transport, community services and other parts of society can be disrupted. Due to this substantial burden, it is important to carefully plan for potential pandemics.

Past pandemics have occurred related to diseases such as smallpox, tuberculosis and influenza, and have resulted in large numbers of deaths worldwide. The most recent pandemic occurred in 2009 due to the spread of a new strain of influenza A, referred to as pandemic influenza (H1N1) 2009 (swine flu). While most people in Australia who contracted the disease suffered only relatively mild illness, the health-care system was placed under strain with at-risk groups, such as people with pre-existing conditions and pregnant women, requiring a high level of care in some circumstances (Kotsimbos et al. 2010).

In 1999, DoHA began developing the Australian Health Management Plan for Pandemic Influenza (AHMPPI) in response to the pandemic potential of avian influenza (H5N1) and a warning by the WHO that a pandemic was highly likely to occur (DoHA 2009a). The AHMPPI outlines a series of phases that should be implemented in response to an influenza pandemic (Table 4.2).

The AHMPPI was used during the 2009 H1N1 influenza pandemic, with the PROTECT phase introduced to identify vulnerable groups (DoHA 2009a).

Table 4.2: Pandemic Influenza Plan—phases of the health response

Phase	Description
The ALERT phase	Being alert to the risk of a pandemic and preparing for a pandemic
The DELAY phase	Once the pandemic virus emerges overseas, keeping the virus out of Australia
The CONTAIN phase	Once the pandemic virus does arrive in Australia, limiting the early spread
The PROTECT phase	Protecting vulnerable people and those who care for them from the virus
The SUSTAIN phase	Sustaining the response, while we wait for a pandemic vaccine
The CONTROL phase	Controlling the pandemic spread with a vaccine
The RECOVER phase	Once the pandemic is under control, returning to normal, while remaining vigilant

Source: DoHA 2009a.



Public health responses to a pandemic include control measures at an individual and population level. Individual measures include promoting hygiene, such as hand washing, while population measures include border control and closure of certain locations, such as schools. The aim is to prevent the disease from entering the country (in the case of border control) or minimise its spread within the community using other measures (DoHA 2009a).

Pharmaceutical interventions can also be used to treat infections and prevent the spread of disease. Antiviral medication can be used for influenza to reduce its duration and severity, and the likelihood of transmission. DoHA manages the National Medical Stockpile, which contains sufficient quantities of drugs, including antivirals and antibiotics, and other medical equipment, that can be supplied to states and territories in response to medical emergencies such as pandemics (Horvath et al. 2006).

Development of a pandemic-specific vaccine is one of the most effective methods to protect the population. However, production of large amounts of a customised vaccine can be technically challenging and time-consuming (Singh et al. 2010). Hence, it is important to utilise other public health strategies, such as those described above, which aim to delay the arrival of the disease and prevent its spread within Australia.

Preparing for the health effects of extreme weather

The term 'extreme weather' describes unusual weather events or phenomena that are at the extremes of a historical distribution. This includes heatwaves and unusually violent storms, or events such as bushfires and floods that are triggered by extreme weather events. It is important to monitor and understand the health effects of extreme weather, particularly given increasing variability in the climate.

Extreme weather events are monitored by the Bureau of Meteorology and this information can be used to provide warnings to the community, health services and health departments. For example, forecasting thunderstorms, particularly during severe pollen seasons, can be useful for individuals with asthma, and emergency departments planning for increased demand, given evidence (described previously) that asthma epidemics can occur during thunderstorms.

Heatwaves, too, are a common extreme weather event in Australia that can affect health, community infrastructure and services. Heat-related illnesses range from relatively minor rash and cramp, to serious heat stroke causing death or hospitalisation. Groups most at risk include people aged 65 and over, people with existing conditions or disability, and those living alone or in poor-quality housing (PwC 2011).

Planning for heatwaves is a relatively new activity for health departments and other agencies. After a prolonged period of high temperatures in January 2009 that resulted in an estimated 374 deaths, a Heatwave Plan for Victoria was developed by the Victorian Department of Health (2009). It emphasises early detection and warning for heatwaves, including:

- an alert system to notify councils, and health and community service providers, about impending high temperatures
- a state-wide public health messaging and communication system
- support services for at-risk groups
- coordinated responses from key agencies.



What is missing from the picture?

Due to the indirect and complex pathways between our health and the environment, data sources that link specific health outcomes to environmental factors may be limited. Our understanding of the connections between health and the environment could be enhanced by:

- surveys and data sets that collect and link both health and environmental data
- data collected at regular intervals to allow for ongoing monitoring
- data connected to geographic location to measure exposure at a local level.

Exploring these connections is an important task requiring the development of new research methods and collaborations. For example, there has been substantial interest in developing an Australian environmental health surveillance system. This could facilitate the ongoing collection and analysis of data about environmental hazards, exposure to these hazards and the health effects of exposure (Western Australia Environmental Health Directorate: Mullan et al. 2008).

Where do I go for more information?

The 2011 AIHW report *Health and the environment: a compilation of evidence* brings together evidence on the relationship between health and a selected list of environmental factors (AIHW 2011b). It also discusses the difficulties involved in assessing the broader relationship between health and the environment.

Every 5 years, the Department of Sustainability, Environment, Water, Population and Communities produces a report on the *State of the environment* (Australian State of the Environment Committee 2011). The 2011 edition is available from: <www.environment.gov.au/soe/2011>.

4.2 Health promotion

At a glance

- Health promotion is a broad term to describe activities that help improve health and prevent illness, for example, health education, social marketing, policy and regulation.
- Health promotion has a long history in Australia. Many initiatives have aimed to alter attitudes and behaviours, encouraging personal responsibility for health outcomes.
- Health promotion can reduce the burden of ill health and lead to social and economic benefits.



Introduction

Health promotion describes activities designed to improve health and prevent disease, often by helping individuals and communities to increase control over the determinants of health (WHO 2009). It is sometimes narrowly defined as health education and social marketing, however, activities can also include structural changes, such as taxation, legislation and regulation. By focusing on prevention, these activities may act together to reduce the social and economic burden of ill health in society.

The WHO Ottawa Charter for Health Promotion recognised the role of health promotion in achieving health for all (WHO 1986). It identified several action areas, including:

- developing healthy public policy, for example, through legislation, taxation and organisational change, with a strong focus on achieving health equity
- reorienting health services toward health promotion rather than disease treatment
- creating physical and social environments that support and encourage good health
- strengthening community actions and developing personal skills to empower groups and individuals to take ownership of their health and act to improve it (WHO 1986; WHO 2009).

This section focuses on activities designed to improve the health of Australians, and ends with a summary of evidence-based advice for healthy living.

What do we know about health promotion in Australia?

Health promotion has a long history in Australia (Box 4.1). Activities have included direct interventions and regulations that act immediately to bring about change, and strategies that aim to educate and indirectly influence behaviour over the long term. These have been initiated at the national, state and community level, and have been funded by the government, private and not-for-profit sectors.



Box 4.1: Selected history of health promotion activities in Australia

Educational and behavioural campaigns:

1970: *Quit. For life* campaign trialled as part of the North Coast Healthy Lifestyle campaign. Consolidated *Quit* campaigns were launched as part of the National Tobacco Strategy 1997–2005.

1978: *Life. Be in it* campaign receives national funding under the Australian Government.

1981: *Slip Slop Slap* campaign introduced by Cancer Council Australia. The message was modified to *Slip Slop Slap Seek Slide* in 2007.

1987: *Grim Reaper* campaign launched—a graphic television campaign aimed at shocking the Australian public into discussions around HIV transmission.

1989: Heart Foundation launches the *Tick* campaign: a way of helping consumers make heart-healthy food choices.

1997: National Tobacco Campaign *Every cigarette is doing you damage* launched. The campaign is recognised as a leading health promotion campaign worldwide, with material used in more than 42 countries.

2005: *Go for 2&5™* released—a national campaign encouraging Australians to increase their daily consumption of fruit and vegetables.

2008: *Don't turn a night out into a nightmare* introduced as part of the National Binge Drinking Campaign. The campaign specifically targets children and young adults aged 13–25, as well as parents of children aged 13–17.

2010 and beyond: The *Healthy and Active Australia* initiative begins, which includes the *Get set 4 life—healthy habits for healthy kids*, *Healthy Spaces and Places*, *Measure Up* and *Swap it, don't stop it* campaigns. Current anti-smoking campaigns include *Who will you leave behind?*, *Break the chain* targeting Indigenous smokers, and *Every cigarette you don't smoke is doing you good*, which is produced in a variety of languages to target people from culturally and linguistically diverse backgrounds.

Policy and regulation:

1953: After the passing of the *State Grants (Milk for School Children) Act*, all states and territories provide free milk to children aged 13 or under in school.

1953: Fluoridated water is first introduced to Australia in Beaconsfield, Tasmania.

1956: The poliomyelitis (polio) vaccine is introduced to Australia. Mass vaccinations are conducted in primary schools across the country.

1973: All states and territories require wearing of fitted seatbelts in motor vehicles and helmets for motorcycle riders and passengers.

1986: The first International Conference on Health Promotion was held in Ottawa, Canada. At this conference the Ottawa Charter was developed to achieve Health for All by the year 2000 and beyond.

1998: Immunise Australia program launched by the Australian Government, including television advertisements, financial incentives and regulations for school attendance.

2006: National *Close the Gap* campaign launched to reduce Indigenous health inequality by closing the health and life expectancy gap between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians within a generation.

2009: Mandatory standards developed requiring the addition of folic acid to bread-making flour, and iodine to bread via iodised salt.

2011: Laws are passed mandating that all tobacco products sold in Australia need to be in plain packaging from 1 December 2012.



To be successful in changing behaviour, health promotion activities often rely on a mix of strategies. For example, organised efforts to reduce smoking in Australia have included increased taxation on tobacco products; restrictions on how these products can be promoted, sold and used; graphic health warnings on packaging and in the media; and support for smokers who are trying to quit.

To ensure relevance to their target population groups, consideration also needs to be given to factors such as education and literacy, geographic location, language and culture. For example, ethnic groups may have different norms related to health and risk factors, and different expectations of the health-care system. These expectations can influence the outcome of health promotion in these communities (McLennan & Khavarpour 2004).

Health promotion can reduce the burden of ill health and lead to social and economic benefits. A report in 2003 that projected to 2010 the epidemiological and economic savings made from several major health promotion activities in Australia found:

- road safety initiatives—including those encouraging people to wear seatbelts, not drink and drive, and to observe speed limits—were saving 1,000 lives and about 5,000 hospital cases every year
- conservatively, between 1970 and 2010, 10% of the decline in tobacco consumption rates can be attributed to health promotion campaigns, with net benefits equalling \$2 billion
- the rate of HIV transmission would have been 25% higher if the national education and prevention campaigns had not been implemented
- the introduction of subsidised immunisations for measles in 1970 saved an estimated 95 lives and averted about 4 million cases between 1970 and 2003, with net benefits exceeding \$9.1 billion
- the net benefit of campaigns targeting coronary heart disease and associated risk factors between 1970 and 2010 was \$1.98 billion
- returns to the community were more significant than financial returns to the government (DoHA 2003a).

Further, improved or expanded health promotion and disease prevention activities have the potential to increase workforce participation and productivity by 175,000 people (representing an increase of about 0.6%) by 2030 (Productivity Commission 2006). The largest gains are expected in reduced morbidity and mortality burdens of mental health, Type 2 diabetes and cardiovascular disease.

Reductions in the burden of chronic disease and improved quality of life for individuals affected would translate to additional benefits for the wider community, such as a reduced number of carers and reduced health-care costs.

In 2008, the Australian Government allocated \$872.1 million over 6 years to the National Partnership Agreement on Preventive Health, representing the single largest investment in health promotion and related activities in Australia's history (National Preventive Health Taskforce 2010).



Funding for a new national prevention agency—the Australian National Preventive Health Agency (ANPHA)—was announced in 2010 as part of this investment. The agency, which became operational in January 2011, has been established to stimulate and strengthen the national prevention and health promotion effort, with a particular focus on strengthening preventive health workforce capacity, evaluating the effectiveness of existing prevention and health promotion activities, and coordinating two national social marketing campaigns focusing on tobacco use and obesity (DoHA 2012b).

Under the *Australian National Preventive Health Agency Act 2010*, the ANHPA is responsible for:

- developing a national prevention and health promotion research strategy that focuses on translating research into practice, particularly in the areas of intervention, evaluation, policy, cost-benefit analysis and social epidemiology
- facilitating a national prevention and health promotion research infrastructure
- ensuring timely and effective collation, analysis, interpretation and dissemination of evaluation findings
- supporting the development of a workforce skilled in prevention and health promotion
- leading a national approach to social marketing for prevention and health promotion programs (ANPHA 2011).

What is missing from the picture?

Evaluation of health promotion activities is crucial for assessing their impact within the community, their cost effectiveness, whether they achieved what was expected, and identifying opportunities for improvement. To maximise effects, a capacity and methodology for evaluation should be developed and resourced in the planning phase of any proposal. Appropriate baseline data should be collected, and targets or anticipated outcomes documented before a campaign or program begins.

It is sometimes argued that the process of evaluation can be complicated due to the size and diversity of activities across Australia, and difficulties in attributing change in behaviour and health outcomes to a specific campaign or program. However, evaluations of this kind are important because they enable practitioners to document, disseminate and promote effective activities, as well as to assess the cost, impact and benefits of these activities and communicate these to the community. In turn, this strengthens the practice of health promotion in Australia.

Where do I go for more information?

There are many resources related to health promotion initiatives in Australia. As a starting point, information on several national strategies is at:





<www.australia.gov.au/topics/health-and-safety/health-promotion>.

For information on the global campaign for health promotion as a major health strategy, or the principles of health promotion, see the WHO website: <www.who.int/healthpromotion>.














What do the experts say about healthier living?

For children...

	Get your childhood and adolescent vaccinations according to the recommended schedules (DoHA 2007).
	Eat at least 2 serves of fruit and 3 serves of vegetables each day (DoHA & NHMRC 2003).
	Participate in at least 60 minutes of moderate to vigorous activity every day and have no more than 2 hours of screen time each day (DoHA 2010a).
	Maintain a healthy weight (DoHA & NHMRC 2003).

For adults...

	Eat at least 2 serves of fruit and 5 serves of vegetables each day (DoHA & NHMRC 2003).
	Drink no more than 2 standard drinks on any day to reduce lifetime risk of harm from alcohol-related disease or injury (NHMRC 2011).
	Participate in at least 30 minutes of moderate to vigorous activity on most, preferably all, days (DoHA 2010a).
	Maintain a healthy weight: classified as a BMI of between 18.5 and 25 kg/m ² (see 'Section 5.6 Obesity') (DoHA 2009b).
	If sexually active, practice safe sex—use condoms and water-based lubricant (DoHA 2011c).
	Get regular health check-ups (DoHA 2010b).
	Get screened! There are national population-based screening programs for breast, cervical and bowel cancer (see 'Section 4.6 Cancer screening') (DoHA 2003b).
	Reduce and manage your stress (beyondblue 2007).
	Include yourself in your community: volunteer or get involved in sport and community groups (Keleher & Armstrong 2005).
	Practise road safety. This includes: wearing a helmet, wearing your seatbelt, using child restraints, and obeying the speed limit (ATC 2011).
	Don't smoke! If you do, smoke away from others to minimise the effects of passive smoking (Ministerial Council on Drug Strategy 2004).



4.3 Infant and childhood vaccination

At a glance

- Routine infant and childhood vaccination has been available in Australia since the 1930s and is an important public health success.
- As at December 2011, 91.8% of children aged 1 year and 92.6% of children aged 2 were fully immunised. Among older children (aged 5), 89.9% were fully immunised.
- There was little difference in immunisation coverage for 2 year olds across low and high socioeconomic groups and Indigenous and non-Indigenous Australians.



Introduction

Immunisation uses the body's natural defence mechanism—the immune response—to build resistance to specific infections. Vaccination refers to having a vaccine, or actually getting the injection, while immunisation means both receiving a vaccine and becoming immune to a disease as a result of being vaccinated (DoHA 2010c).

Mortality and ill health due to vaccine-preventable diseases have the potential to be substantial, and this is especially true in young children. Immunisation protects children against the effects of the disease itself, and also against long-term complications of the disease, which can be even more severe. It also plays a role in protecting those unable to be immunised. The more people who are vaccinated, the less chance of a disease spreading widely in the community. This is referred to as herd immunity.

The rate of immunisation coverage reflects the capacity of the health-care system to effectively target and provide vaccinations to all children, and the willingness of parents to have their children vaccinated. The reduction in mortality and morbidity in children in the last century is largely due to immunisation (Plotkin et al. 2008).

The immunisation program in Australia

Immunisation has been available in Australia since the 1800s; Box 4.2 provides a brief history.

Box 4.2: The history of immunisation in Australia

Smallpox vaccinations began in 1804 with the smallpox vaccine locally produced from 1847 and reserved mainly for outbreaks.

In the 1880s, plague vaccine was used to control an outbreak of this disease in Sydney. The successful use of vaccines during World War I led to the development and use of new vaccines in the 1920s and beyond (Gidding et al. 2001).

Since the introduction of infant and childhood vaccination for diphtheria in 1932, for tetanus, pertussis (whooping cough) and poliomyelitis in the 1950s, and measles, mumps and rubella in the 1960s, deaths from these vaccine-preventable diseases have declined dramatically.

The NHMRC recommends specific vaccinations for all children, people aged 65 and over, and others at high risk of contracting vaccine-preventable diseases.

The Australian Government provides free vaccines for 16 vaccine-preventable diseases, and these are set out in the National Immunisation Program Schedule (NIPS) (DoHA 2011d). For infants and children, the NIPS specifies hepatitis B, diphtheria, tetanus, pertussis, *Haemophilus influenzae* type b (Hib), poliomyelitis (polio), pneumococcal disease, rotavirus, measles, mumps, rubella, meningococcal disease and varicella (chickenpox). For some Indigenous children, the schedule includes hepatitis A and additional coverage for pneumococcal disease. Infection with these diseases can in some cases cause serious complications or death.

In 2007, vaccination against human papillomavirus (HPV) was introduced to the NIPS for 12–13 year old girls, with a catch-up program for all females then aged 12–26. For more information, see 'Section 4.4 Human papillomavirus vaccination'.

Coverage goals for Australia, recommended by the NHMRC in 2000, call for higher than 90% coverage of children at the age of 2 and near 100% at school entry age. However, due to a small proportion of parents who choose not to immunise their children, and children with medical conditions that preclude immunisation, a 100% immunisation rate is not considered achievable.

The Australian Childhood Immunisation Register (ACIR) records vaccinations administered to children and monitors coverage for conditions in the NIPS (Box 4.3 provides more detail). To be considered fully immunised, children should have received all the vaccinations appropriate to their age.



Box 4.3: Immunisation coverage

The data in this section are for children on the ACIR who are fully immunised for coverage reporting purposes; that is, they have received the specified number of doses of diphtheria, tetanus and pertussis; measles, mumps and rubella; poliomyelitis; hepatitis B; and Hib.

The NIPS includes rotavirus, varicella, meningococcal disease and pneumococcal disease vaccines as well as the vaccines listed above, for children up to the age of 2. In time, the ACIR coverage definition of 'fully immunised' may be expanded to cover all childhood vaccines included on the NIPS.

What do we know about childhood vaccination?

As at December 2011, 91.8% of children aged 12 months to less than 15 months, and 92.6% of children aged 24 months to less than 27 months were fully immunised (Table 4.3). Among older children (60 months to less than 63 months), 89.9% were fully immunised. These cohorts are hereafter referred to as 1, 2, and 5 year olds respectively. The proportion of children fully immunised has remained stable since 2001 for 1 year olds and since 2003 for 2 year olds (DoHA 2011e).

Table 4.3: Children assessed as fully immunised^(a), selected diseases, by age group, 31 December 2011 (per cent)

Disease	Age (years) ^(b)		
	1	2	5
Diphtheria, tetanus and pertussis	92.3	94.7	90.5
Poliomyelitis	92.3	94.7	90.4
<i>Haemophilus influenzae</i> type b (Hib)	92.1	95.0	..
Hepatitis B	91.9	94.3	..
Measles, mumps and rubella	..	93.9	90.3
Fully immunised	91.8	92.6	89.9

.. Not applicable.

(a) Data as at 31 December 2011 and age as at 30 September 2011. Only vaccines administered before 12, 24 and 60 months respectively are included in the calculation.

(b) Children aged 1, 2 and 5 refer to 12–<15 months, 24–<27 months and 60–<63 months, respectively.

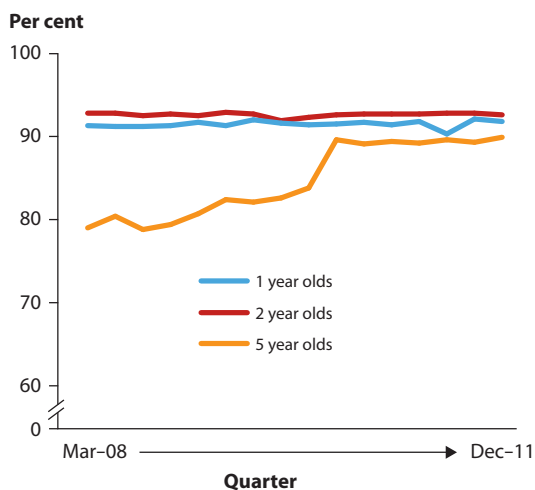
Source: DHS 2012.

The proportion of infants and children assessed as fully immunised has been identified as a key indicator of positive childhood development (AIHW 2011c, 2011d). As such, infant and childhood immunisation is presented here as a performance indicator (see 'Immunisation rates for vaccines in the national schedule' below).

Immunisation rates for vaccines in the national schedule. The proportion of 1, 2 and 5 year olds who have been assessed as fully immunised according to the Australian Childhood Immunisation Register.



- As at December 2011, the proportion assessed as fully immunised was 90% or higher for each of the age groups.
- Between March 2008 and December 2011 these rates have been stable for children aged 1 and 2.
- For children aged 5 there was an increase in coverage in the early part of this period, but rates have since stabilised.



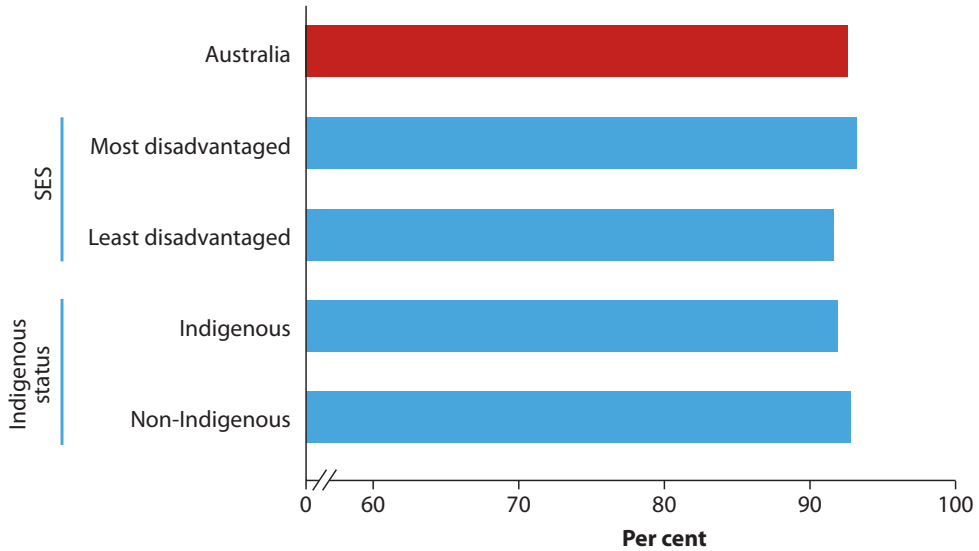
Sources: DHS 2012; DHS unpublished.

In 2010, there was little difference in immunisation coverage for 2 year olds across population subgroups (Figure 4.2).

- Children living in the most socioeconomically disadvantaged areas were not disadvantaged in terms of immunisation coverage: 93.2% of children living in these areas were fully immunised compared with 91.6% of children living in the least disadvantaged areas.
- Aboriginal and Torres Strait Islander children can be at risk of delayed immunisation (NCIRS 2008). By the age of 2 many, but not all, Indigenous children have caught up to their non-Indigenous counterparts. Consistent with this, immunisation coverage at the age of 2 was slightly lower for Indigenous (91.9%) than non-Indigenous children (92.8%).

Between 2008 and 2010 there was little change in immunisation coverage across these population subgroups in Australia (AIHW 2011c).





Note: Records for children whose Indigenous status was not reported (about 3%) were excluded from the analysis.

Source: AIHW analysis of Australian Childhood Immunisation Register data.

Figure 4.2: Two year old children on the ACIR who are fully immunised, selected population groups, 30 September 2010

Based on data from 2009 (or the latest year available), the average vaccination rate for 2 year olds among OECD countries was 93.6% for measles, 95.3% for hepatitis B and 95.3% for pertussis. The Australian vaccination rates for measles (94.0%) and hepatitis B (95.8%) were similar to the OECD averages; however, the vaccination rate for pertussis (91.7%) was lower (OECD 2011).

Where do I go for more information?

For information on the Australian Childhood Immunisation Register, visit www.medicareaustralia.gov.au/public/services/acir.

Detailed analysis of infant and childhood vaccination rates is in the AIHW report *Headline indicators for children's health, development and wellbeing 2011* (AIHW 2011c).

Information specifically related to rates for Indigenous Australians is in the AIHW report *Aboriginal and Torres Strait Islander Health Performance Framework 2010: detailed analysis* (AIHW 2011a).

For a summary of evidence showing that childhood immunisation is an important measure of early childhood development, see the AIHW report *National outcome measures for early childhood development: development of an indicator-based reporting framework* (AIHW 2011d).

4.4 Human papillomavirus vaccination

At a glance

- Through the use of the HPV vaccine, the National HPV Vaccination Program aims to reduce incidence of cervical cancer in Australia by preventing the HPV infection that can lead to 70–80% of cervical cancer cases.
- Coverage of the vaccine in Australia, defined as the proportion of girls vaccinated with three doses of HPV vaccine by the age of 15, was estimated at 70.8% as at March 2011.
- There has been a decline in genital warts and cervical abnormalities among young women since the introduction of the HPV vaccine in Australia.



Introduction

HPV is a virus that infects human epithelial cells of the skin and mucosa. HPV infection with one or more of the 40 genital HPV types is the most common sexually transmitted infection of both men and women, with infection rates highest in women in young adulthood. Persistent infection with a high-risk HPV type is necessary, although not sufficient, for the development of cervical cancer (Walboomers et al. 1999; Bosch et al. 2002).

Australia was the first country to introduce a national HPV vaccination program in 2007. The National HPV Vaccination Program (NHVP), funded by the Australian Government, offers a course of three injections to be given over 6 months. Currently, the NHVP is an ongoing program for girls aged 12–13 administered through schools, although between 2007 and 2009 it also included a catch-up program for girls and women aged 12–26 (NHVPR 2011). To be effective, the vaccines need to be administered before first HPV infection with the specific HPV types, that is, before first sexual activity.

There are two HPV vaccines approved for use in the NHVP (DoHA 2011f). These protect against high-risk HPV types 16 and 18, which are the two main HPV types that can lead to cervical cancer, and are detected in 70–80% of cases of cervical cancer in Australia (Brotherton 2008). One of these vaccines also protects against HPV types 6 and 11, which do not lead to cervical cancer, but cause more than 90% of genital warts.



What do we know about HPV vaccination?

Coverage estimates

Data on the vaccination coverage for NHVP are collected and reported by the National HPV Vaccination Program Register (NHVPR), which is Australia's first adolescent and adult vaccination register, established under Commonwealth legislation to record administered HPV vaccines.

National HPV vaccination coverage, defined as the proportion of girls in the population aged 15 who have received three doses of HPV vaccine, was estimated at 70.8% by the NHVPR. This represented nearly 324,000 doses in 2009 (DoHA 2011f). Coverage estimates (for 3 doses) for the catch-up program run through schools were 73% for girls aged 12–13, 72% for girls aged 14–15, and 66% for girls aged 16–17 (DoHA 2011f). Coverage estimates were lower for women aged 18–26 vaccinated outside schools, with 32% receiving 3 doses, although the true figure is likely to be 10–20 percentage points higher due to under-notification to the NHVPR in this age group (Brotherton et al. 2011a).

The effects of vaccination

Effects on cervical cancer incidence require sufficient time to pass for cancers that would otherwise have developed to be averted by HPV vaccination. However, since the program began, there has been a decline in genital warts among young women (Donovan et al. 2011; Read et al. 2011), as well as the first evidence of a decline in cervical abnormalities (changes to cells in the cervix caused by infection with HPV) in girls younger than 18 in the 3 years after the introduction of the HPV vaccine in Australia (Brotherton et al. 2011b)—both conditions associated with HPV infection.

What is missing from the picture?

It is unknown how the introduction of the NHVP against HPV types 16 and 18 will affect screening rates in the National Cervical Screening Program among vaccinated women. Linking HPV vaccination data and cervical screening data would provide more information on screening outcomes and participation in vaccinated women. For detailed results on the National Cervical Screening Program, see the AIHW report *Cervical screening in Australia* (AIHW 2011e).

Where do I go for more information?

Information about the HPV vaccine and vaccination program in Australia is available on the Cancer Council Australia website <www.cervicalcancervaccine.org.au> and the Immunise Australia website <www.immunise.health.gov.au>.

For the policy advising vaccinated women to continue to have regular Pap tests to screen for cervical cancer, see the National Cervical Screening Program website: <www.cancerscreening.gov.au>.

4.5 Adult vaccination

At a glance

- Of Australians aged 65 or older, 75% were vaccinated against seasonal influenza in 2009. This coverage was similar to that estimated from previous surveys.
- Among the adult population aged 18 and older, seasonal influenza vaccination for those predisposed to severe influenza (53%) and those working in health care, residential care or child care (43%) was higher than the general population (32%).
- Of Australians aged 65 or older, 55% were fully vaccinated against pneumococcal disease.



Introduction

Vaccination strengthens the body's defences against a particular disease (or infection) by exposing the immune system to a relatively weak version of the virus, bacterium or pathogen that causes that disease. In Australia, there are more than 20 diseases or conditions for which vaccines are available.

The diseases and infections against which adult Australians are routinely vaccinated include seasonal influenza (often called influenza or 'the flu'), pneumococcal disease, tetanus, shingles, pandemic (H1N1) influenza (swine flu) and pertussis. Information on adolescent and adult vaccination against HPV is in the previous section, '4.4 Human papillomavirus vaccination'.

Of these diseases, the most serious and common are seasonal influenza and pneumococcal disease. Vaccination against these diseases is provided free of charge to adults aged 65 or older under an Australian Government program. A further program is available to Aboriginal and Torres Strait Islander people aged 50 or older, and those aged 15–49 with medical or other risk factors.

With the exception of the NHVPR for HPV vaccination, the most recent information about vaccination of Australian adults comes from the 2009 Adult Vaccination Survey, which asked Australians aged 18 or older about their vaccination against seasonal influenza, pneumococcal disease, pandemic influenza and pertussis.

In *The Australian immunisation handbook, 9th edition*, the NHMRC provides clinical guidelines on the safe and effective use of vaccines (DoHA & NHMRC 2008) and, in particular, discusses vaccination for specific at-risk groups, for each disease. These groups are targeted for one or more of the following reasons:

- they are at higher risk of being infected because of lower immunity
- they are at higher risk of being infected because of greater exposure to others who are infected (say in health-care, aged care or child care settings); or they may infect others in these settings
- they are at higher risk of complications were they to be infected.

Results for some of the at-risk groups are reported in this section.



What do we know about adult vaccination?

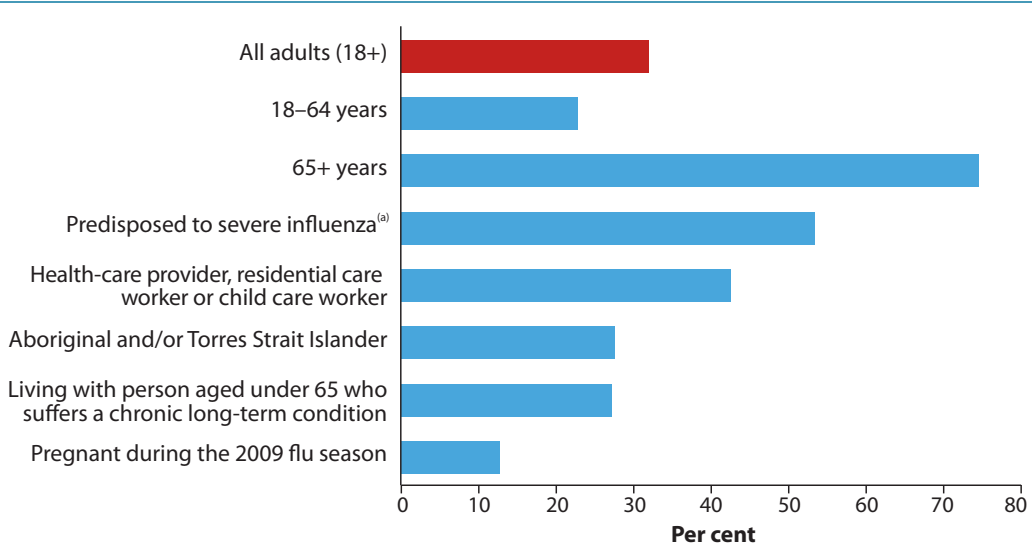
Seasonal influenza

Influenza is an infectious viral disease that can sometimes cause widespread illness in the community and lead to complications, such as pneumonia and pleurisy (DoHA & NHMRC 2008).

In 2009, 32% of Australians aged 18 or older were vaccinated against seasonal influenza (Figure 4.3). Vaccination for various NHMRC at-risk or recommended populations was higher than the general population for those predisposed to severe influenza (53%) and those working in health care, residential care or child care (43%).

4

Protecting and promoting health



(a) Australians with various circulatory, respiratory and immuno-suppressing conditions.

Source: AIHW 2011f.

Figure 4.3: Vaccination against seasonal influenza, selected groups, 2009

Pneumococcal disease

Pneumococcal disease is an infectious bacterial disease that most frequently occurs in young children and the elderly. The most common form of the disease in adults is pneumococcal pneumonia; other forms are meningitis and septicaemia.

The proportion of the population vaccinated against pneumococcal disease varies by age group. Of the population aged 65 or older (one of the NHMRC target groups), 54% were fully vaccinated in 2009 (that is, had the relevant number of vaccinations for their age), whereas among those aged 18–64, 5% were fully vaccinated.

Results for Aboriginal and Torres Strait Islander people are drawn from the 2004–05 ABS National Aboriginal and Torres Strait Islander Health Survey (AIHW 2011a). It was estimated that in 2004–05, 12% of Indigenous Australians aged 18–49 had been vaccinated against pneumococcal disease in the last 5 years. Of those aged 50 or older, 34% had been vaccinated in the last 5 years.

Vaccination rates for influenza and pneumococcal disease. Proportion of people aged 65 or over who have been vaccinated for influenza and pneumococcal disease.



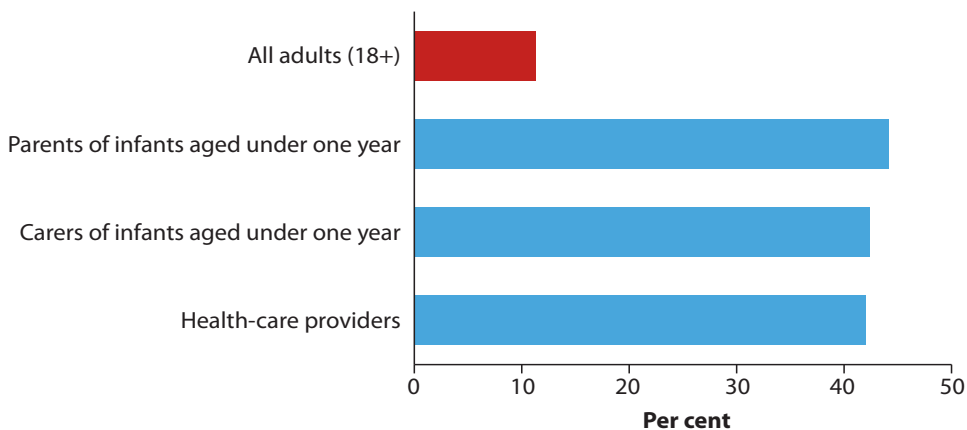
- In 2009, 51% of Australian adults aged 65 and over reported they were immunised against pneumococcal disease and influenza.
- Vaccination rates for influenza and pneumococcal disease were highest in *Remote/Very remote* areas (57%) but generally similar for *Major cities* (50%), *Inner regional* (52%) and *Outer regional* areas (49%).
- Between 2006 and 2009, vaccination rates for influenza and pneumococcal disease declined among those aged 65 and over—from 59% to 51%.

Sources: AIHW 2011f; COAG Reform Council 2011.

Pertussis

Pertussis (also known as whooping cough) is caused by a bacterial infection and is highly infectious among unvaccinated individuals. In adults, it can be associated with significant morbidity, with cough persisting for up to 3 months.

At the time of the 2009 survey, 11% of Australians aged 18 or older were vaccinated against pertussis as an adult or adolescent. Although most Australians have childhood vaccinations for pertussis, the NHMRC recommends a booster vaccination for certain at-risk groups of adults (see Figure 4.4). For the three at-risk groups shown, vaccination rates are considerably higher than for the broader population aged 18 or older.



Source: AIHW 2011f.

Figure 4.4: Vaccination against pertussis as an adult or adolescent, selected groups, 2009



What is missing from the picture?

For adult vaccination, there is a lack of routine data collection. The information that is available comes from irregular population surveys, and does not cover all vaccines available to adults (for example, tetanus and Q fever). There is not an adult vaccination register similar to the children's vaccination register discussed in 'Section 4.3 Infant and childhood vaccination'.

Also, it should be noted that the data from the 2009 Adult Vaccination Survey, on which some of the results above are based, cannot support statistically valid results for Aboriginal and Torres Strait Islander people and other smaller population groups.

Where do I go for more information?

For detailed findings from the 2009 Adult Vaccination Survey, see the AIHW report *2009 Adult Vaccination Survey: summary results* (AIHW 2011f) and the COAG Reform Council report *National Healthcare Agreement: performance report for 2009–10* (COAG Reform Council 2011).

4.6 Cancer screening

At a glance

- More than 1.7 million women participated in BreastScreen Australia in the 2-year period 2009–2010. Participation by women in the target age group of 50–69 has remained between 55% and 57% for the past decade.
- Nearly 3.8 million women participated in the National Cervical Screening Program in the 2-year period 2009–2010. Participation by women in the target age group of 20–69 has remained between 57% and 59% for the past 5 years.
- About 38% of the 2.1 million people invited to participate in the National Bowel Cancer Screening Program between July 2008 and June 2011 returned a completed bowel cancer screening kit for analysis.



Introduction

Cancer screening involves the use of a test to identify individuals at risk of cancer. The screening test itself is not diagnostic; rather, individuals with a positive screening result are usually referred for further investigation with diagnostic tests. The aim of screening is to either detect cancer at an earlier stage where treatment options are often more effective, or detect and treat abnormalities that, if left untreated, may become cancerous.

Population-based cancer screening is an organised, integrated process that uses systematic testing within a defined target group. It does not include testing when an individual presents to a health-care practitioner because of symptoms, or when a test is offered to an individual without symptoms as part of a general health check.

Population-based screening programs should ideally meet a number of criteria defined by the WHO: the condition must be an important health problem and have a recognisable latent or early symptomatic stage; a validated, safe and acceptable test that is able to accurately predict the presence of the disease must be available; and effective, available and accessible treatment options must be available to all people diagnosed with the disease.

In Australia there are national population-based screening programs for breast, cervical and bowel cancer that meet these criteria. These programs are BreastScreen Australia, the National Cervical Screening Program (NCSP) and the National Bowel Cancer Screening Program (NBCSP).

While prostate cancer is also an important health condition, current evidence is that the commonly used prostate-specific antigen (PSA) test, either alone or combined with digital rectal examination, is not suitable for use in a population-based screening program, and the harms of such screening outweigh the benefits (AHMAC 2010).



What do we know about cancer screening in Australia?

The three population-based cancer screening programs are monitored against defined standards and performance measures (indicators). An important indicator of the effectiveness of a population screening program is the proportion of people in the target population who take part and the equity of access by different subgroups.

Participation is reported annually for each of the national screening programs by the COAG Reform Council as NHA performance indicators (see 'Cancer screening rates' below). More comprehensive reports on all screening program indicators are produced annually by the AIHW, in separate monitoring reports (see 'Where do I go for more information?').

Cancer screening rates (breast, cervical, bowel). Target populations who have participated in one of the three national cancer screening programs.



- 55.0% of women aged 50–69 participated in BreastScreen programs (2009–2010).
- 57.4% of women aged 20–69 participated in the National Cervical Screening Program (2009–2010).
- 50.4% of people aged 50, 55 and 65 participated in the National Bowel Cancer Screening Program in 2010.

BreastScreen Australia

BreastScreen Australia was established in 1991 and operates as a joint program of the Australian and state and territory governments. It aims to reduce illness and death resulting from breast cancer in Australia through organised mammographic screening to detect cases of unsuspected breast cancer in women, enabling intervention at an early stage. BreastScreen Australia targets women aged 50–69 for 2-yearly screening mammograms, although women aged 40 or above are also eligible to attend.

Participation is measured over 2 years to align with the recommended screening interval (time between screening mammograms) of BreastScreen Australia, and is based on the number of women screened (not the number of screening mammograms performed) as a proportion of the target population.

How many women participated?

More than 1.7 million women participated in BreastScreen Australia in the 2 years from 2009–2010, of which 79% were in the target age group of 50–69.

Participation by women aged 50–69 has remained steady at 55% to 57% between 1997–1998 and 2009–2010, despite a steady increase in the actual number of women participating over this time.

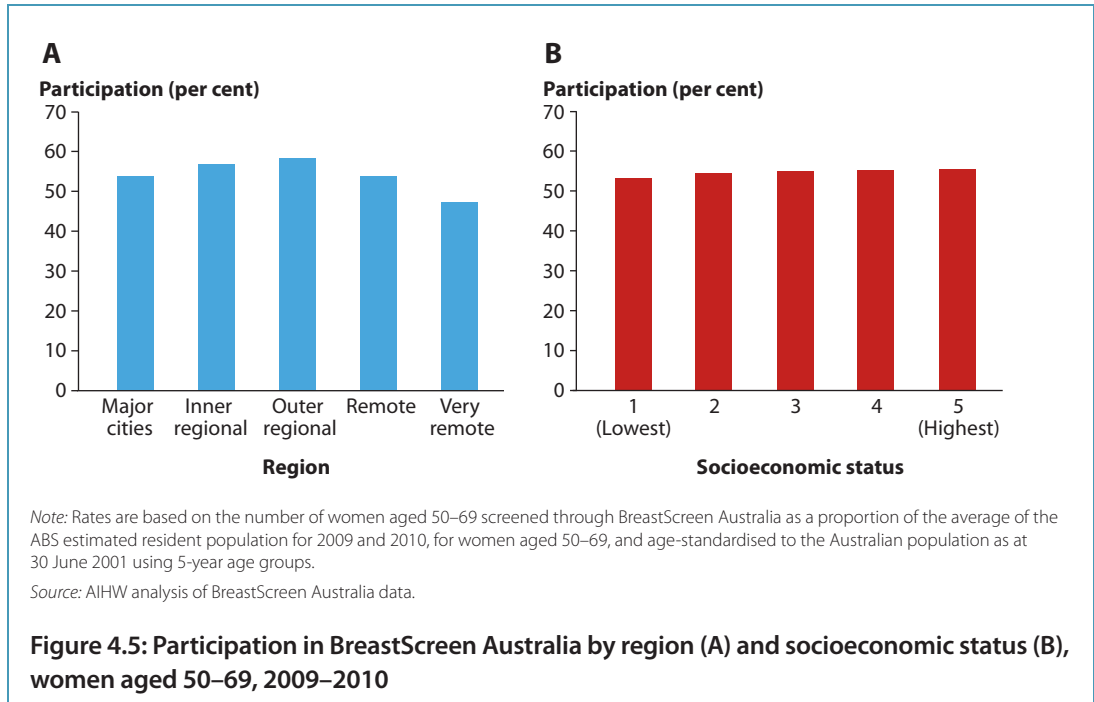


Does participation differ for different populations?

Participation by Aboriginal and Torres Strait Islander women increased from 33.7% to 36.2% from 1998–1999 to 2009–2010; however, it remained significantly lower than that of non-Indigenous women (54.9%) in the latest reporting period.

Participation varies by geographic region of residence, with the highest measured in *Outer regional* areas, and lowest in *Very remote* areas (Figure 4.5A). To improve access for women in *Remote* and *Very remote* areas, states and territories use relocatable screening services, mobile screening vans and community buses to overcome transport barriers.

While participation increases with increasing socioeconomic status of residence, this trend is small, with all socioeconomic groups recording participation rates of 53–56% (Figure 4.5B).



How many women had a breast cancer detected?

In 2009, 549 women who screened for the first time and 2,859 women who attended subsequent screens were diagnosed with invasive breast cancer. This means that for every 10,000 women aged 50–69 screened for the first time, 80 had an invasive breast cancer detected, and for every 10,000 women attending subsequent screens, 45 had an invasive breast cancer detected (AIHW 2011g).

National Cervical Screening Program

The NCSPP, established in 1991, operates as a joint program of the Australian and state and territory governments. It aims to reduce cervical cancer cases, as well as illness and death resulting from cervical cancer in Australia, by detecting and treating high-grade abnormalities of the cervix before any possible progression to cervical cancer. It achieves this through an organised approach to cervical screening targeting women aged 20–69 for 2-yearly Papanicolaou smears (or Pap tests).



Participation is measured over 2 years to align with the recommended screening interval (time between Pap tests) of the NCSP, and is based on the number of women screened (not the number of Pap tests performed) as a proportion of the target population.

How many women participated?

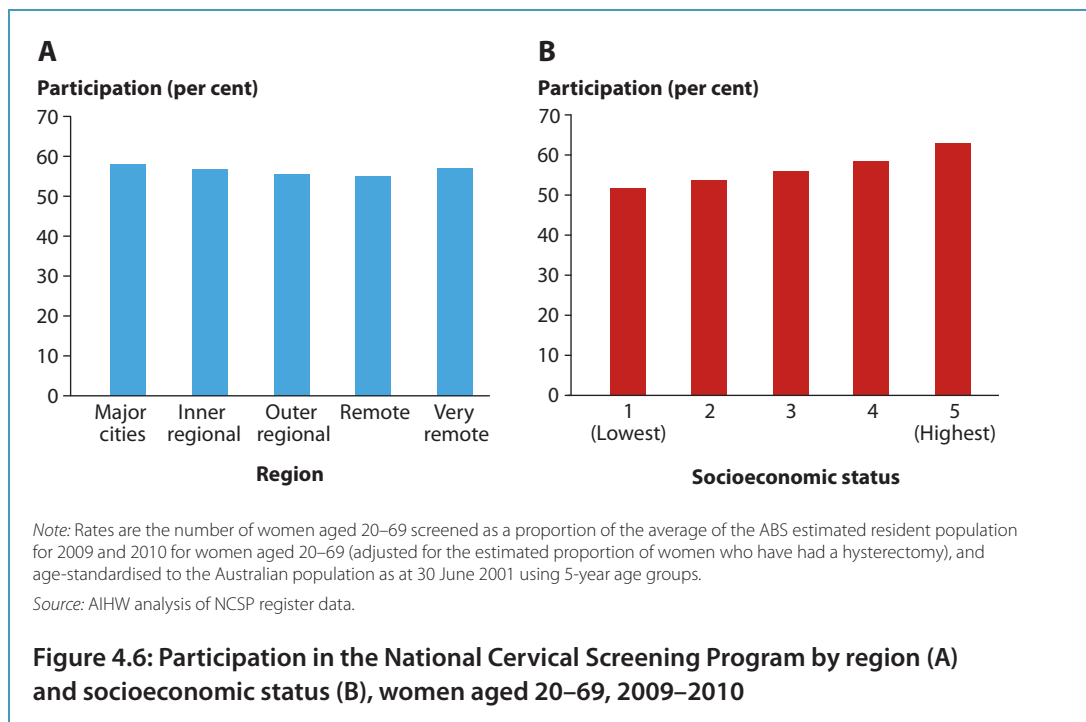
Nearly 3.8 million women participated in the NCSP in the two years 2009–2010, of which 96% were in the target age group of 20–69. Participation in this target age has remained steady at 57% to 59% between 2004–2005 and 2009–2010. There has been a steady increase in the actual number of women participating over this time due to growth in the population.

Does participation differ for different populations?

Information on participation for Aboriginal and Torres Strait Islander women is not available, as Indigenous status of participants is not collected (see ‘What is missing from the picture?’), although there is evidence that this population group is under-screened (Coory et al. 2002; Binns & Condon 2006).

While participation in the NCSP was significantly higher in *Major cities*, *Inner regional* and *Very remote* areas compared with other geographic areas, this difference was small, with all areas recording participation rates of 55–58% (Figure 4.6A).

There was a clear trend of increasing participation with increasing socioeconomic status of area of usual residence, ranging from 52% in the most disadvantaged areas to 63% in the least disadvantaged (Figure 4.6B).



How many women had a high-grade abnormality detected?

In 2009, for every 1,000 women aged 20–69 screened, 8 had a high-grade abnormality detected, providing an opportunity for treatment before possible progression to cervical cancer.

National Bowel Cancer Screening Program

The NBCSP aims to reduce both the number of new cases of bowel cancer, as well as illness and death resulting from bowel cancer, by detecting abnormalities of the colon and rectum early. The program is coordinated at the national level by the Australian Government Department of Health and Ageing, in partnership with state and territory governments. Eligible people are individually invited to participate in the program through the Department of Human Services (formerly Medicare Australia). Invitation packs include a free faecal occult blood test (FOBT) kit that enables a person to take a sample of their faeces that is sent to the program's pathology laboratory to be tested for microscopic traces of blood. The NBCSP is being phased in gradually to help ensure that health services, such as colonoscopy and treatment services, are well-placed to meet any increased demand. Phase 1 of the program began in 2006 with screening offered to men and women aged 55 and 65. Phase 2, which began in July 2008, extended screening to also include people aged 50 and will run to December 2014.

While annual participation rates, as reported by the performance indicator earlier in this section, provide an important indicator of the proportion of the population screened in a given year, the NBCSP is a relatively new screening program, and there have been a number of factors that may have affected annual participation rates. These include a change in the target population, an issue with the reliability of the screening FOBT kit in 2009, and uncertainty over ongoing funding. These factors, combined with the unique design of the NBCSP, mean that a more meaningful measure of program participation uses a longer time frame. Accordingly, participation is presented for the first 3 years of Phase 2 (July 2008 to June 2011) in this section.

How many people participated?

About 38% of the 2.1 million people invited in the first 3 years of Phase 2 (between 1 July 2008 and 30 June 2011) returned a completed bowel cancer screening kit for analysis.

Does participation differ for different populations?

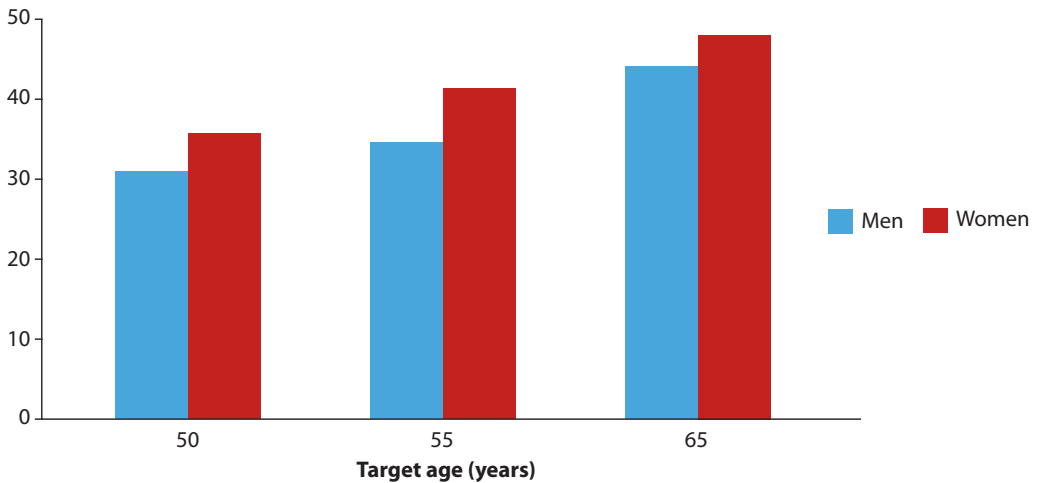
Women (41%) were 1.1 times as likely to screen as men (36%). The highest rate of participation was by people aged 65 (47%), while those aged 50 had the lowest (34%) (Figure 4.7).

Participation rates for Aboriginal and Torres Strait Islander people were not available as it is unknown how many people invited identify as Indigenous. However, comparison with data from the 2006 ABS Census of Population and Housing indicate that it is likely that they under-screen.

People invited in *Remote* and *Very remote* regions had a significantly lower level of participation than people invited from other regions.

People living in areas with the greatest socioeconomic disadvantage also had a significantly lower level of participation than people from other socioeconomic areas.



Crude participation (per 100 invitations)

Note: Rates are age specific based on the number of people screened through the NBCSP as a proportion of the number of people aged 50, 55 and 65 invited to participate between 1 July 2008 and 30 June 2011.

Source: AIHW analysis of NBCSP Register data as at 30 June 2011.

Figure 4.7: Crude participation in the National Bowel Cancer Screening Program, by age and sex, 2008–2011

How many people had bowel cancers or adenomas detected?

Participants who receive a positive screening result are encouraged to discuss this result with their doctor, who will refer them for colonoscopy, if necessary. Of those people invited in the first 3 years of Phase 2, there were about 1,100 cancers and 3,300 advanced adenomas (benign growths that have the potential to become cancerous) reported to NBCSP Register by clinicians, although this number is under-reported because not all findings are returned to the program register.

What is missing from the picture?

Each of the screening programs maintains a comprehensive register of all people who participate in the respective program. These registers are responsible for inviting and/or reminding people to participate in screening, following up positive screening results and providing data to aid accreditation, reporting and management. As such, the quality and coverage of data for these programs is extremely high. However, there are a number of priorities for data collection.

- National cancer data do not include whether a new case of cancer was identified through screening, or if cancers identified through screening are diagnosed at an earlier stage to those that present naturally. Combining data from screening registers with the Australian Cancer Database would provide more information on screen-detected cancers.

- There is no national mechanism for collection of Aboriginal or Torres Strait Islander identification on pathology forms. As a result, state and territory cervical cytology (Pap test) registers are unable to report Indigenous status, hence cervical screening trends specific to Indigenous women cannot be measured nationally.
- It is unknown how the introduction of a national vaccination program against HPV in 2007 will affect cervical screening rates among vaccinated women. Combining HPV vaccination data and cervical screening data would provide more information on screening participation and outcomes in vaccinated women.
- Outcome data for the NBCSP is under-reported. The Department of Health and Ageing is working on a number of steps to improve reporting of outcomes.

Where do I go for more information?

For more information on each of the national population-based cancer screening programs and other population health screening issues, see <www.cancerscreening.gov.au>.

For more detailed analyses of the monitoring indicators for each of the national population-based cancer screening programs, see the following AIHW reports:

- *BreastScreen Australia monitoring report 2008–2009* (AIHW 2011g)
- *Cervical screening in Australia 2008–2009* (AIHW 2011e)
- *National Bowel Cancer Screening Program monitoring report: phase 2, July 2008–June 2011* (AIHW 2012).

For information on the differences between participation in the NBCSP, and bowel screening rates in the NHA performance indicators, see the AIHW technical paper: *Calculating screening rates for bowel cancer: methodologies for the National Bowel Cancer Screening Program and the National Healthcare Agreement performance indicators explained* (AIHW 2010).



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Many things affect how healthy we are and our likelihood of becoming ill or being injured. Some behaviours, such as smoking, have direct and specific effects on health, while others, such as low health literacy, can act in ways that are indirect or wide-ranging.

This chapter focuses on behaviours that have a major influence on health, for example, how we understand and use health information, what foods we eat, the activities we participate in, and the habits we adopt. It also looks at biomedical factors, such as obesity, high blood pressure and high cholesterol, which represent actual bodily changes. The chapter concludes with an analysis of multiple risk factors.



CHAPTER 5

HEALTH BEHAVIOURS AND RISKS



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5.1 Health literacy

At a glance

- Health literacy refers to the knowledge and skills required to understand and use information relating to health issues. Levels of health literacy can have a direct impact on a person's health and costs to the broader community.
- The latest available data show that 41% of Australians aged 15–74 had a level of health literacy that was adequate or above.
- People living in more disadvantaged areas and areas outside *Major cities*, and people with poorer self-assessed health status, were more likely to have lower health literacy.



5

Health behaviours and risks

Introduction

Health literacy is a measure of a person's ability to find, understand and apply health information. It involves knowledge of bodily functions, signs of poor health, and how and where to seek more information. The concept of health literacy is broader than the ability to read labels, fill in forms and follow instructions. It also encompasses the ability to access health information and interpret conflicting advice critically, navigate the health-care system, and communicate effectively on health-related matters.

Health literacy can have a direct impact on an individual's health. A person with low health literacy may not be able to effectively manage their health, placing them at greater risk of adverse health outcomes. This can be detrimental to the individual and the broader community. High health literacy among the population may reduce costs in the health-care system by preventing illness and chronic disease, and reducing rates of injury and death.

The method used to define and measure health literacy in the Australian population is discussed in Box 5.1.

The National Health and Hospitals Reform Commission identified improving health literacy as a national health reform direction for Australia in its 2009 report *A healthier future for all Australians* (NHHRC 2009). Two of the report's key recommendations were that health literacy be included as a core element of the National Curriculum for primary and secondary schools; and that there should be improved access to evidence-based, consumer-friendly information that supports people in better understanding their health and making decisions.

Box 5.1: Measuring health literacy

The latest national information on health literacy in Australia comes from the ABS Adult Literacy and Life Skills Survey (ALLS), conducted in Australia in 2006 (ABS 2008a). The ALLS was also conducted in a number of other countries in successive survey waves.

For the purposes of the ALLS, health literacy is defined as the knowledge and skills required to understand and use information relating to health issues such as drugs and alcohol, disease prevention and treatment, safety and accident prevention, first aid, emergencies and staying healthy. The survey collected information from a sample of 15–74 year olds living in private dwellings in all but *Very remote* regions of Australia. The level of health literacy of an individual was derived from their responses to 191 health-related questions across four domains: prose literacy, document literacy, numeracy and problem solving.

Based on this information, respondents were categorised into one of five levels of health literacy, with 1 being the lowest and 5 the highest. Level 3 is regarded as adequate health literacy.

There have been a range of other surveys conducted in Australia that collected information on health literacy. For example, the South Australian Health Omnibus Survey, conducted in September and October 2008, surveyed more than 2,800 people aged 15 and over. In this survey, a screening tool called the Newest Vital Sign was used to identify people at risk of limited functional health literacy (Adams et al. 2009).

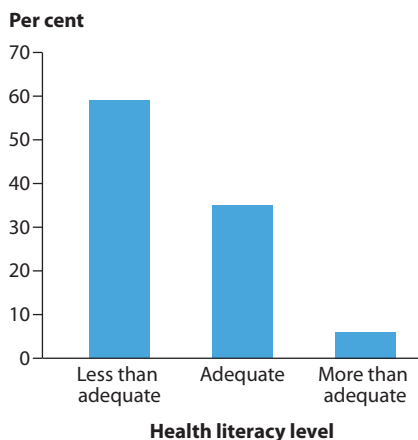
What do we know about health literacy in Australia?

Based on data from the 2006 ALLS, 41% of Australians aged 15–74 had at least an adequate level of health literacy (defined as level 3 health literacy or above) (ABS 2008a). This was similar for males and females (40% and 41% respectively). See the indicator 'Health literacy' below.

Health literacy: The proportion of Australians aged 15–74 with at least an adequate level of health literacy.



- In 2006, 41% of Australians aged 15–74 had at least an adequate level of health literacy.
- Males and females overall had similar health literacy levels.
- Only 6% of 15–74 year olds had more than adequate health literacy.



Source: ABS ALLS 2006 (ABS 2008a).



The proportion of Australians with at least adequate health literacy generally increased from the 15–19 to the 35–39 age group, and then declined (Figure 5.1). Results from the ALLS show that about 83% of older Australians (aged 65–74) did not have an adequate level of health literacy in 2006.

Based on a different measure, the 2008 South Australian Health Omnibus Survey also found that older people had much lower levels of adequate health literacy than younger people. This survey found that only 22% of South Australians aged 65 and over had adequate functional health literacy compared with 69% of those aged 25–44 (Adams et al. 2009). Lower health literacy at older ages is challenging, particularly as older Australians are more likely to need health services at this stage of life.

Results from the ALLS show that lower health literacy is associated with living outside *Major cities* and with lower SES (Figure 5.1). Among those aged 15–74, 42% of people living in *Major cities* had at least an adequate level of health literacy compared with 37% of those living in other areas. Similarly, 55% of the population in the highest SES group had at least an adequate level of health literacy compared with 26% of those in the lowest group.

The ALLS also found that health literacy was higher among people who were employed, had higher levels of formal education, who participated in social groups and organisations, or who spoke English as a first language (ABS 2008a).

Lower levels of health literacy are associated with poorer self-assessed health status (Figure 5.1). From the ALLS, 48% of Australians aged 15–74 who assessed their own health as ‘excellent’ or ‘very good’ had at least adequate health literacy. In comparison, only 25% of those with fair or poor health status had at least adequate health literacy.

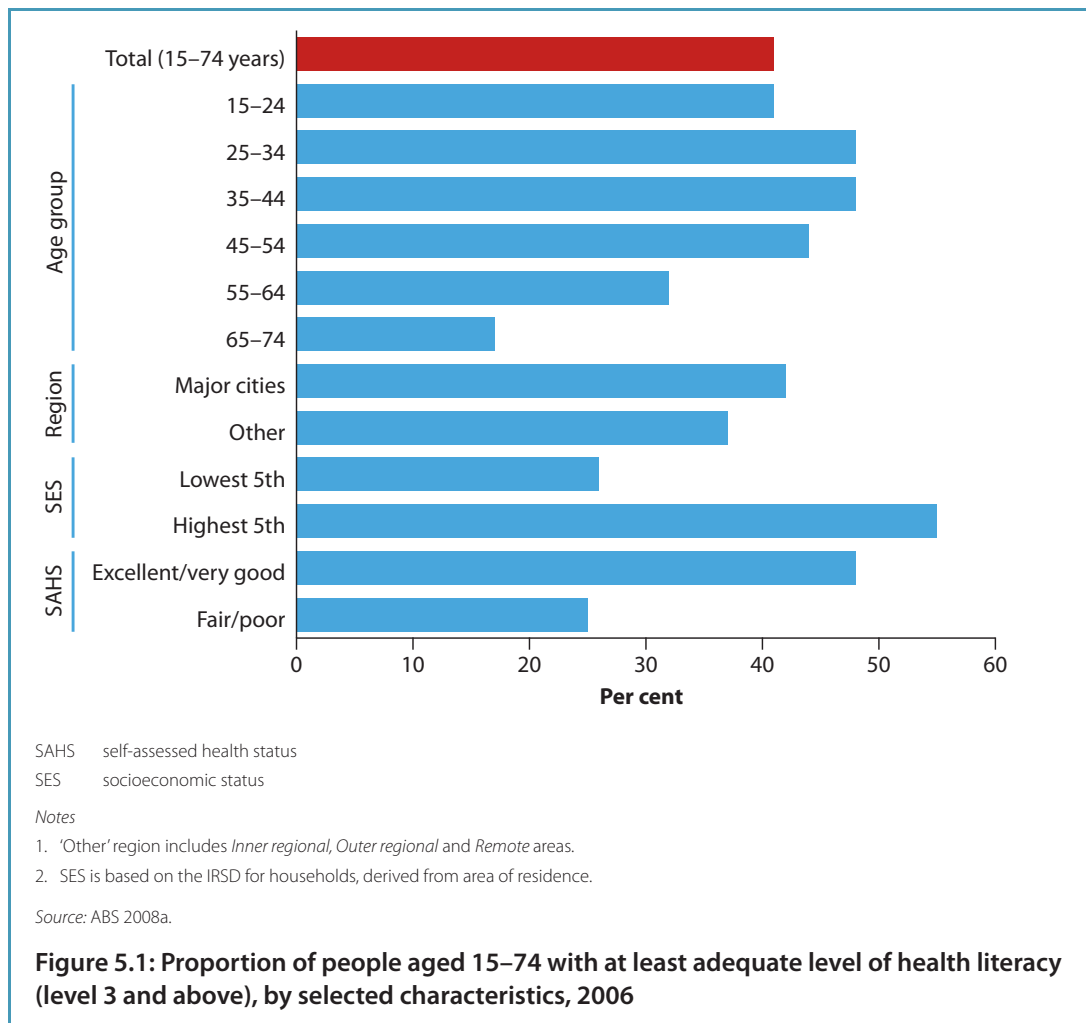
The South Australian Health Omnibus Survey found that people with lower health literacy were more likely to have chronic conditions such as diabetes, heart disease and stroke, and less likely to have recently visited a doctor. People aged over 64 with inadequate health literacy were more likely to have been admitted to hospital than those with adequate health literacy (Adams et al. 2009).

How do we compare with other countries?

Comparable data are not available for international comparisons, with the exception of Canada.

The results from the ALLS were similar in Australia and Canada, with 45% of Canadians aged 16 to 65 achieving a health literacy of level 3 or above compared with 43% of Australians in the same age group (ABS 2008a).





What is missing from the picture?

The latest national data on health literacy are from 2006 and estimates do not include the whole population. This survey did not include people aged 75 and over—a group with relatively high prevalence of chronic diseases and high health service use—nor did it include people in nursing homes and aged care facilities or those living in *Very remote* regions. It is likely that the proportion of people with adequate health literacy would be lower if these population groups were included.

Another gap in the health literacy picture is for Aboriginal and Torres Strait Islander people—a population group with a high prevalence of chronic disease and relatively poor health. Because of the relatively small sample sizes in population surveys, there are no reliable estimates for the health literacy of Indigenous Australians.

There are currently no time-series data available to measure changes in health literacy levels over time.



5.2 Antenatal health

At a glance

- Regular antenatal care increases the likelihood of identifying pregnancy complications, resulting in improved health outcomes for mother and baby.
- Adequate intakes of nutrients, such as folic acid and iodine, are needed for the healthy development of the unborn baby.
- Smoking and alcohol consumption are risk factors for poorer birth and neonatal outcomes and should be avoided during pregnancy.



5

Health behaviours and risks

Introduction

Antenatal health—that is, health in the time before a child is born—is important for both the pregnant woman and the developing unborn baby. Over the past century, the availability of routine antenatal care has helped reduce maternal death rates, miscarriages, birth defects and low birthweight.

Ideally, antenatal health care should start before pregnancy. A range of measures can help reduce potential risks and optimise health outcomes to ensure babies have a good start in life and to protect the mother's health. These include:

- avoiding exposure to harmful substances that can interfere with normal development, such as certain drugs, medications, infectious diseases and environmental agents
- eating a healthy diet to provide sufficient nutrients and energy needed during pregnancy
- ensuring appropriate weight gain during pregnancy
- having good metabolic control, such as normal blood pressure and blood sugar levels
- regular antenatal care sessions.

A number of aspects are discussed in further detail in this section because of their contribution to the health of Australian mothers and their babies. They include the importance of antenatal care and adequate intakes of nutrients, the effects of smoking and alcohol consumption during pregnancy, gestational diabetes and mental health concerns.

What do we know about antenatal health?

The importance of antenatal care

Antenatal care (also referred to as prenatal care) is an important part of pregnancy and evidence shows there is a strong relationship between regular antenatal care and positive child health outcomes. Receiving antenatal care at least four times, as recommended by the WHO, increases the likelihood of receiving effective maternal health interventions (WHO 2009). The purpose of antenatal visits is to monitor the health of mother and baby, provide health advice, identify complications, and provide intervention if needed.

In 2009, available data (from Queensland, South Australia, the Australian Capital Territory and Northern Territory) show that 97% of women who gave birth at 32 weeks or more gestation had at least one antenatal visit, with 92% having five or more (Li et al. 2011). Aboriginal and Torres Strait Islander mothers had fewer antenatal visits than non-Indigenous mothers. Of Indigenous mothers who gave birth at 32 weeks or more, 77% had five or more visits, compared with 93% of non-Indigenous mothers.

The proportion of pregnancies with an antenatal visit in the first trimester (that is, in the first 13 weeks of pregnancy) is presented below as a performance indicator.

Proportion of pregnancies with an antenatal visit in the first trimester. Pregnant females who have a live birth who had at least one antenatal visit in the first 13 weeks of pregnancy. Presented as a percentage of all females who had a live birth.



- Data are not available nationally and not comparable across jurisdictions.
- For the three jurisdictions where data are available, Indigenous females were less likely to have a visit than non-Indigenous females.
- Where recorded, more than 50% of females had at least one visit in the first trimester.

Source: AIHW (unpublished) National Perinatal Data Collection.

Folic acid and iodine intake

Folate is a B group vitamin needed for the healthy development of babies in early pregnancy. Naturally occurring folate is found in a wide variety of foods, such as green leafy vegetables, cereals, fruits and grains. Folic acid is the synthetic form of folate used in supplements or added to food. Adequate intakes of folic acid help prevent neural tube defects (serious birth defects) (MRC Vitamin Study Research Group 1991).

Women capable of becoming pregnant are advised to consume 400 micrograms (μg) of folic acid per day for at least one month before, and three months after, conception (NHMRC & NZMoH 2006). Estimates of baseline dietary folic acid intake showed that women of child-bearing age (16–44) consumed an average of 108 μg per day, well below recommended amounts (FSANZ 2007a).



To help increase population folic acid intakes, food regulation in the form of mandatory fortification was introduced in September 2009, requiring the addition of folic acid to all wheat flour for making bread (with the exception of organic flour).

Iodine is an essential mineral that is particularly important for the developing brain and nervous system of the unborn child and infants in their first 2–3 years of life. For this reason, it is important that pregnant and breastfeeding women have sufficient iodine. A national study (Li et al. 2008) confirmed the re-emergence of iodine deficiency in Australia, mostly in south-east Australia where most Australians live.

Pregnant women are advised to have 220 µg of iodine per day and breastfeeding women 270 µg per day (NHMRC & NZMoH 2006). Estimates of baseline dietary iodine intake showed that women of child-bearing age consumed an average of 100 µg per day, which is below that recommended (FSANZ 2007b).

In an effort to increase population iodine intakes, food regulation was introduced in 2009 to coincide with mandatory folic acid fortification. This required the replacement of salt with iodised salt in all bread, except organic bread.

Some early studies show favourable changes in population folate and iodine status (Brown et al. 2011; Axford et al. 2011). However, women who are pregnant or breastfeeding, or considering becoming pregnant, are still advised to take special pregnancy supplements containing folic acid (NHMRC & NZMoH 2006) and iodine (NHMRC 2010).

Smoking during pregnancy

Smoking during pregnancy increases the risk of complications and is associated with poorer outcomes for the baby. Complications include low birthweight, pre-term birth, and small size for gestational age (suggesting intra-uterine growth restriction) as well as infant death (Laws et al. 2006).

In 2009, 15% of Australian women smoked while pregnant (Li et al. 2011). This figure has remained relatively stable over the past 5 years. Younger mothers were more likely to smoke than older mothers in 2009. More than 1 in 3 teenage mothers (37%) reported smoking during pregnancy, which was 10% of all mothers who reported smoking.

The proportion of women who smoked while pregnant was higher for Indigenous women (48%) than non-Indigenous women (13%) (Unpublished analysis of the National Perinatal Data Collection 2009). This difference in part reflects the younger age of Indigenous mothers compared with other Australian mothers.



Alcohol consumption during pregnancy

Fetal alcohol spectrum disorders can occur when an unborn baby is exposed to harmful levels of alcohol. This is becoming increasingly recognised as an important public health concern. Alcohol is known to be harmful to the unborn child and is considered the most common preventable cause of birth defects and brain damage in children (Brems et al. 2010). Variation in the timing, dose and frequency of alcohol exposure, as well as individual susceptibility of the unborn baby, are thought to contribute to the range and severity of impairments in affected children. These conditions include physical, cognitive and behavioural impairments that are life-long and can be profound.

The 2009 NHMRC alcohol guidelines advise that not drinking is the safest option for women who are pregnant, planning a pregnancy or breastfeeding (NHMRC 2009). In 2010, 51% of pregnant women had consumed alcohol at least once during pregnancy. The proportion of pregnant women abstaining from alcohol increased from 40% in 2007 to 49% in 2010 (AIHW 2011a).

Gestational diabetes

Gestational diabetes mellitus (GDM) is a condition of abnormally raised blood sugar levels that may occur during pregnancy in women who have not previously been diagnosed with other forms of diabetes. It usually goes away after pregnancy but can re-occur in later pregnancies.

GDM increases the risk of serious complications in both mother and baby (Lee et al. 2007). Mothers with GDM are at higher risk of intervention during labour, high blood pressure, pre-term labour and a longer hospital stay than mothers without GDM. The longer-term risks of GDM to the mother include progression to Type 2 diabetes (which occurs in up to half of women within 30 years) and increased risk of developing heart disease.

Babies of mothers with GDM are at higher risk of macrosomia (high birthweight), shoulder dystocia (problems delivering the baby's shoulders), respiratory distress syndrome and jaundice than babies of mothers without GDM (AIHW 2010a). In fact, babies of mothers with GDM are at higher risk of nearly all adverse outcomes, with the exception that babies born to mothers with GDM have a lower rate of fetal death (AIHW 2010a).

Available data show that GDM affected 5% of pregnancies in Australia in the years 2005–2008 (AIHW 2010a). Mothers with GDM were significantly older than mothers without GDM in pregnancy.



Mental health

In recent years, the importance of antenatal mental health as a public health issue has been increasingly recognised. Although mental health issues such as depression are traditionally associated with the postnatal period (after birth), research now suggests antenatal depression is equally important (Austin et al. 2007; Perinatal Mental Health Consortium 2008). One study estimated that 8.9% of Australian women experienced antenatal depression. This figure increases to 15.7% in the postnatal period (Buist & Bilszta 2006).

A woman's mental wellbeing can affect the wellbeing of her infant and have an impact on relationships within the family during this critical time (Beck 1998; Halligan et al. 2007). Mental health disorders have been identified as one of the top three causes of indirect death (death caused by a pre-existing disease or a disease not directly related to pregnancy but aggravated by it) in women who are pregnant or have given birth within the previous year (Austin et al. 2007). In a review of maternal mortality 1994–2002, Austin et al. (2007) found a significant number of suicides occurred during pregnancy (in addition to those occurring in the postnatal period), with the majority occurring by violent means.

The National Perinatal Depression Initiative 2008–2013 is an ongoing project by beyondblue and collaborating experts in perinatal mental health. In March 2010, the initiative implemented the 'Draft clinical practice guidelines for depression and related disorders—anxiety, bipolar disorder and puerperal psychosis—in the perinatal period'. This is the first time guidelines have been developed in Australia for the detection and treatment of depression and related conditions during pregnancy and the first year after birth. The initiative aims to improve the prevention and early detection of antenatal and postnatal depression and to provide better care, support and treatment for pregnant women, new mothers and their families.

What is missing from the picture?

There are a number of areas in antenatal health in which there are limited data, and/or lack of consensus on definitions and diagnostic criteria.

- Mandatory fortification of most bread in Australia with folic acid and iodine needs to be monitored to ensure the initiative's long-term effectiveness and safety.
- There is no definitive objective measure or test to diagnose fetal alcohol spectrum disorders and better data are needed to determine their prevalence in the community. Research in this area is currently being undertaken at the Telethon Institute for Child Health Research in conjunction with the Department of Health and Ageing.
- Research into the development of Type 2 diabetes and other chronic conditions, such as cardiovascular disease, among children and adults who were affected by GDM has not yet been undertaken at a national level. The capacity to report on these outcomes has been developed in Western Australia and, if expanded, has the potential to improve the pre-pregnancy, antenatal and postnatal care of women with GDM.
- More recent data are needed to determine the prevalence of other conditions and risks, such as high blood pressure and mental health disorders, among Australian women during pregnancy.

Where do I go for more information?

More information on the following topics can be found in these sources:

- healthy eating during pregnancy: Food Standards Australia and New Zealand <www.foodstandards.gov.au/consumerinformation/pregnancyandhealthyeating>
- monitoring folic acid and iodine fortification: *Mandatory folic acid and iodine fortification in Australia and New Zealand: baseline data for monitoring* (AIHW 2011b) and its supplement (AIHW 2011c)
- alcohol and pregnancy: Telethon Institute for Child Health Research <www.ichr.uwa.edu.au>
- gestational diabetes: *Diabetes in pregnancy: its impact on Australian women and their babies 2010* (AIHW 2010a)
- mental health during pregnancy and after birth: beyondblue <www.beyondblue.org.au>.



5.3 Infant feeding and early nutrition practices

At a glance

- The Australian Dietary Guidelines for Children and Adolescents in Australia (2003) reflect the WHO recommendation for exclusive breastfeeding for the first 6 months. Although most babies (96%) in Australia in 2010 were initially breastfed, only 39% of infants were exclusively breastfed to around 4 months, and 15% to around 6 months.
- The guidelines recommend introducing solid foods at around 6 months to meet the infant's increasing nutritional and developmental needs. In 2010, fewer than 1% of infants aged 1 month had consumed soft/semi-solid/solid food (in the last 24 hours), rising to 35% of infants aged 4 months, 92% of infants aged 6 months and 95% of children aged 12 months.



5

Health behaviours and risks

Introduction

Early childhood nutrition is important for an infant's survival, growth and development, and to enhance health throughout the lifecycle. For infants, it provides many health benefits, including reducing the risk of infection, asthma, allergies and sudden infant death syndrome (SIDS) (NHMRC 2003b). It also helps to improve cognitive development and protection against obesity and chronic diseases in later life. Breastfeeding may assist with bonding and attachment between the mother and the baby. For mothers, it provides many positive health effects, such as reducing the risk of some cancers and osteoporosis (NHMRC 2003a).

Australia's dietary guidelines recommend exclusive breastfeeding of infants until 6 months of age, with the introduction of solid foods at around 6 months and continued breastfeeding until the age of 12 months—and beyond if both mother and infant wish (NHMRC 2003b). For those mothers who are unable to breastfeed or choose not to, a baby should be fed a suitable breast milk substitute.

The 2004 Longitudinal Study of Australian Children showed that 92% of children were introduced to breast milk at some point in their life (AIFS 2008). The same survey showed that by 1 week of age, fewer than 80% of infants were fully breastfed. A steady decline each month of age was observed thereafter, reducing to 28% at 5 months of age and 14% at 6 months of age.

The promotion of breastfeeding is an important public health strategy. In November 2009, the Australian Health Ministers' Conference (AHMC) endorsed the Australian National Breastfeeding Strategy 2010–15 with the objective of 'increasing the percentage of fully breastfed babies from birth to six months of age, with continued breastfeeding and complementary foods to twelve months and beyond' (AHMC 2009:1).

In 2011, the AIHW completed the 2010 Australian National Infant Feeding Survey (ANIFS)—see Box 5.2—to provide estimates of the prevalence and duration of breastfeeding and other feeding practices adopted by mothers or carers.

Box 5.2: 2010 Australian National Infant Feeding Survey

The 2010 ANIFS, undertaken in 2010–11, was the first large-scale, specialised, national survey of infant feeding practices and related attitudes and behaviours conducted in Australia.

Its main aim was to provide baseline data on estimates of the prevalence and duration of breastfeeding and other feeding practices adopted by mothers or carers.

About 52,000 children aged up to 24 months were randomly selected nationwide from the Medicare enrolment database. A pilot study to test the survey method and survey instrument was conducted from August 2010 to September 2010. The main survey was conducted between October 2010 and February 2011.

The de-identified survey data are available from the Australian Data Archives managed by the Australian National University at <www.ada.edu.au>.

How do we define and measure breastfeeding?

The internationally recommended terms for defining breastfeeding practices are outlined in Table 5.1 and are used in this section.

Until the 2010 ANIFS, there had been limited national data for reporting on infant feeding practices. Further, due to lack of standardised measures and inconsistent use of definitions, it has been difficult to compare breastfeeding rates across jurisdictions. To help improve this situation, a core set of national breastfeeding indicators were developed (Box 5.3). The 2011 AIHW report provides baseline results on the newly developed indicators at national and state and territory levels (AIHW 2011d).

Table 5.1: Definitions for breastfeeding practices

Feeding practice	Requires that the infant receive	Allows the infant to receive	Does not allow the infant to receive
Exclusive breastfeeding	Breast milk (including expressed milk)	Oral rehydration solutions, drops, syrups (vitamins, minerals, medicines)	Anything else
Predominant or 'full' breastfeeding	Breast milk (including expressed milk) as the predominant source of nourishment	Certain liquids (water and water-based drinks, fruit juice), ritual fluids and oral rehydration salts, drops or syrups (vitamins, minerals, medicines)	Anything else (in particular, non-human milk, food-based fluids)
Complementary feeding or 'partial' breastfeeding	Breast milk (including expressed milk)	Anything else: any food or liquid including non-human milk and formula	Not applicable
Any breastfeeding		Any of the above definitions	
Ever breastfed	The infant has been breastfed or received expressed breast milk or colostrum ^(a) at least once		

(a) Colostrum, which is produced in the breast during late pregnancy and for the first 30 to 40 hours after birth, is yellowish and thicker than mature milk, and it contains a high concentration of immunoglobulins.

Source: AHMC 2009.



Box 5.3: Development of a core set of national breastfeeding indicators

In December 2010, the AIHW convened a workshop, attended by academics, breastfeeding practitioners and policy makers, to gain consensus on a core set of national breastfeeding indicators. A set of six infant feeding indicators were agreed by workshop participants:

- Indicator 1: Proportion of children ever breastfed (for children aged 0–24 months)
- Indicator 2: Proportion of children breastfed at each month of age, 0–24 months
- Indicator 3: Proportion of children exclusively breastfed to each month of age, 0–6 months
- Indicator 4: Proportion of children predominantly breastfed to each month of age, 0–6 months
- Indicator 5: Proportion of children receiving soft/semi-solid/solid food at each month of age, 0–12 months
- Indicator 6: Proportion of children receiving non-human milk or formula at each month of age, 0–12 months.

Source: AIHW 2011e.

What do we know about infant feeding?

The 2010 ANIFS provides the most current data on prevalence and duration of breastfeeding and other feeding practices adopted by mothers and carers, and related attitudes.

Infant feeding

Data from the 2010 ANIFS showed that:

- 96% of infants aged 0–2 years commenced breastfeeding (Indicator 1)
- 69% of infants were still receiving some breast milk at 4 months, and 60% at 6 months (Indicator 2)
- 39% of infants were exclusively breastfed to around 4 months, and 15% to around 6 months (Indicator 3)
- 47% of infants were predominantly (fully) breastfed for less than 4 months, dropping to 21% for less than 6 months (Indicator 4)
- fewer than 1% of infants aged 1 month had consumed soft/semi-solid/solid food (in the last 24 hours), rising to 35% of infants aged 4 months, 92% of infants aged 6 months and 95% of children aged 12 months (Indicator 5)
- 40% of infants aged 1 month received non-human milk or infant formula, the rate rising gradually to 55% at 6 months and 80% by 12 months (Indicator 6).



Exclusive breastfeeding

As noted previously, Australia's infant feeding guidelines recommend exclusive breastfeeding until 6 months of age, with the introduction of solid foods at around 6 months and continued breastfeeding until the age of 12 months or beyond.

The headline indicator result reported opposite was that 15% of infants overall were breastfed to around 6 months of age, although this rate was not experienced across all sociodemographic groups (Table 5.2). In particular:

- infants of younger mothers/carers were only one-third as likely to be exclusively breastfed to around 6 months as infants of older mothers/carers
- infants of mothers/carers with tertiary qualifications were 44% more likely to be exclusively breastfed to around 6 months than infants of mothers/carers with Year 11 education or below.

Further, although 39% of infants were exclusively breastfed to about 4 months of age, there were significant disparities:

- infants of mothers/carers with high household incomes were 28% more likely to be exclusively breastfed to around 4 months of age than infants of mothers/carers with low household incomes
- infants of Aboriginal or Torres Strait Islander mothers/carers were two-thirds as likely to be exclusively breastfed to around 4 months of age as infants of non-Indigenous mothers/carers.

There were no clear patterns of disparity across regions.

Regular use of a pacifier

The Infant Feeding Guidelines for Health Workers (2003) recommend that if a pacifier (dummy) is used, its introduction should be delayed until after 1–2 months, and it should be used infrequently (NHMRC 2003b). Early use of bottles and dummies (pacifiers), especially before the first breastfeed, can interfere with the natural processes of breastfeeding, reducing the infant's sucking capacity and the stimulation of the mother's breasts for milk production.

The 2010 ANIFS found that 49% of infants and children (aged 0–24 months) regularly used a pacifier (AIHW 2011d). Of the regular pacifier users, 62% started using a pacifier regularly in their first month of life, and a further 11% started regular use in their second month of life.



Table 5.2: Duration of exclusive breastfeeding, by selected mother's/carer's sociodemographic characteristics, 2010 (per cent)

Sociodemographic characteristic	Initiation ^(a)	Duration (months)						
		0<1	1<2	2<3	3<4	4<5	5<6	6<7
All	90.4	61.4	55.8	48.0	39.2	27.0	15.4	2.1
Mother's/carer's age (years)								
24 or younger	88.1	50.4	42.7	30.9	21.7	11.3	6.2	2.0
25–29	90.5	61.6	55.8	47.2	37.0	23.3	11.9	1.6
30–34	91.0	62.0	56.4	48.6	39.9	27.4	15.2	1.7
35 or older	90.1	62.5	57.8	50.9	43.1	31.6	19.2	2.9
Education								
Bachelor degree or higher	92.3	65.6	61.2	55.0	47.5	33.6	18.4	2.0
Diploma/certificate	90.3	60.1	53.9	44.3	35.2	23.5	13.5	1.7
Year 12 or equivalent	88.7	57.2	51.2	42.9	32.4	21.1	13.2	3.3
Year 11 or below ^(b)	84.0	53.1	45.1	37.5	26.9	19.5	12.8	2.6
Gross household income (per year)								
\$156,000 or more	93.7	64.1	59.2	52.4	44.9	31.1	16.8	2.3
\$88,400–\$155,999	91.7	64.4	59.8	52.6	43.4	29.4	16.3	1.6
\$52,000–\$88,399	90.9	61.5	55.8	47.6	38.9	27.6	15.8	2.0
\$26,000–\$51,999	88.7	58.1	52.2	43.9	35.5	25.1	14.7	2.5
\$25,999 or below	85.9	56.4	49.7	40.8	31.9	20.0	13.0	3.0
Mother's/carer's Indigenous status								
Indigenous	86.8	59.3	46.2	32.5	18.6	11.0	n.p.	n.p.
Non-Indigenous	90.4	61.4	56.0	48.1	39.5	27.2	n.p.	n.p.
Main language spoken at home								
English	90.7	62.2	56.8	48.8	40.3	27.7	15.6	1.9
Other	87.1	54.5	47.8	40.9	30.6	21.6	14.6	3.8
Remoteness								
Major cities	90.2	59.7	54.1	46.4	38.1	26.3	14.5	2.1
Inner regional	90.0	65.3	60.0	51.8	42.8	28.9	17.4	2.2
Outer regional	91.5	66.7	61.4	52.1	42.2	30.4	19.6	2.5
Remote/Very remote	94.1	62.9	58.7	52.1	36.8	24.4	15.9	1.0

(a) Initiation to exclusive breastfeeding.

(b) Includes 'Did not go to school'.

Source: AIHW 2011d.



What is missing from the picture?

One of the principles of the breastfeeding strategy is that it is consistently informed by the best available evidence. A follow-up survey to the 2010 ANIFS is needed to help determine the effectiveness of the breastfeeding strategy and further guide its implementation.

Previously, it has been difficult to compare breastfeeding rates across state and territory jurisdictions because of the lack of standardised measures and definitions. The endorsement of the six core breastfeeding indicators (Box 5.3) by governments would help ensure data are consistent and comparable.

Where do I go for more information?

The Australian National Breastfeeding Strategy 2010–2015 is available from the Department of Health and Ageing website: <www.health.gov.au>.

For more information about the development of national breastfeeding indicators, see the AIHW report *National breastfeeding indicators: workshop report* (AIHW 2011e).

For detailed data reported by these indicators, see the AIHW report *2010 Australian National Breastfeeding Survey: indicator results* (AIHW 2011d).



5.4 Dietary behaviours

At a glance

- Chronic diseases that can be related to diet, such as cardiovascular disease, diabetes and some cancers, are a major cause of death and disability in Australia, and their prevalence is steadily increasing.
- Many Australians eat too few vegetables, fruit and wholegrain cereals, and eat too many foods high in fat, sugar and salt.
- Those with higher levels of risky dietary behaviours include socially disadvantaged people, people with disabilities and people living in rural areas.



5

Health behaviours and risks

Introduction

The food we eat plays a major role in our health and wellbeing. For infants and young children, good nutrition is important for optimal growth and development. For all Australians, good nutrition contributes to quality of life, helps maintain healthy body weight, protects against infections, and reduces the risk of chronic disease and premature death.

On the other hand, poor dietary choices are associated with ill health. Chronic diseases that can be related to diet, such as cardiovascular disease, diabetes and some cancers, are a major cause of death and disability in Australia, and their prevalence is steadily increasing. The burden of disease due to poor diet is often associated with large intakes of energy-dense foods, with high saturated fat, sugar and/or salt content, and low intakes of nutrient-dense foods, such as vegetables, fruit and wholegrain cereals.

Excessive energy intakes, combined with low levels of physical activity, have contributed to the continuing rise in overweight and obesity (Swinburn et al. 2009). The National Preventative Health Taskforce acknowledged that this is one of the greatest public health challenges facing Australia (NPHT 2009). Further details about obesity prevalence are in 'Section 5.6 Obesity'.

Nutrient deficiencies and inadequacies, including iodine, folic acid (AIHW 2011b, 2011c), vitamin D (Nowson 2006) and iron (Ahmed et al. 2008), have also been identified in certain population groups.

Dietary intake assessments are made by comparing food intakes with the Australian Dietary Guidelines (NHMRC 2003a, 2003b), the Australian Guide to Healthy Eating (DoHA 1998) and nutrient intakes with Nutrient Reference Values for Australia and New Zealand, including Recommended Dietary Intakes (NHMRC & NZMoH 2006). These references provide guidance on healthy food choices and nutrient intakes that promote good nutrition and health. The Australian Dietary Guidelines and Australian Guide to Healthy Eating are currently being reviewed and are expected to be released in 2012. This review will ensure the best available evidence underpins dietary recommendations to promote health and wellbeing, and to protect against chronic disease. The recommended dietary intakes for individual nutrients are soon to be reviewed through the Nutrient Reference Values review project.

Improving the dietary choices of Australians is a major part of many current health campaigns such as *Get set 4 Life—Habits for Healthy Kids* (DoHA 2011) and *Swap it, don't stop it* (ANPHA 2011a), as well as previous national initiatives such as *Go for 2&5™* (DoHA 2008). The National Partnership Agreement on Preventive Health (NPAPH) is the Australian Government's largest investment in preventive health and seeks to tackle the rising prevalence of lifestyle-related chronic disease. Among other things, it aims to increase the proportion of children and adults meeting nutritional guidelines (COAG 2009).

This section examines some of the sociodemographic influences on dietary behaviours. Selected findings on infant feeding are in 'Section 5.3 Infant feeding and early nutrition practices'.

What do we know about our food and nutrient intakes?

Detailed national information on food and nutrient intakes was last collected for adults in the 1995 National Nutrition Survey, and for children aged 2–16 in the 2007 Australian National Children's Nutrition and Physical Activity Survey.

The latest national data on dietary behaviours come from selected questions in the 2007–08 National Health Survey. Survey respondents were asked about their usual vegetable, fruit and milk consumption. Overall results from this survey were reported in the last edition of *Australia's health*; this section includes analysis by geographic location and socioeconomic status.

Fruit and vegetable intake

The Australian Guide to Healthy Eating (DoHA 1998) recommends that men and women (aged 19 and over) consume two to four serves of fruit and four to eight serves of vegetables per day. In health promotion messages, this is generally interpreted as two serves of fruit and five serves of vegetables (See Box 5.4 for serve sizes).

Box 5.4: What is a serve of fruit and vegetables?

By convention, a serve of fruit is 150 grams, and a serve of vegetables is 75 grams. Examples of a serve include:

Fruit

- 1 medium apple, orange, banana
- 2 items of small fruit such as apricots, plums
- About 8 strawberries
- 1 cup of canned fruit
- About 20 grapes or cherries

Vegetables

- 1 medium potato
- 1 cup of salad vegetables
- ½ cup tomatoes, capsicum, cucumber
- ½ cup carrots, swede, turnip
- ½ cup peas, broad beans, lentils
- ½ cup spinach, cabbage, broccoli

Source: Adapted from NHMRC 2003a.

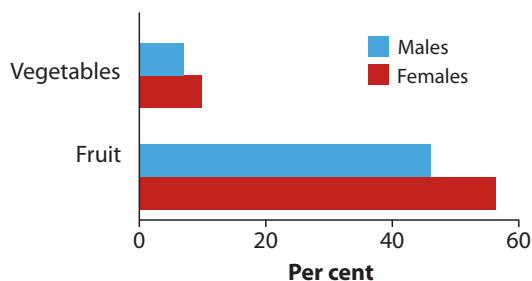


Results from the 2007–08 National Health Survey show that fewer than 1 in 10 people aged 12 and over usually eat sufficient serves of vegetables and about half eat sufficient serves of fruit. Females are more likely than males to report sufficient serves of fruit, and only 6% of people eat sufficient fruit and vegetables on a regular basis (see the performance indicator ‘Fruit and vegetable intake’ below).

Fruit and vegetable intake. The percentage of people aged 12 or over eating sufficient serves of fruit and vegetables each day to obtain a health benefit.



- About half of all people usually consume the recommended serves of fruit daily.
- Fewer than 1 in 10 usually consume the recommended serves of vegetables daily.
- More females than males usually eat the recommended serves of fruit or vegetables each day.



Source: ABS 2009.

The proportion of people consuming insufficient amounts of fruits and vegetables did not vary greatly by geographic location or by socioeconomic status (Table 5.3).

Table 5.3: Insufficient consumption of fruit and vegetables, by selected variables, people aged 15 and over, 2007–08 (per cent)

Selected variable	Males	Females
Geographic location		
Major cities	95.6	93.6
Inner regional	92.5	89.6
Other ^(a)	95.6	90.6
Socioeconomic status		
1 st quintile (most disadvantaged)	95.7	94.9
2	95.4	92.0
3	95.3	92.9
4	94.5	91.0
5 th quintile (least disadvantaged)	94.9	92.1

(a) ‘Other’ includes *Outer regional* and *Remote* areas.

Notes

1. Rates are age-standardised to the 2007–08 survey population.
2. Servings do not include juices based on fruit and vegetables.

Source: AIHW 2012.



Type of milk

The 2007–08 National Health Survey collected information about the main type of milk usually consumed, including cow's milk, soy milk, evaporated and condensed milk, and other unspecified types of milk; and the fat content of this milk—whole (regular/full cream), reduced fat or skim.

The type of milk consumed can be used as a guide for saturated fat intake. Analysis of the 1995 National Nutrition Survey showed that the type of milk consumed was a valid measure of energy obtained from total fat and saturated fat (Marks et al. 2001).

Overall, 48% of all milk drinkers aged 15 and over consumed whole milk, with males (54%) more likely to drink whole milk than females (42%) (Figure 5.2). About one-third (35%) of all milk drinkers consumed reduced fat milk and 18% drank skim milk, with higher proportions of females than males drinking these types of lower fat milks.

Consumption of whole milk varied by where people live (Table 5.4). Those who lived in *Inner regional* and *Other* areas were more likely to consume whole milk than those in *Major cities*. The consumption of whole milk also increased as socioeconomic status decreased. One possible explanation for this is that whole milk is usually cheaper than milks with a lower fat content (Cleanthous & Thuraisingam 2010).

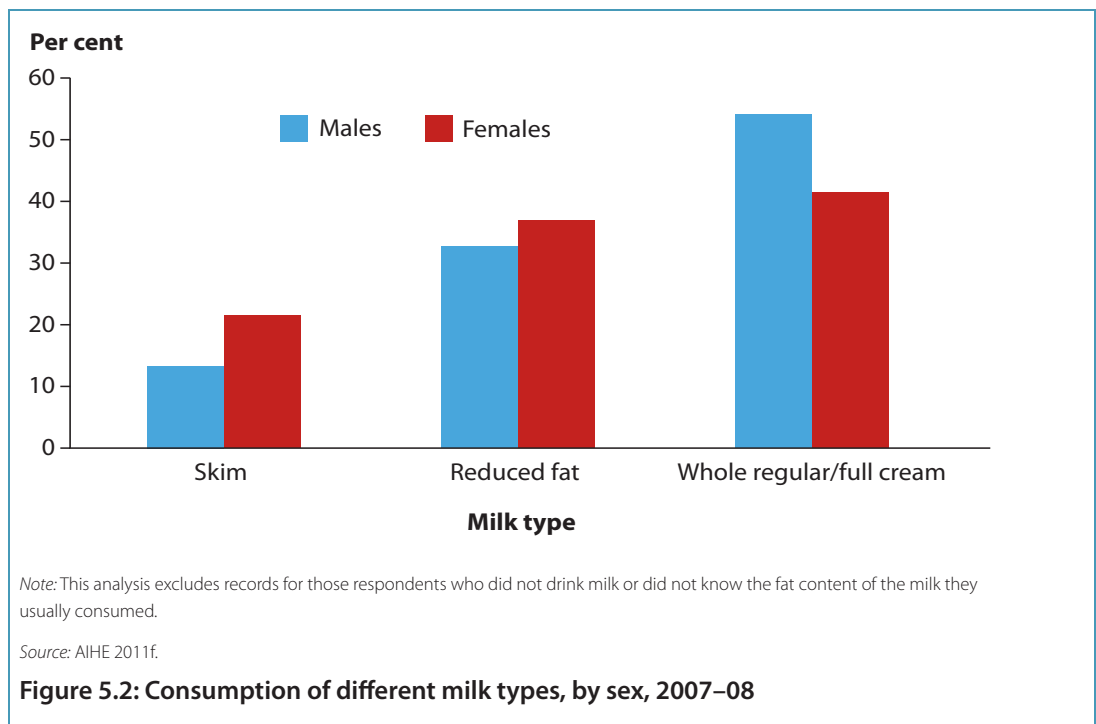


Table 5.4: Consumption of whole milk^(a), by selected variables, people aged 15 and over, 2007–08 (per cent)

Selected variable	Males	Females
Geographic location		
Major cities	48.4	37.3
Inner regional	54.2	41.8
Other ^(b)	55.1	45.1
Socioeconomic status		
1 st quintile (most disadvantaged)	62.7	50.0
2	53.2	42.3
3	51.8	38.3
4	44.2	35.4
5 th quintile (least disadvantaged)	43.3	31.8

(a) Whole milk/regular/full cream contains 3% or more of fat.

(b) 'Other' includes *Outer regional* and *Remote* areas.

Note: Rates are age-standardised to the 2007–08 survey population.

Source: AIHW 2011f.

What is missing from the picture?

Detailed national information on food and nutrient intakes is becoming increasingly out-dated, as it was last collected for adults in 1995 and children in 2007. The 2011–13 Australian Health Survey will provide an important update on current food and nutrient intakes, enabling a better understanding of the Australian diet. This will help identify areas of particular concern and enable health promotion messages to be better targeted.

Dietary assessment methods based on self-reports can be affected by social desirability or social approval (Miller et al. 2008). For example, foods considered to be 'desirable', such as fruit and vegetables, are commonly over-reported, whereas 'undesirable' foods, such as alcohol, fat and salt, are under-reported (Herbert et al. 2008). As this affects risk estimates, there is a need for innovative techniques to work around these limitations.

Where do I go for more information?

Specific detailed analysis of the previous national nutrition surveys are provided in:

- *Australia's food and nutrition* (AIHW forthcoming)
- *2007 Australian National Children's Nutrition and Physical Activity Survey—main findings* (CSIRO & University of South Australia 2008)
- *Towards national indicators for food and nutrition: an AIHW view: reporting against the Dietary Guidelines for Australian Adults* (AIHW 2006).

The Australian Dietary Guidelines and Nutrient References Values for Australia and New Zealand are available from the NHMRC's website: <www.nhmrc.gov.au>.

The Australian Guide to Healthy Eating is available from the Department of Health and Ageing's website: <www.health.gov.au>.



5.5 Physical activity

At a glance

- Almost 60% of Australians aged 15 and over do not do enough physical activity to benefit their health, as defined by national guidelines.
- Australians living in areas outside *Major cities*, and people who live in the most disadvantaged areas, are less likely to undertake sufficient physical activity.
- Participation in sport and physical recreation for Australians has decreased from 66% in 2005–06 to 64% in 2009–10, with the largest decline in those aged 25–34 (75% to 69%).



Introduction

Physical activity is defined as a series of bodily movements, produced by the muscles, that results in energy expenditure (AIHW 2010b). It can benefit human health by helping to prevent and manage chronic disease, and maintain a healthy body weight, musculoskeletal system and psychological wellbeing. Physical activity can be performed as deliberate exercise or sports (such as running), incidental movement (for example, hanging out the washing) or work-related activity (such as heavy lifting).

Emerging evidence is that a sedentary lifestyle (for example, sitting while watching TV) can be detrimental to health, and this effect can exist regardless of any physical activity undertaken during the day (Healy et al. 2008). This means that a person who adheres to the National Physical Activity Guidelines (see Box 5.5) may still have adverse health effects from being sedentary at other times.

To fully understand levels of physical activity, all forms of activity (including inactivity) need to be measured. The information about physical activity in this edition of *Australia's health* refers to people aged 15 and over. Information about physical activity and children is in the 2010 edition of *Australia's health* (AIHW 2010b).



Box 5.5: National Physical Activity Guidelines

The National Physical Activity Guidelines for adults set out steps to better health for Australian adults (DHAC 1999). These are:

- think of movement as an opportunity, not an inconvenience
- be active every day in as many ways as you can
- put together at least 30 minutes of moderate-intensity physical activity on most, preferably all, days (examples of moderate-intensity activity are brisk walking, swimming, doubles tennis and medium-paced cycling)
- if you can, enjoy some regular, vigorous activity for extra health and fitness (examples of vigorous physical activity are jogging, football and basketball).

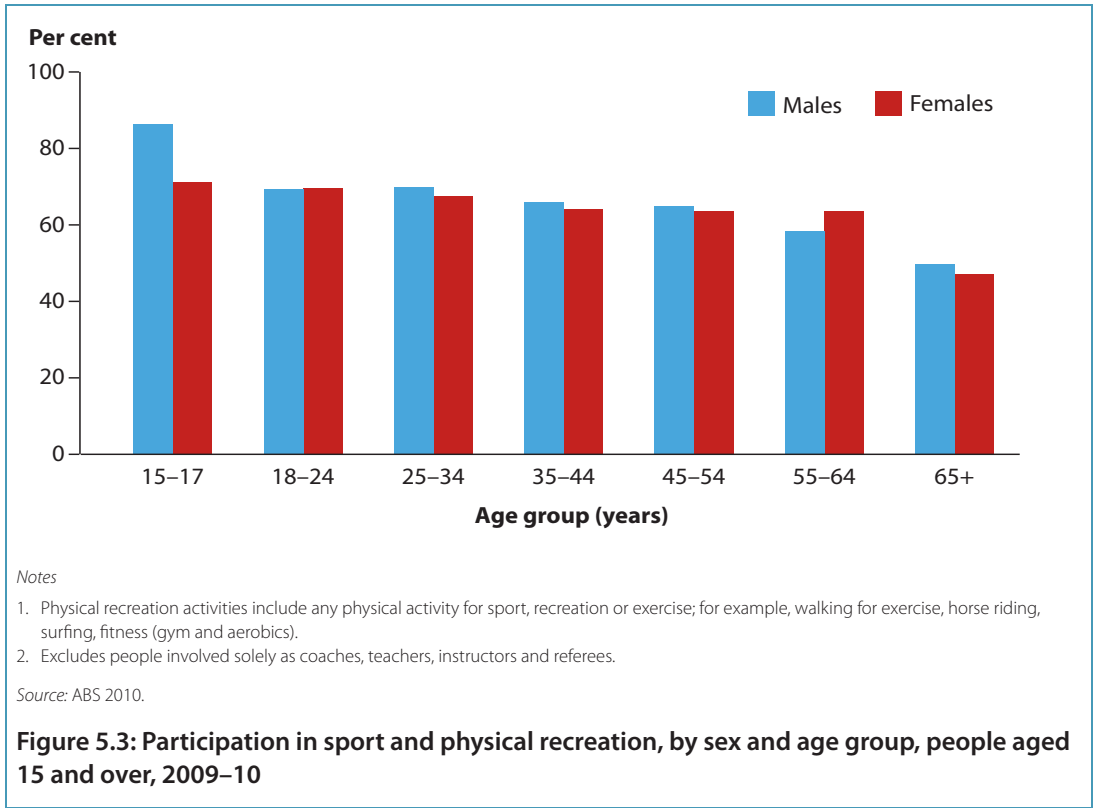
Recommendations for older adults are also available, with advice about physical activity that accommodates abilities and health problems common at older ages (DoHA 2009).

Recommendations for children and adolescents advise participation in at least 60 minutes of moderate to vigorous activity every day and no more than 2 hours of screen-time activity each day (DoHA 2004a, 2004b).

What do we know about participation in sport and physical recreation?

One view on physical activity patterns is given by surveys that measure participation in sport and physical recreation. Estimates from the ABS Multi-Purpose Household Survey 2009–10 show that 65% of males and 63% of females had participated in some form of sport or physical activity in the previous 12 months (ABS 2010). The participation rate between the sexes was similar across all age groups except for adolescence (15–17 years), where males were more active (Figure 5.3). The proportion of people participating in sport and physical recreation declined with age, from 79% of those aged 15–17 to 48% of those aged 65 and over. The most popular activities reported by Australians were walking (23%), followed by aerobics/fitness/gym (14%), swimming/diving (7%), cycling (7%) and running/jogging (7%).

The overall participation rate for Australians in sport and physical recreation decreased from 66% in 2005–06 to 64% in 2009–10. Notably, there was a statistically significant decrease in the participation rate for 25–34 year olds (75% in 2005–06 to 69% in 2009–10).



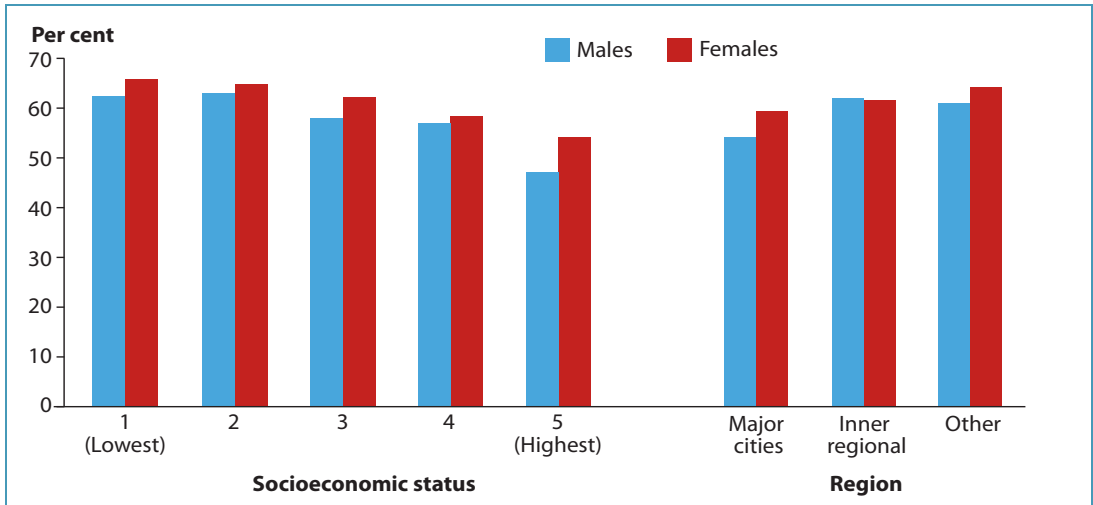
Insufficient physical activity

‘Sufficient’ physical activity for adults to confer a health benefit is generally interpreted as 30 minutes of moderate or vigorous physical activity on at least 5 days of the week—a total of at least 150 minutes per week.

Based on data from the 2007–08 National Health Survey, almost 60% of Australians aged 15 and over do not undertake sufficient physical activity to confer a health benefit. The proportion of people with insufficient levels of physical activity increased with age, with 80% of women aged 75 and over not undertaking sufficient physical activity.

In 2007–08, people who lived in areas outside *Major cities* were less likely to undertake sufficient exercise compared with *Other* areas (Figure 5.4). Similarly, people who lived in the most socioeconomically disadvantaged areas were less likely to undertake sufficient physical activity than those who lived in the least disadvantaged areas.





Notes

1. Rates are age-standardised to the 2007–08 National Health Survey population.
2. ‘Sufficient’ physical activity is interpreted as 30 minutes of moderate or vigorous physical activity on at least 5 days of the week—a total of at least 150 minutes per week.
3. Records for people who did not know the number of sessions or the time spent exercising were excluded from analysis unless they reached sufficient time and sessions through other questions.
4. ‘Other’ region includes the *Outer regional* and *Remote* areas of Australia.

Source: AIHW 2012.

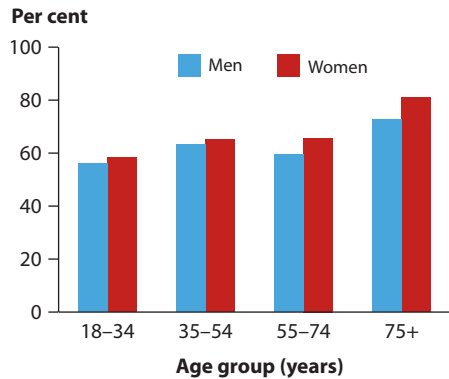
Figure 5.4: Insufficient time or sessions of physical activity, by selected variables, people aged 15 and over, 2007–08

The proportion of adults (18 and over) who did not participate in sufficient physical activity is presented here as a performance indicator (see ‘Physical inactivity’). Insufficient physical activity is also a target area of the NPAPH.

Physical inactivity. The percentage of adults who did not participate in sufficient regular physical activity to gain a health benefit. The recommended minimum level of activity is 150 minutes per week of walking or other moderate or vigorous activity, over at least five sessions.



- In 2007–08, most adults (62%) did not do the recommended amount of physical activity.
- Physical inactivity increased with age—76% of people aged 75 and over did not meet the guidelines, compared with 57% of people aged 18–34.
- Women were slightly more likely than men to be physically inactive.

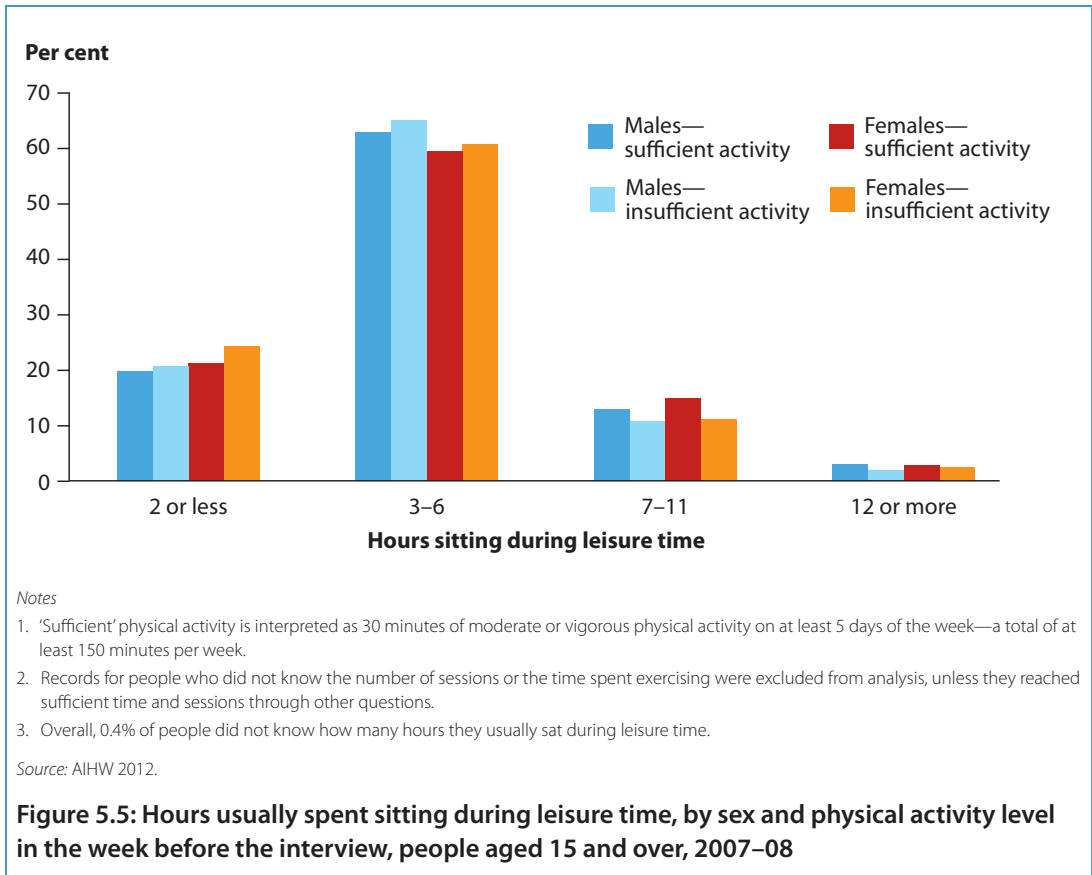


Source: ABS 2011a.



Sedentary lifestyle

Having a sedentary lifestyle is becoming increasingly recognised as being detrimental to health. It can contribute to many chronic diseases, as well as increased risk of mortality (Katzmarzyk et al. 2009). One way of assessing a sedentary lifestyle is to record the amount of time people spend sitting (for example, while watching TV or at the computer). Data on sitting during leisure time (outside work hours) show that, regardless of physical activity sufficiency, in 2007–08 most people spent between 3 and 6 hours each day sitting during their leisure time (Figure 5.5).



What is missing from the picture?

To further understand sedentary behaviours, measurement of sitting time across the whole day (including during travel, work, study and 'screen time') is required. In addition, the use of new technologies to allow the measurement of physical activities would provide more accurate data than relying on self-reported data. Examples of these technologies are accelerometers and pedometers. In the case of accelerometers, recording speed and distance can provide information to measure the intensity of activities during a time period.



Where do I go for more information?

Information about physical activity is published in many AIHW reports and is a feature of many national indicator sets. Two reports may be of interest: *Key indicators of progress for chronic disease and associated determinants: technical report* (AIHW 2009a) and *Key indicators of progress for chronic disease and associated determinants: data report* (AIHW 2011f).

Recommendations for levels of physical activity for adults, children, adolescents and older adults are available from the Department of Health and Ageing website: <www.health.gov.au>.

5

Health behaviours and risks

5.6 Obesity

At a glance

- In 2007–08, 25% of Australian adults (aged 18 and over) and 8% of children (aged 5–17) were obese; this equates to almost 3 million people.
- There is a graded relationship between socioeconomic status and obesity: people who live in the most disadvantaged areas are more likely to be obese than people who live in areas that are less disadvantaged.
- Rates of obesity have increased for both adults and children over the past few decades. Halting and reversing this trend is a priority for Australian governments.



Introduction

A healthy body weight is important for overall health and can help prevent and control many diseases and conditions (NHMRC 2003a). Conversely, being an unhealthy weight (including underweight, overweight or obese) can have associated health problems. For example, being overweight or obese can contribute to the development of chronic conditions, such as heart disease and stroke, Type 2 diabetes, osteoarthritis, some cancers and sleep apnoea. As excess body weight increases, so does the risk of chronic disease and mortality (NIH 1998).

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (WHO 2011a). This section focuses on obesity, defined as a BMI of 30 or more (see Box 5.6).

In Australia, rates of obesity in both adults and children have increased over the last two decades. Due to the large burden that obesity places on individuals, families and the community (NPHT 2009), the Australian Government has set as one of its health priorities the halting and reversing of this trend (Commonwealth of Australia 2010). The prevention of obesity (including the associated risk factors of physical inactivity and poor diet) is a focus for health departments and agencies, both in Australia and overseas. As such, large investments in programs, initiatives and other activities that promote healthy lifestyles are being made. For example, the Australian National Preventive Health Agency includes obesity (alongside harmful alcohol consumption and smoking) as a key area for the development of risk reduction strategies (ANPHA 2011b).



Box 5.6: Classifying obesity using the BMI

There are many ways to ascertain whether a person is obese. A commonly used method to assess body weight is the BMI, which is calculated by dividing a person's weight in kilograms by the square of their height in metres (kg/m^2).

The standard classification of BMI for adults recommended by the WHO is based on the association between BMI and illness and death (WHO 2000):

- underweight: $\text{BMI} < 18.5$
- healthy weight: $\text{BMI} \geq 18.5$ and $\text{BMI} < 25$
- overweight but not obese: $\text{BMI} \geq 25$ and $\text{BMI} < 30$
- obese: $\text{BMI} \geq 30$.

For example, a person who is 160 centimetres tall and weighs 85 kilograms has a BMI of 33.2 and is classified as obese.

This classification may not be suitable for all ethnic groups (such as those from the Asia-Pacific) and older people, and does not distinguish between muscle and fat. BMI can be used for children; however, cut-off points for body weight categories depend on age and sex as well as height and weight (Cole et al. 2000; Cole et al. 2007).

Other methods that can be used to measure obesity (and risk of chronic disease) include waist circumference, waist-to-hip ratio, and skin-fold measurements.

What do we know about obesity?

Based on measured heights and weights, 25% of adults and 8% of children (aged 5–17) were obese in 2007–08; this equates to almost 3 million people aged 5 or over (ABS 2009). Similar proportions of adult men and women were obese—26% and 24% respectively. For both sexes, rates of obesity generally increased with age, until the age group of 55–64. After this age group, obesity rates decreased.

The proportions of men and women who were obese increased markedly between 1995 and 2007–08, as did the proportion of boys (Table 5.5).

Table 5.5: Body mass index, by age and sex, 2007–08 and 1995 (per cent)

BMI category	1995	2007–08	1995	2007–08
	Boys (5–17)		Girls (5–17)	
Underweight	(a)	(a)	(a)	(a)
Normal weight	79.5	74.5	78.9	76.1
Overweight	16.0	16.2	15.3	18.2
Obese	4.5	9.3	5.8	5.6
	Men (18 and over)		Women (18 and over)	
Underweight	0.7	1.2	2.4	2.7
Normal weight	35.5	31.1	48.8	42.6
Overweight	45.2	42.2	29.9	31.0
Obese	18.6	25.5	18.9	23.6

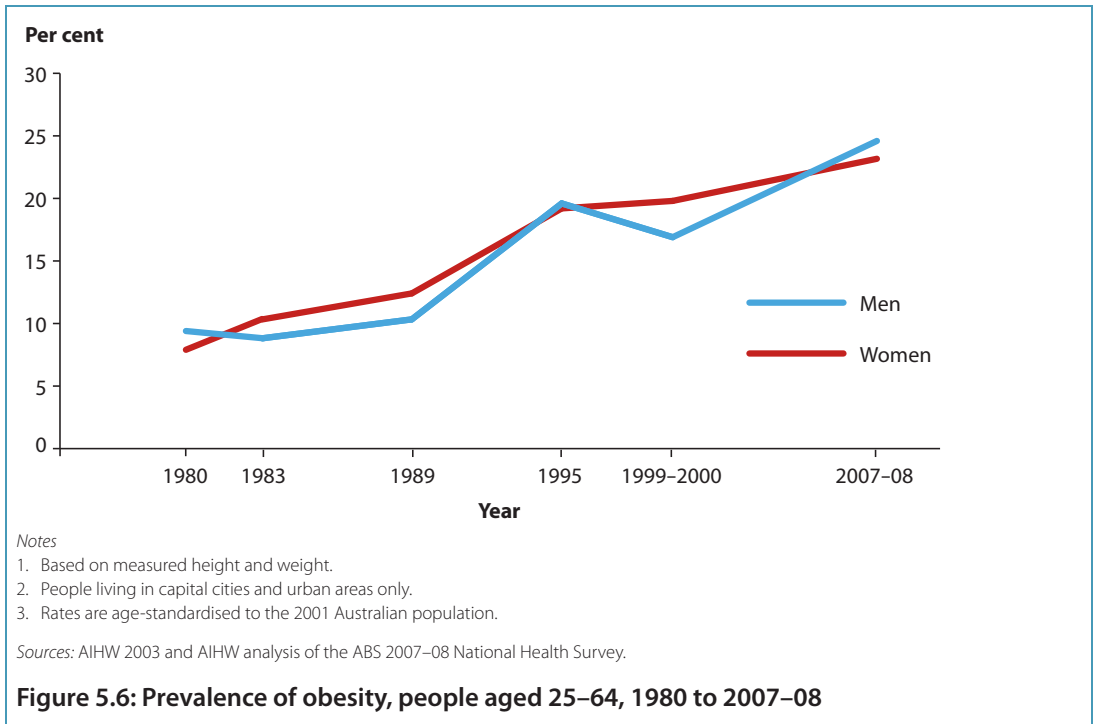
(a) Proportions for underweight were combined with those for normal weight because cut-off points were not available.

Notes

1. BMI was calculated from measured height and weight.
2. Estimates for 2007–08 are from the ABS 2007–08 National Health Survey. Estimates for 1995 are from the ABS 1995 National Nutrition Survey.

Source: ABS 2009.

Information on long-term trends in obesity (derived from measured height and weight) is restricted by the availability of suitable data. Figure 5.6 shows the increase in obesity for men and women since the 1980s; however, it is only for those aged 25–64, and is based only on data collected in capital cities.

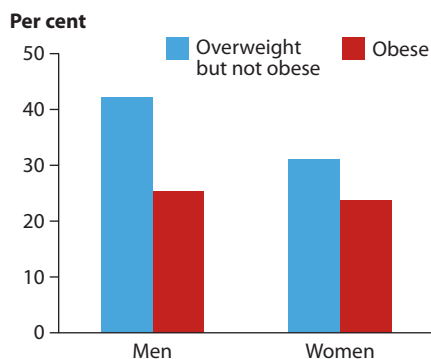


The proportion of adults who are overweight or obese is a national performance indicator (see 'Proportion of persons overweight or obese' below), and a performance measure under the NPAPH.

Proportion of persons overweight or obese. The percentage of adults who are overweight (with a BMI 25 or over but less than 30) or obese (with a BMI of 30 or more).



- In 2007–08, the majority of adults (61%) were either overweight or obese.
- Compared with 1995, the proportion of adults who were overweight or obese increased by 5 percentage points (from 56% to 61%).
- People who live in more disadvantaged areas of Australia are more likely to be obese.



Source: ABS 2009.

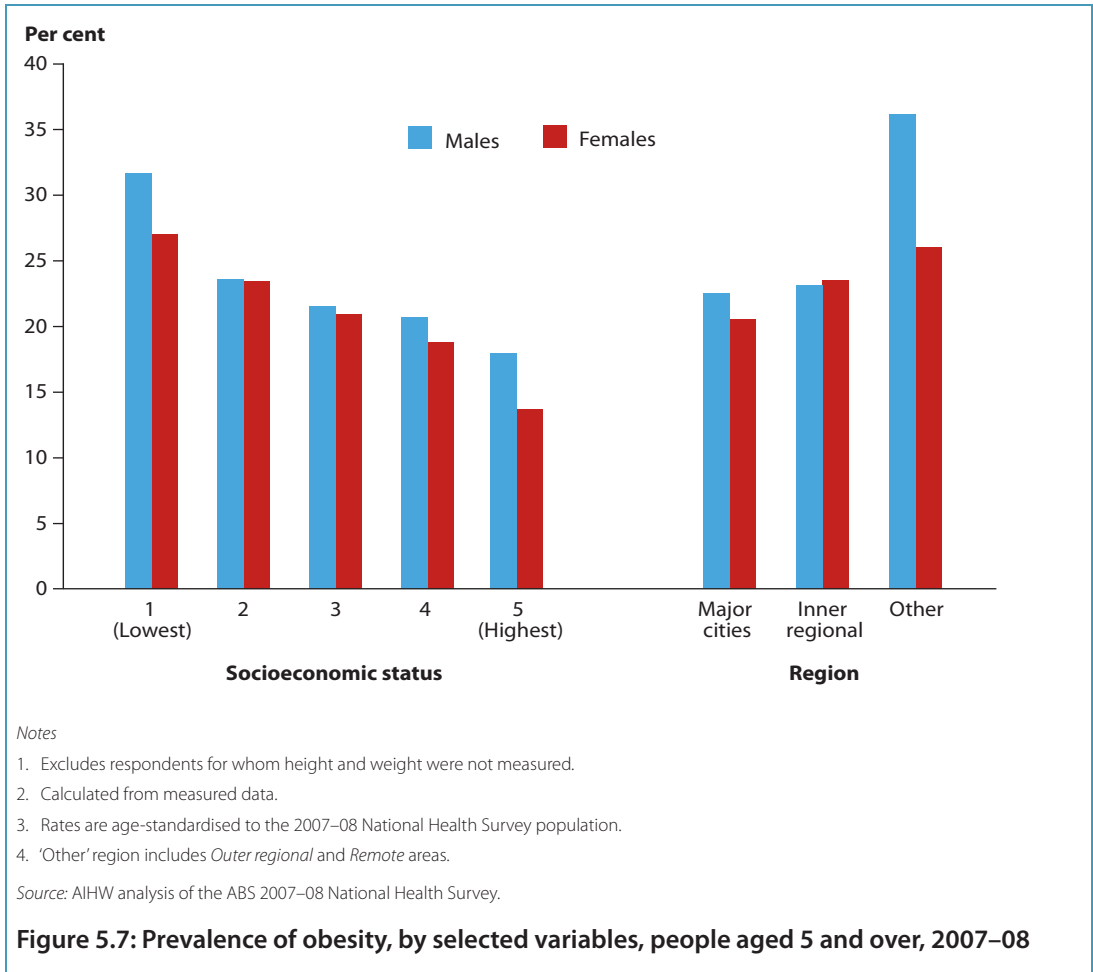
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How does obesity vary among population groups?

A clear gradient can be seen in levels of obesity by socioeconomic disadvantage: people who live in the most disadvantaged areas are more likely to be obese than people who live in areas that are less disadvantaged (Figure 5.7).

For males, obesity was more common in *Other* areas than in *Major cities* or *Inner regional* areas (36% compared with 23% and 22% respectively). Similarly, a higher proportion of females in *Other* areas (26%) were obese compared with *Major cities* (21%) or *Inner regional* areas (24%), but the differences were not as large (Figure 5.7).



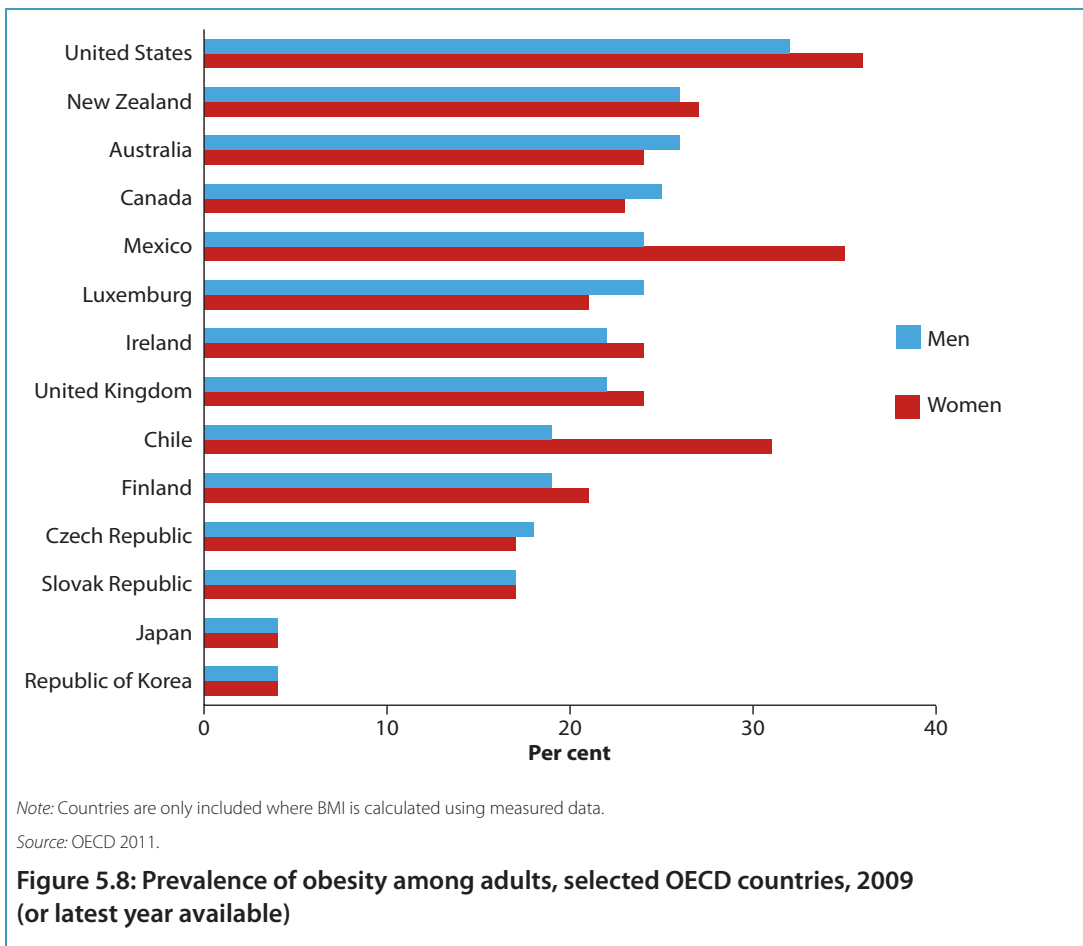


In 2004–05, after adjusting for differences in age structure, 34% of Aboriginal and Torres Strait Islander adults were obese compared with 18% of non-Indigenous adults (AIHW 2011g).

For Indigenous adults, the prevalence of obesity increased with age, and women were more likely to be obese than men (34% compared with 28%).

International comparisons

Comparisons among OECD countries show that Australia has the second-highest rate of obesity for males and fifth highest for females (OECD 2011) (Figure 5.8). International comparisons are limited because of the different methods used for collecting data. For example, estimates for Australia are based on measured height and weight, whereas for some other countries estimates are based on self-reported information. Figure 5.8 shows obesity rates for OECD countries where estimates were derived using measured data.



What is missing from the picture?

To strengthen the evidence base on obesity in Australia, it is important to continue regular population health surveys that collect measured data on body weight from all population groups. This will allow monitoring of trends in overweight and obesity, rather than a snapshot of the population at one point in time. More information is also needed about levels of physical activity and dietary intakes to better understand the pathways that lead to obesity.

Where do I go for more information?

Information about body weight (including obesity) is published in many AIHW reports. As a starting point, see the previous edition of *Australia's health* (AIHW 2010b), where obesity was discussed in the section on body weight.

Excess weight is also highlighted in many national indicator sets. The *Key indicators of progress for chronic disease and associated determinants* (one of which is obesity), are described in two reports: a technical report (AIHW 2009a) and a data report (AIHW 2011f).

5.7 Biomedical risks

At a glance

- Biomedical risk factors, such as high blood pressure, high cholesterol and impaired glucose regulation, can have relatively direct and specific risks for health. Their management may involve lifestyle changes and prescription medicines.
- According to the latest data, among Australians aged 25 and over an estimated 30% had high blood pressure, 52% high cholesterol and 16% impaired glucose regulation.
- There have been no national surveys of these biomedical risk factors, based on measured data, since 1999–2000. The next national results are expected from the 2011–2013 Australian Health Survey, which will include a range of biomedical measures.



Introduction

Unlike behaviours and other determinants discussed elsewhere in this chapter, biomedical factors represent actual bodily changes. The three biomedical factors discussed in this section—high blood pressure, high blood cholesterol and impaired glucose tolerance—can be regarded as relatively downstream in the process of increasing the risk of ill health, that is, closer to directly affecting health. They carry relatively direct and specific risks for health, and are often influenced by behavioural factors, which are in turn influenced by other upstream determinants. Note that overweight and obesity is often included in the category of biomedical risk factors, but is reported separately in this report in ‘Section 5.6 Obesity’.

Biomedical factors are commonly managed in clinical practice as well as being a focus of some population-based interventions. High blood pressure and high cholesterol, for example, are often controlled by prescription medicines, typically in conjunction with diet and exercise.

There have been no national surveys of these risk factors since the 1999–2000 Australian Diabetes, Obesity and Lifestyle (AusDiab) study. For this reason, only the main features of these risks are presented, and readers should exercise caution when interpreting the results because they are now more than a decade old and may not accurately reflect the prevalence of risks in 2012. More details on these risk factors are available in earlier editions of *Australia's health* and other AIHW reports (see ‘Where do I go for more information?’).

The 2011–2013 Australian Health Survey covering biomedical measures, as well as nutrition and physical activity, will produce welcome new data on these topics.



What do we know about high blood pressure?

High blood pressure—that is, blood pressure above an optimal level (Box 5.7)—is associated with a number of serious health conditions. Studies show that the closer the blood pressure is to the healthy minimum, the lower the risk of stroke, coronary heart disease, chronic kidney disease and heart failure—even death. This relationship applies across the whole range of blood pressure levels usually encountered in clinical practice (NHFA 2009).

Worldwide, high blood pressure has been found to be responsible for more deaths and disease than any other biomedical risk factor (Lopez et al. 2006). When it is controlled through medication, the risk is reduced, but not necessarily to the levels of unaffected people (WHO/ISH 1999).

The proportion of people with high blood pressure increases markedly with age, reaching an estimated 78% of those aged 75 or older (AIHW 2011h). In 2003, 8% of the burden of disease and injury in Australia was attributed to high blood pressure, placing it second out of the 14 risk factors studied (Begg et al. 2007).

Some of the major causes of high blood pressure are diet (particularly a high salt intake), obesity, excessive alcohol consumption and physical inactivity—all of which have the potential to be modified by changes in individual behaviour.

Box 5.7: High blood pressure

Blood pressure represents the forces exerted by blood on the wall of the arteries, and is written as systolic/diastolic (for example, 120/80 mmHg, stated as '120 over 80'). Systolic blood pressure reflects the maximum pressure in the arteries when the heart muscle contracts to pump blood; diastolic blood pressure reflects the minimum pressure in the arteries when the heart muscle relaxes before its next contraction.

There is a continuous relationship between blood pressure levels and cardiovascular disease risk that makes the definition of high blood pressure somewhat arbitrary. The WHO defines high blood pressure as:

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

In this report, high blood pressure is defined using these guidelines.

Source: WHO (Whitworth et al 2003).

The AusDiab study results indicate that 30% of Australians aged 25 and over (3.7 million people) had high systolic or diastolic blood pressure, or were on medication for high blood pressure in 1999–2000. A higher proportion of men (32%) than women (27%) were affected.

Between 1995 and 1999–2000, the prevalence of measured high blood pressure among Australians aged 25 and over remained about the same—31% in 1995 and 30% in 1999–2000. However, looking at the urban population aged 25–64—the only population for which longer term trends are available—the prevalence of measured high blood pressure fell by 50% or more for both men and women over the final two decades of the 20th century (AIHW 2010b).



It is widely recognised that the combined effects of risk factors are magnified when more than one is present (Trevisan et al. 1998). Based on self-reported data in 2007–08, combinations of risk factors that include high blood pressure become more common after the age of 65. But for those who are obese, have a large waist circumference or do not undertake sufficient physical activity, high blood pressure features more commonly in risk factor combinations from the age of 55 (AIHW 2012).

Over the period 2000–01 to 2009–10, the rate at which high blood pressure problems were managed by GPs did not change significantly, ranging from 8.6 to 9.1 problems managed per 100 GP encounters (Britt et al. 2010).

What do we know about blood cholesterol?

Cholesterol is a fatty substance produced by the liver and carried by the blood to the rest of the body. Its natural function is to supply material for cell walls and hormones. When the concentration of cholesterol in the blood rises to what is considered a high level (see Box 5.8), it can become a major risk factor for coronary heart disease, ischaemic stroke and peripheral vascular disease.

Box 5.8: High blood fats—cholesterol and triglyceride

The risk of heart disease increases steadily with increasing blood cholesterol levels. A total cholesterol level of 5.5 mmol/L or more is considered 'high' but this is an arbitrary definition. In this report, levels of high blood cholesterol are based on a total cholesterol level of 5.5 mmol/L or more.

Two important parts of blood cholesterol are:

- low-density lipoprotein (LDL) cholesterol, often known as 'bad' cholesterol, which is the main contributor to plaque (fat and fibre-like deposits on the walls of arteries, which can result in blockages)
- high-density lipoprotein (HDL) cholesterol, often known as 'good' cholesterol, which has a protective effect against heart disease by helping to reduce plaque.

Although LDL and HDL have opposing effects, the total cholesterol level is often used as an indicator of cardiovascular disease risk.

Triglyceride is another form of fat that is made by the body. Its levels can fluctuate according to dietary fat intake and, under some conditions, excess levels may contribute to plaque.

High blood cholesterol is a basic cause of plaque, the process by which the blood vessels that supply the heart and certain other parts of the body become clogged. For most people, saturated fat in the diet is the main factor that raises blood cholesterol levels but genetic factors can also play a role. Physical activity and diet are particularly important in the maintenance of healthy blood cholesterol levels (NHFA & CSANZ 2001).

The most recent national estimates of measured blood cholesterol levels come from the 1999–2000 AusDiab study. Its results indicate that in 1999–2000 nearly 52% of Australians aged 25 and over (6.5 million) had total cholesterol levels of 5.5 mmol/L or more—considered to be high. The prevalence of high cholesterol was greatest in men aged 55–64 and women aged 65–74 (AIHW 2011g).

Trends in the prevalence of high blood cholesterol are available only to the year 2000 and only for people aged 25–64 living in capital cities. These data indicate that blood cholesterol levels of adults in 1999–2000 were similar to those 20 years earlier: 49% of men and 46% of women had high total cholesterol in 1999–2000 compared with 51% of men and 43% of women in 1980 (AIHW 2011h).



AusDiab estimates indicate that those living in rural communities had a slightly higher rate of high total cholesterol (50%) than people living in urban areas (47%), and people who did not complete secondary school were also slightly more likely to have high total cholesterol than those who did complete secondary school (AIHW 2009b).

Over the period 2000–01 to 2009–10, the rate at which cholesterol-related problems were managed by GPs rose from an estimated 2.9 to 3.5 per 100 GP encounters (AIHW: Britt et al. 2010).

What do we know about impaired glucose regulation?

Impaired glucose regulation (IGR) is the metabolic state between normal glucose regulation and the state of failed regulation known as diabetes (WHO 1999). There are two categories of IGR: impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) (see Box 5.9).

IFG and IGT are not considered to be conditions in their own right but rather risk factors for the future development of diabetes and cardiovascular disease (Dunstan et al. 2001; NHMRC 2001). Studies show that 60% of people who develop diabetes had IGT or IFG 5 years or so before they were diagnosed with diabetes (Unwin et al. 2002).

Impaired glucose regulation is most common in people who have other risk factors for diabetes or cardiovascular disease, including being overweight or obese, being physically inactive, and having high levels of triglyceride or total cholesterol, low HDL cholesterol levels or high blood pressure (Twigg et al. 2007). Preventing these risk factors, as well as early treatment and improved management of impaired glucose regulation, can reduce the progression to Type 2 diabetes. A study by Tuomilehto et al. (2001) showed that lifestyle interventions among obese adults with IGT—such as counselling aimed at reducing weight and total fat intake, increasing fibre intake, and increasing physical activity—reduced the rate of progression to diabetes by 40–60% over a 3–6 year period.

Based on measured data from the AusDiab study, it is estimated that 16% of Australians aged 25 or over had impaired glucose regulation in 1999–2000, with the prevalence in women peaking in the 75 and older age group, and in men in the 65–74 age group (Figure 5.9).



Box 5.9: Impaired glucose regulation

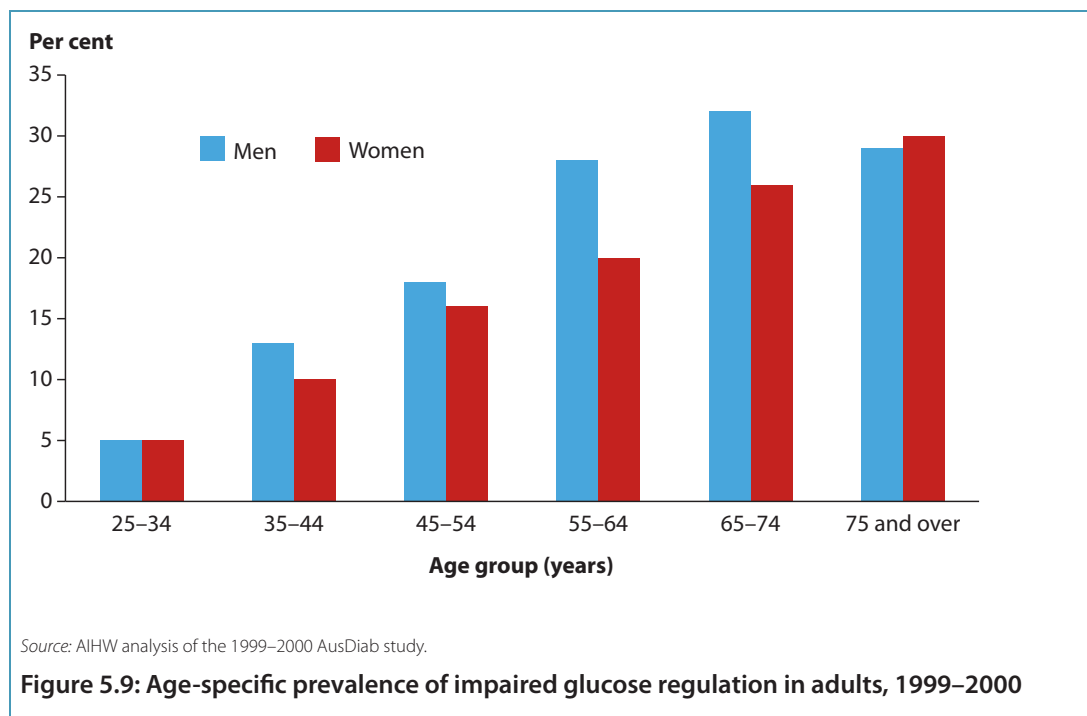
IFG and IGT are measured using an oral glucose tolerance test (OGTT)—the same test that is used for diabetes. In the OGTT, a first blood glucose measurement is taken after a fasting period of about 8 hours; then an additional measurement is taken 2 hours after consuming 75g of glucose (typically in the form of a high-sugar drink).

IFG indicates an abnormality in fasting glucose regulation and is diagnosed when the OGTT results show that the fasting blood glucose level (that is, the first measurement) is 6.0 mmol/L or more but less than 7.0 mmol/L, and the blood glucose level at 2 hours is less than 7.8 mmol/L.

IGT indicates an abnormality in glucose regulation after drinking and is diagnosed when the OGTT results show that the fasting blood glucose level is less than 7.0 mmol/L and the blood glucose level at 2 hours is more than 7.8 mmol/L but less than 11 mmol/L.

Note that diabetes—rather than just impaired glucose regulation—is diagnosed when the fasting blood glucose level is 7.0 mmol/L or more, or the OGTT result is 11.1 mmol/L or more, or both.

IGT was more common than IFG, at 11% and 6% respectively, with each having quite different age and sex distributions. Results from the AusDiab study suggest that the overall prevalence of IFG was significantly higher in men (8%) than women (3%), and that the prevalence of IGT was significantly higher among women (12%) than men (9%).



What is missing from the picture?

There have been no national surveys of blood pressure levels, blood cholesterol levels or impaired glucose tolerance, based on measured data, since 1999–2000. As these results are now more than 10 years old, they may not reflect the current status of Australians today. Further, the sample of this survey was limited to people aged 25 and over, and excluded the Australian Capital Territory. There was also a relatively low response rate for the biomedical examination (37% of total households contacted and found to be eligible).

The next national results are expected from the 2011–2013 Australian Health Survey, which will contain a range of biomedical measures, including:

- systolic and diastolic blood pressure
- total cholesterol, HDL, LDL, triglycerides, and apolipoprotein B
- plasma glucose (fasting where possible).

However, because 2-hour measurements are not taken in the survey, it will not be possible to determine IFG and IGT.

As the AusDiab study was designed to provide national estimates only, conclusions cannot be drawn about the prevalence of biomedical risks among Indigenous Australians. The Aboriginal and Torres Strait Islander components of the Australian Health Survey will help fill this important gap in biomedical data for this population.

Where do I go for more information?

For more information about these biomedical risks in the Australian population, refer to the following publications, which are available at <www.aihw.gov.au>:

- *Prevention of cardiovascular disease, diabetes and chronic kidney disease: targeting risk factors* (AIHW 2009b)
- *Australia's health 2010* (AIHW 2010b)
- *Cardiovascular disease: Australian facts 2011* (AIHW 2011h).

5.8 Tobacco smoking

At a glance

- Australia's level of smoking continues to fall and is among the lowest for OECD countries, with about 1 in 7 people aged 14 or older smoking daily in 2010.
- Continued declines in daily smoking are likely in the future, given declines in smoking uptake among people under the age of 40.
- The proportion of households with dependent children having someone smoking inside the home continues to fall from 31% in 1995 to 6% in 2010.



Introduction

Tobacco smoking is the single most preventable cause of ill health and death in Australia. It contributes to more hospitalisations and deaths each year than alcohol and illicit drug use combined (AIHW 2008a). It is a major risk factor for coronary heart disease, stroke, peripheral vascular disease, several cancers, respiratory disorders and other diseases and conditions.

In 2003, there were about 15,500 deaths attributable to tobacco in Australia (Begg et al. 2007). The overall burden of disease from smoking decreased from 10% of the total burden in 1996 to 8% in 2003, however, it remained the largest single risk factor contributing to disease and death. In 2004–05, tobacco smoking was estimated to cost Australian society \$31.5 billion in tangible costs, such as health care, fires and reduced workplace productivity, and intangible costs of pain and suffering (Collins & Lapsley 2008).

The Council of Australian Governments' National Healthcare Agreement has set two targets to be met by 2018: to reduce the proportion of Australian adults smoking daily to 10%, and to halve the smoking rate among Aboriginal and Torres Strait Islanders (COAG 2008).

What do we know about tobacco smoking?

The most commonly reported measure of population smoking rates is daily smoking, as this reflects the pattern of smoking most harmful to health. Estimates from the 2010 National Drug Strategy Household Survey (NDSHS; Box 5.10) show that about 2.8 million Australians aged 14 or older (15%) smoked daily (AIHW 2011a), while 3% smoked less often than daily. The majority of the population (58%) had never smoked, and about one-quarter were former smokers (24%). The proportion of daily smokers was highest in the Northern Territory (22%) and lowest in the Australian Capital Territory (11%). Females were less likely than males to smoke and were more likely to have never taken up smoking, except in the 12–17 age group (3.2% for females compared with 1.8% for males).



Box 5.10: National Drug Strategy Household Survey

The AIHW's NDSHS is run by the Australian Institute of Health and Welfare at 3-yearly intervals. It collects comprehensive information about Australians' use of and attitudes towards tobacco, alcohol and illicit drugs; experiences of alcohol and other drug-related harm; and physical and mental health.

The last survey was conducted in 2010, the tenth in a series that started in 1985. The survey collected information from more than 26,000 respondents from cities, regional and remote areas across Australia. People living in non-private dwellings and institutions were not included in the sample. The first seven surveys covered people aged 14 and over; since 2004, people aged 12 and over have been included.

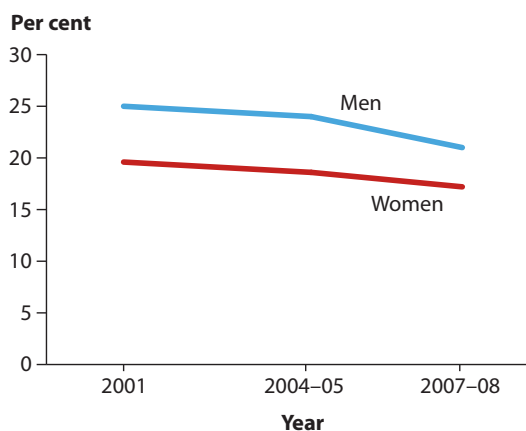
Like many other surveys, the NDSHS is based on self-reported information. People may be less inclined to report illegal drug use than to report the use of legal drugs (AIHW 2008a). Illicit drug users may also be marginalised and difficult to reach (AIHW 2008b). This means that survey results relating to illicit drug use may be underestimates of actual prevalence.

The proportion of adults who are daily smokers is a national performance indicator, presented below. As it draws on data from the National Health Survey rather than the NDSHS, the indicator data differs from the statistics presented elsewhere in this section.

Proportion of adults who are daily smokers. Adults (18 or over) who smoke tobacco (manufactured or roll-your-own) every day. Presented as an age-standardised percentage.



- In 2007–08, 19% of adults were daily smokers—21% of men and 17% of women.
- The long-term downward trend in smoking rates, for both men and women, has continued in recent years.
- Among men, daily smoking is most common in the 25–34 age group. For women, it is most common in the 40–49 age group.



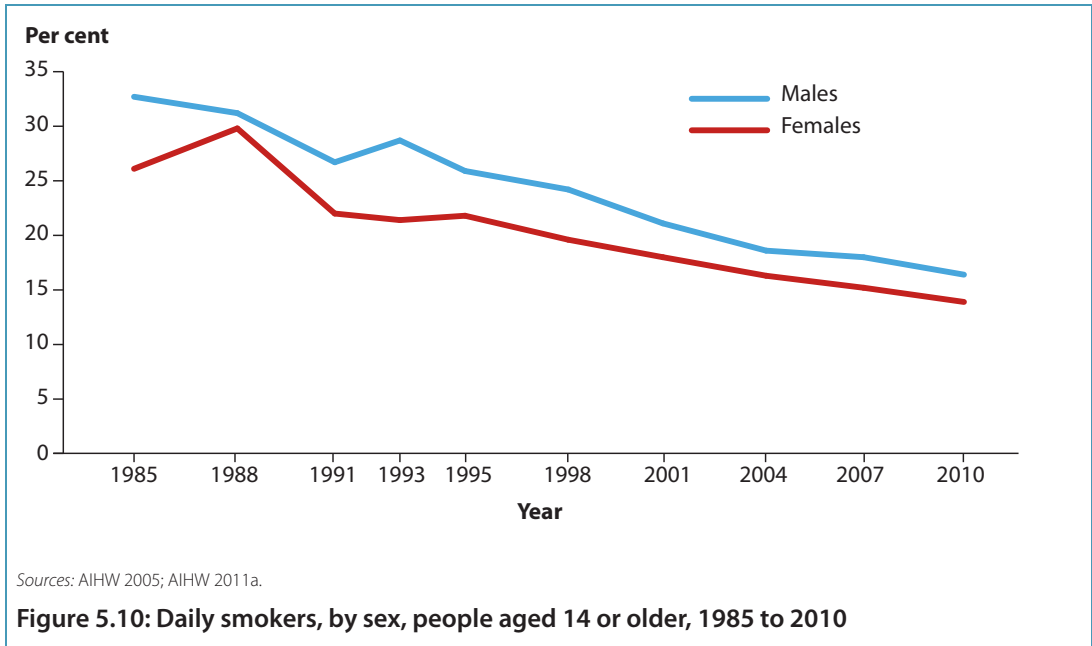
Source: ABS 2009.

Daily smoking rates for those aged 14 or older halved between 1985 (30%) and 2010 (15%). The decline was recorded for both males and females (Figure 5.10), and in recent years was largest for those aged in their early-20s to mid-40s (AIHW 2011a). The proportion of those aged 45 or over who smoked daily remained relatively stable or slightly increased between 2007 and 2010. Since 2001, more than half of the population aged 14 or older have never smoked; this increased from 51% in 2001 to 58% in 2010 (AIHW 2002; AIHW 2011a).



Despite the decline in the proportion of Australians smoking tobacco, the total number of current smokers (daily, weekly and less than weekly) remained stable between 2007 and 2010, at about 3.3 million, due to population growth (AIHW 2011a).

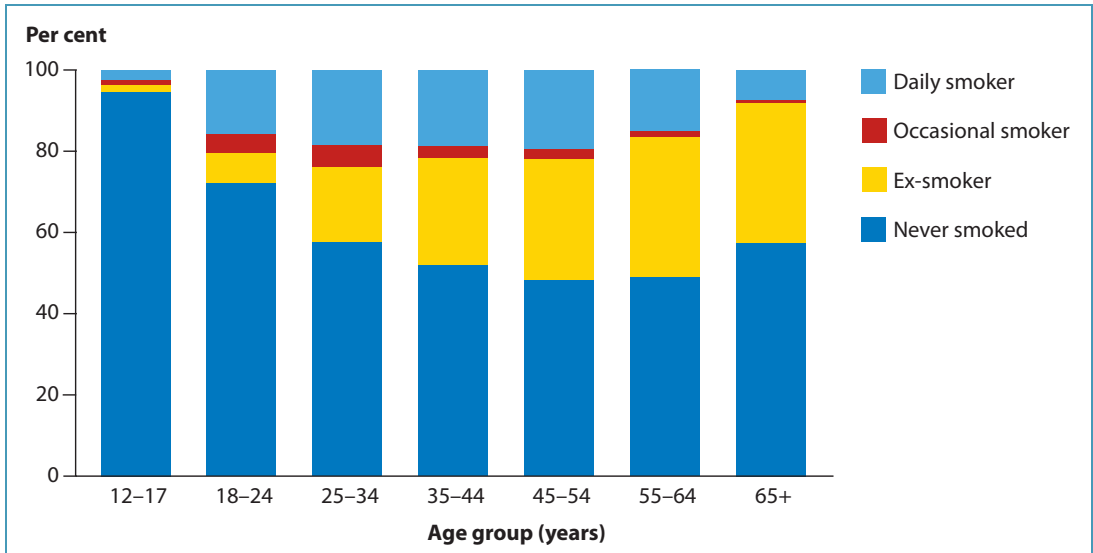
The prevalence of smoking in Australia is expected to further decline in the future, given the decrease in the prevalence of daily smoking for age groups under 40, the increasing proportion of younger people who have never smoked, and that most people who take up smoking do so relatively early in life.



Most adult tobacco users first tried smoking during adolescence (AIHW 2008c). As people who begin smoking early are more likely to continue smoking, tobacco use among young people is a key predictor of adult smoking (Tyas & Pederson 1998). One of the objectives of the National Drug Strategy 2010–2015 is to prevent the uptake and delay the onset of drug use, including tobacco. The age at which 14–19 year olds smoked their first full cigarette increased from 13.4 years in 1998 to 14.9 in 2010 (AIHW 2011a). The proportion of people in this age group who never smoked also increased, from 76% in 2001 to 88% in 2010.

In 2010, daily smoking rates were highest among people aged 45–54 (19%) (Figure 5.11). Only 7% of people aged 65 or over smoked daily, although more than one-third of this age group were ex-smokers.





Source: AIHW 2011a.

Figure 5.11: Tobacco smoking status, by age group, people aged 12 or older, 2010

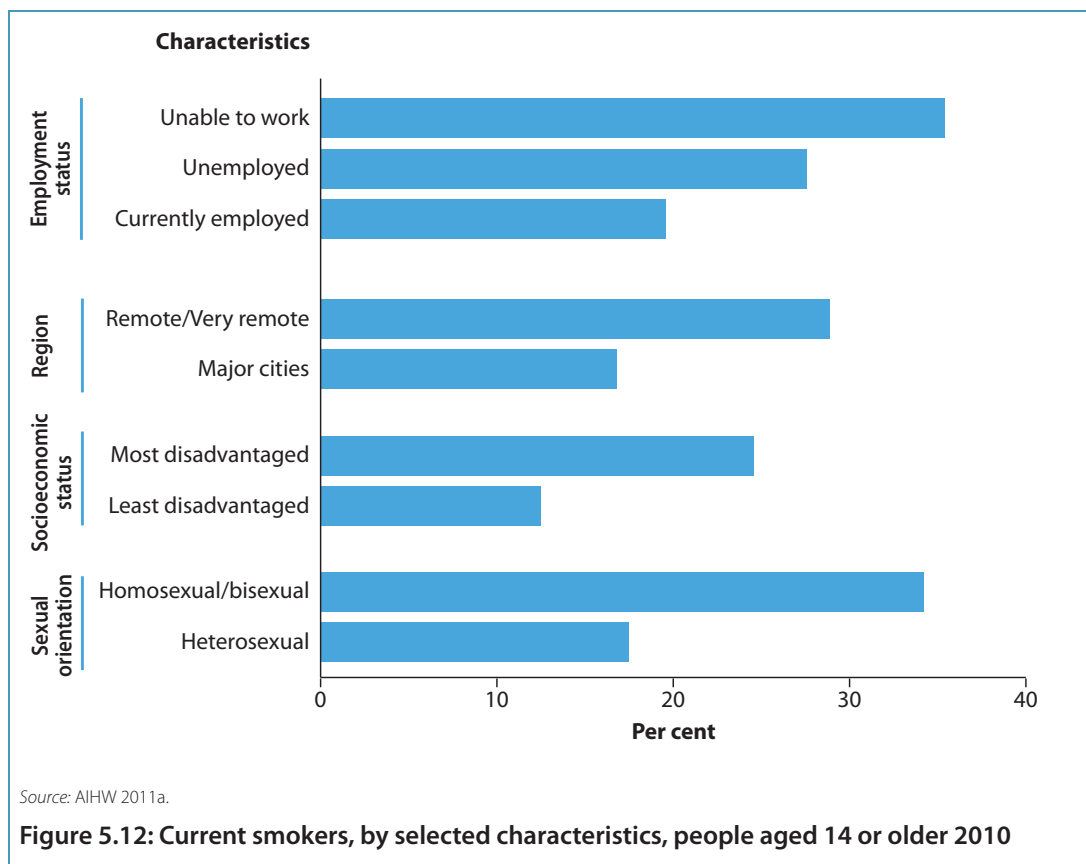
Successive Australian Secondary Students' Alcohol and Drug surveys have shown that smoking among young people has been declining. In 2008, 5% of secondary school students aged 12–15 and 13% of students aged 16–17 were current smokers, compared with 11% and 23%, respectively, in 2002 (White & Smith 2009).

Disadvantaged population groups

Certain groups within the population are at greater risk of developing harmful drug use behaviours or experiencing drug-related harm. These groups may require particular targeting in terms of education, treatment and prevention programs (AIHW 2007).

Groups more likely than average to smoke included people who were unable to work or were unemployed, people identifying as homosexual or bisexual, people living in socioeconomically disadvantaged areas, and those living in *Remote* and *Very remote* areas (Figure 5.12). Aboriginal and Torres Strait Islander people were 2.2 times as likely as non-Indigenous Australians to smoke tobacco (AIHW 2011a).

The NDSHS also shows an association between smoking and poor mental health. Twice as many smokers (19%) as non-smokers (9%) have been diagnosed with, or treated for, a mental illness, and smokers were also more likely to report high or very high levels of psychological distress in the 4 weeks before the survey (AIHW 2011a). However, the direction and nature of this relationship is unclear.



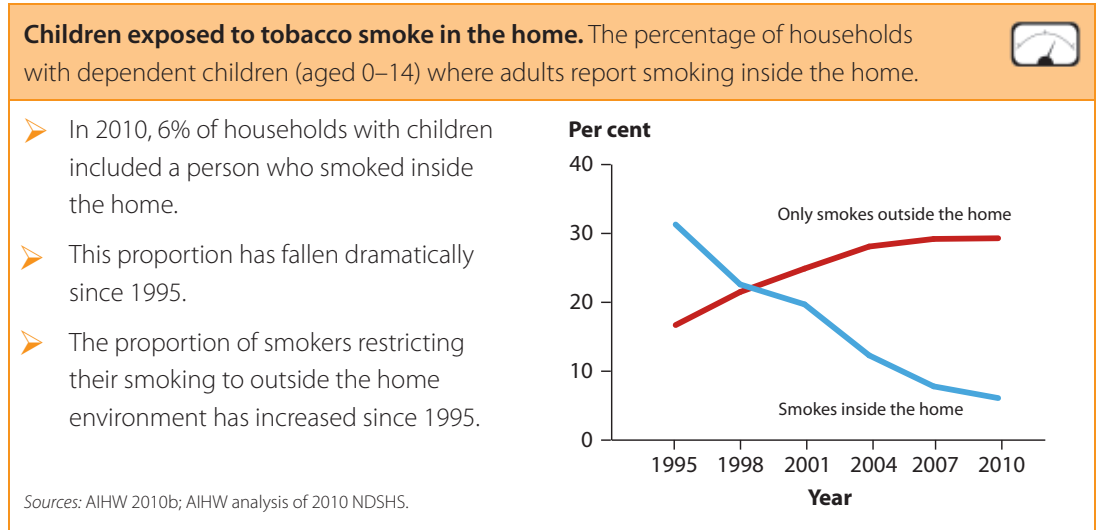
Exposure to second-hand smoke

Second-hand smoke is known to be a cause of various health problems in adults and children (NHMRC 1997). It can be particularly harmful to children, increasing the risk of a range of health problems, including chest infections, ear infections, asthma and sudden infant death syndrome (Dunn et al. 2008).

For those individuals who do live with one or more smokers, the home is a major source of exposure to second-hand smoke (Scollo & Winstanley 2008). This has declined in the last decade, reflecting a continuing decline in the prevalence of smoking as well as an increase in smokers confining their smoking to outside the home environment. In 2010, more than three-quarters (77%) of Australians lived in homes where no-one regularly smoked, and 18% lived with one or more people who smoked only outside the home. However, 5% of non-smokers were exposed to smoke from another resident at home at least once a day (AIHW 2011i).



As at 2012, all states and territories, except for Northern Territory, had implemented bans on smoking in cars to reduce children’s exposure to environmental smoke (Scollo & Winstanley 2008; ACT Health 2012). Parents are also choosing to reduce their children’s exposure to smoke at home. Between 1995 and 2010, the proportion of households with dependent children having someone smoking inside the home fell from 31% to 6% (see the performance indicator ‘Children exposed to tobacco smoke in the home’, below). Of these households, the proportion with smokers who chose to only smoke outside the home increased from 17% in 1995 to 29% in 2010.



- In 2010, 6% of households with children included a person who smoked inside the home.
- This proportion has fallen dramatically since 1995.
- The proportion of smokers restricting their smoking to outside the home environment has increased since 1995.

International comparisons

The proportion of daily smokers among the population aged 15 or older varies considerably among OECD countries. In 13 of 34 OECD countries, less than 20% of the adult population smoked daily in 2009. Rates were lowest in Mexico (13%), Sweden (14%), Iceland (16%), the United States (16%), Canada (16%) and Australia (17%). Greece maintains the highest level of daily smoking at 40% of the adult population, followed by Chile and Ireland, with about 30% (OECD 2011). Since 1979, most OECD countries have experienced substantial declines in daily smoking rates, although this has slowed over more recent years (AIHW 2011i).

What is missing from the picture?

The following information would enhance the usefulness of social cost studies and evaluations of policy effectiveness:

- national data on the proportion of people who have successfully quit and how they successfully maintained cessation
- annual data on the number of deaths attributable to tobacco in Australia
- tobacco-attributable crime (including smuggling), and associated costs
- workplace absenteeism attributable to the consumption of tobacco
- more robust data on the direct health and social costs of tobacco smoking.

At the beginning of each wave of the NDSHS, the questionnaire is evaluated and questions are refined, added or removed to ensure current information needs are reflected, while also maintaining time series data.

Where do I go for more information?

For more information on tobacco smoking in Australia, see the 2010 NDSHS (AIHW 2011a) and the *Drugs in Australia 2010* (AIHW 2011i) reports, available online at: www.aihw.gov.au/alcohol-and-other-drugs.



5.9 Alcohol consumption

At a glance

- In 2010, 1 in 5 people aged 14 and over were at risk of alcohol-related harm over their lifetime, and 2 in 5 were at risk of harm from a single drinking occasion in the past 12 months.
- About 13% of recent drinkers admitted to driving under the influence of alcohol.



Introduction

The consumption of alcohol is widespread within Australia and is entwined with many social and cultural activities. However, excessive use of alcohol leads to substantial health and social harms each year. Alcohol is second only to tobacco as a preventable cause of drug-related death and hospitalisation in Australia (NHMRC 2009). In 2003, an estimated 2% of the total burden of disease in Australia was attributable to excessive alcohol consumption, with a large proportion of this burden falling on males under the age of 45 (Begg et al. 2007).

In 2004–05, the cost to the Australian community of alcohol-related social problems was estimated to be \$15.3 billion; the majority (71%) was for tangible costs (Collins & Lapsley 2008), such as those associated with lost productivity, health, road accidents and crime.

Alcohol is a causal factor in about 60 types of diseases and injuries and a component cause in perhaps 200 others. Alcohol is also associated with many serious social issues, including violence, drink-driving, child neglect and abuse, and absenteeism in the workplace (WHO 2011b). The National Alcohol Strategy 2006–2011 aims to reduce some of these harms by focusing on intoxication, public safety and amenity, the health impacts of drinking, and the cultural place and availability of alcohol in Australian society (MCDS 2006).

Strategies include reducing the secondary supply of alcohol to minors; considering the introduction of health warning labels on alcohol products; and measuring the harms associated with alcohol use, including trends in drink-driving-related deaths and injuries, community perceptions of safety and alcohol-related emergency admissions and hospital separations (MCDS 2011).

The NHMRC has produced guidelines for how individuals and communities can minimise the harmful effects of alcohol (NHMRC 2009)—see Box 5.11.

Box 5.11: The Australian alcohol guidelines

In Australia, guidelines about alcohol use are produced by the NHMRC. The most recent version of the Australian Guidelines to Reduce Health Risks from Drinking Alcohol was released in 2009. The alcohol risk data in this section are reported against Guideline 1 and Guideline 2 (see NHMRC 2009 for more details).

Guideline 1: Reducing the risk of alcohol-related harm over a lifetime

Drinking no more than 2 standard drinks on any day reduces the lifetime risk of harm from alcohol-related disease or injury.

Guideline 2: Reducing the risk of injury on a single occasion of drinking

Drinking no more than 4 standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion.

What do we know about alcohol consumption?

Current status

The 2010 NDSHS (see Box 5.10 in 'Section 5.8 Tobacco smoking') showed that in 2010:

- most (81%) Australians aged 14 and over consumed alcohol: 47% drank alcohol at least once a week and 34% drank less often than weekly (Figure 5.13)
- 1 in 5 abstained from alcohol (12% had never consumed a full serve of alcohol; 7% were ex-drinkers)
- daily drinking was most common among males (10%) and especially males aged 70 or older (18% compared with 7% of the population overall).

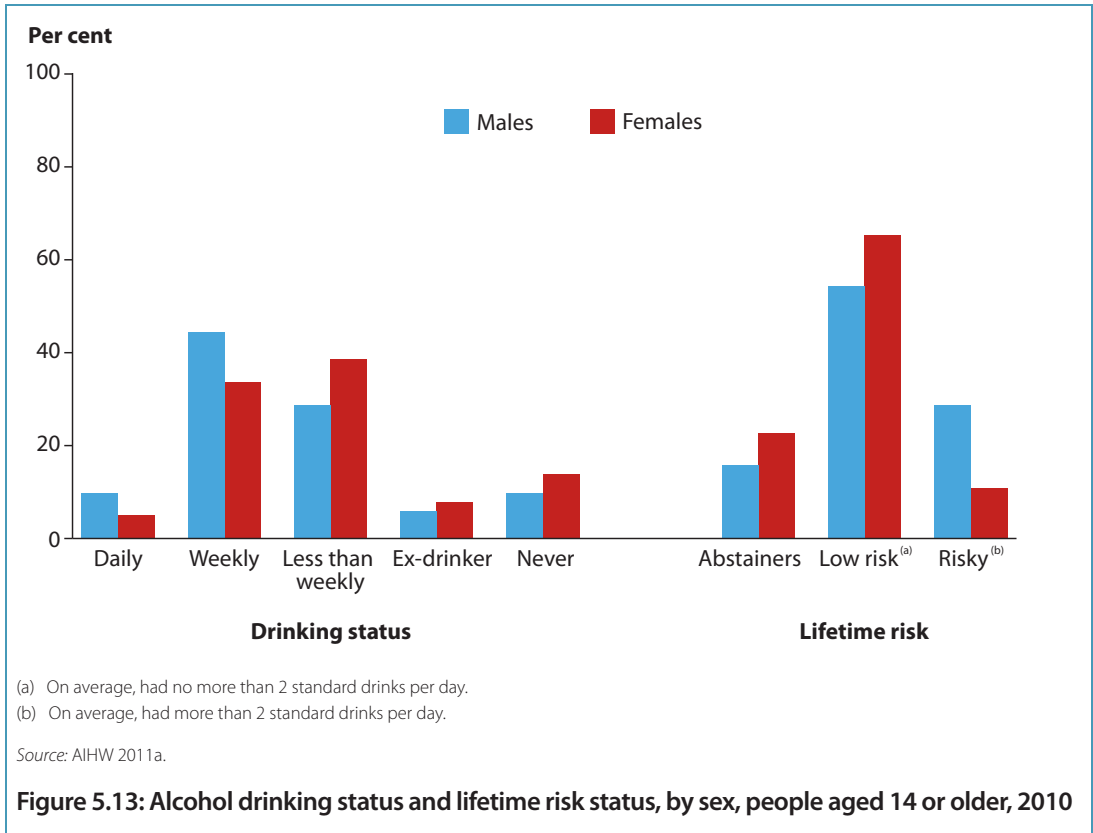
Lifetime risk

In 2010, 20% of people aged 14 or older reported drinking alcohol at levels that exceeded the 2009 guideline levels for lifetime harm. Some population groups were more likely to consume alcohol in quantities that put them at risk of incurring an alcohol-related disease or injury over their lifetime.

For example:

- males were 2.6 times as likely as females to consume alcohol at risky levels (29% and 11% respectively) (Figure 5.13)
- people aged 18–29 were more likely than any other age group to drink alcohol in risky quantities (32% for those aged 18–19 and 27% for those aged 20–29) (AIHW 2011a).





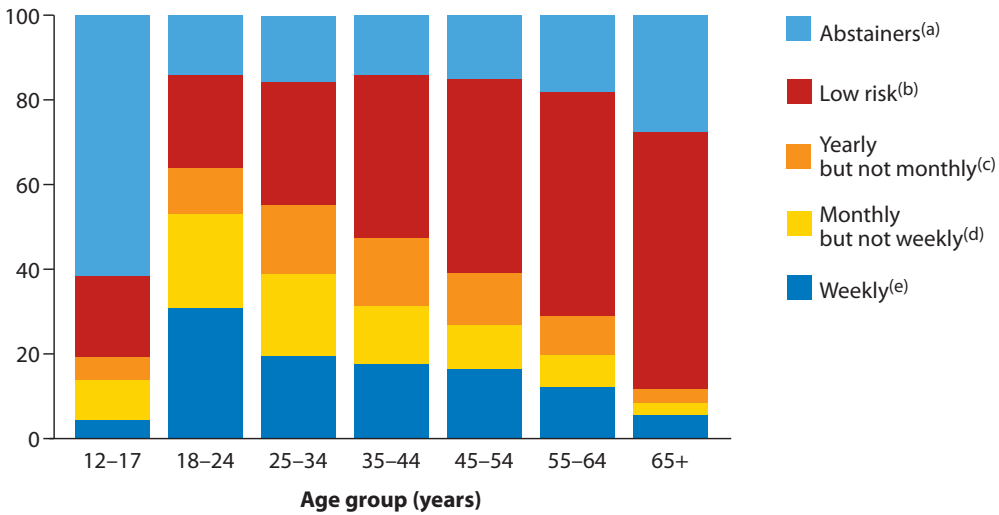
Single occasion risk

In 2010, about 2 in 5 (39%) people aged 12 or older drank in a pattern that placed them at risk of an alcohol-related injury from a single drinking occasion at least once in the previous 12 months (Box 5.11; Figure 5.14). In addition:

- 15% put themselves at risk at least once a week and 12% put themselves at risk at least once a month, but not as often as weekly
- males were far more likely than females to drink alcohol in quantities that placed them at risk from a single occasion of drinking (48% and 29% respectively), and consumed these quantities more often
- people aged 18–24 were the most likely to regularly consume alcohol in risky quantities, with more 31% doing so as often as weekly (AIHW 2011a).



Per cent



- (a) Not consumed alcohol in the previous 12 months.
- (b) Never had more than 4 standard drinks on any occasion in the previous 12 months.
- (c) Had more than 4 standard drinks at least once a year but not as often as monthly.
- (d) Had more than 4 standard drinks at least once a month but not as often as weekly.
- (e) Had more than 4 standard drinks at least once a week.

Source: AIHW 2011a.

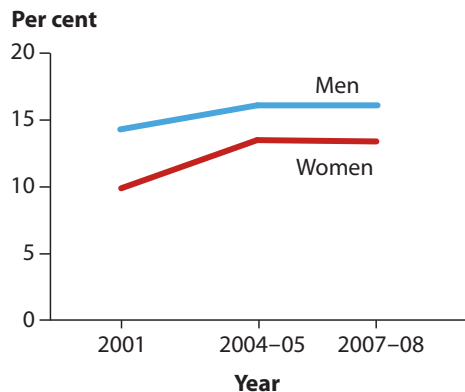
Figure 5.14: Single occasion risk status, by age, people aged 12 or older, 2010

The performance indicator 'Proportion of adults at risk of long-term harm from alcohol' is presented below. As it draws on data from the National Health Survey rather than the NDSHS, and is based on the 2001 NHMRC guidelines, the indicator data differ from the statistics presented elsewhere in this section.

Proportion of adults at risk of long-term harm from alcohol. Persons aged 18 or over whose alcohol consumption pattern puts them at risk of long-term alcohol-related harm according to 2001 National Health and Medical Research Council guidelines. Presented as an age-standardised percentage.



- In 2007–08, 15% of adults consumed alcohol at levels that put them at risk of long-term harm: 16% of men and 13% of women.
- While rates of risky alcohol consumption increased slightly from 2001 to 2004–05, the most recent data show no significant change.
- Men aged 25–29 (21%) and women aged 65–69 (18%) had reported the highest rates of risky alcohol consumption.



Source: ABS 2009.



Trends

Between 1993 and 2010, the proportion of people in Australia aged 14 or older who drank daily remained relatively stable at about 7–8%. There was also little change in the proportions of people drinking alcohol at levels that put them at risk of harm over their lifetime, or from a single drinking occasion at least once a month. The proportion of people abstaining rose from 17% in 2007 to 19% in 2010 (a statistically significant difference); the largest increase in abstainers was seen among those aged 12–17 (AIHW 2011a).

Between 1964 and 2009, the volume of alcohol (in litres) consumed by Australians aged 15 or older initially rose from 10 litres per person to peak at 13.1 litres per person in 1974, and then fell back to a level similar to that at the start of the period (ABS 2011b). On a per capita basis, there were 10.3 litres of pure alcohol available for consumption per person in 2009–10. Of all pure alcohol available for consumption in 2009–10, beer contributed 43%, wine 37%, spirits 13%, and ready-to-drink (pre-mixed) beverages 7% (ABS 2011b).

Young people

Consumption of alcohol by young people is of concern because of the negative social outcomes associated with high-risk drinking (Toumbourou et al. 2005, Lubman et al. 2007). Results from the NDSHS show that, in 2010, 30% of those aged 16–17 and 5% of those aged 12–15 had consumed alcohol at levels that put them at risk of harm from a single occasion of drinking at least once a month.

Among young adults, alcohol is responsible for the majority of drug-related deaths and hospital episodes, causing more deaths and hospitalisations in this age group than all illicit drugs, and many more than tobacco (NHMRC 2009). In 2009–10, there were more than 20,000 hospitalisations with an alcohol-related principal diagnosis for people aged 10–39, more than any other drug (AIHW 2011j).

Other population groups

The 2010 NDSHS found that certain population groups were more likely to consume alcohol at levels that put them at risk of injury on a weekly basis. In particular, those living in *Remote/Very remote* areas were more likely to drink at risky levels at least once a week than those in *Major cities* (26% compared with 15% respectively). Homosexual or bisexual people were more likely to drink at risky levels (29%) than heterosexual people (20%) (AIHW 2011a).

Aboriginal and Torres Strait Islander people are less likely than non-Indigenous Australians to consume alcohol. However, Indigenous Australians who do drink generally consume at much more harmful levels (Gray et al. 2004). Over the period 2004–2008, Indigenous Australians died from mental and behavioural disorders due to alcohol use at 7 times the rate of non-Indigenous Australians, and from alcoholic liver disease and poisoning by alcohol at 6 times the rate non-Indigenous Australians (AIHW 2011g).

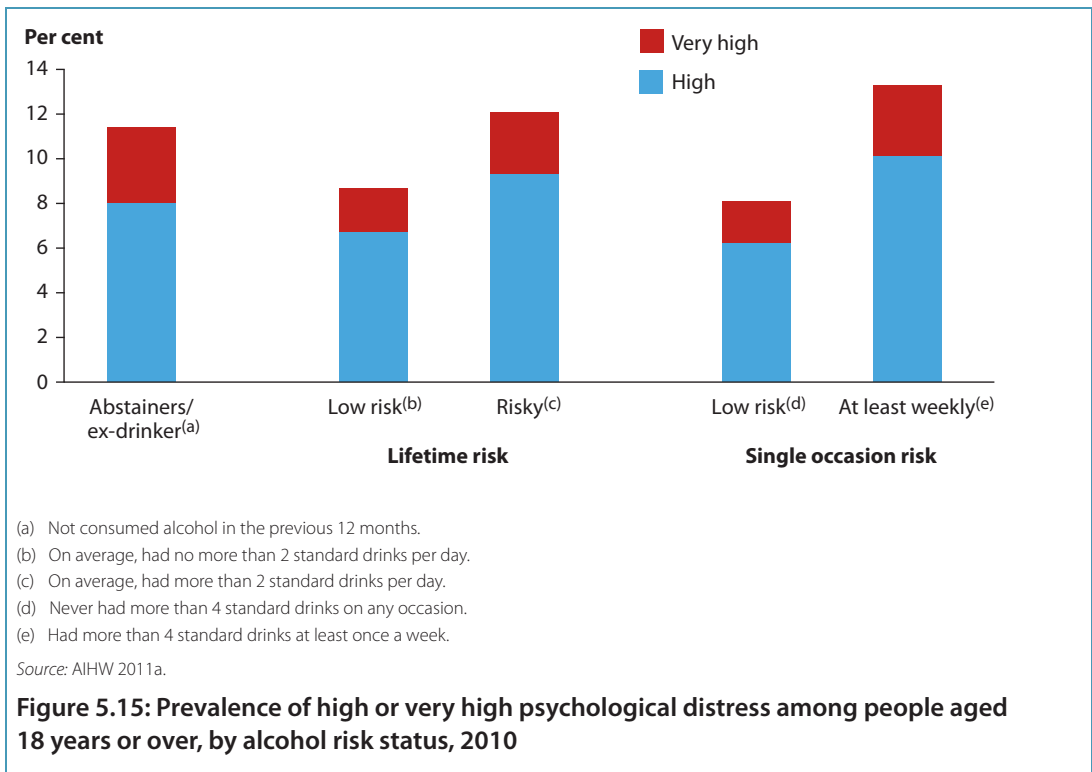


Harm to others

Drinking alcohol often results in harm not only to the drinker, but also to others around the drinker. An Australian study of alcohol's harm to others reported that 367 people died and 13,699 people were hospitalised because of the drinking of others in 2005 (Laslett et al. 2010). Using police data, an estimated 70,000 Australians were victims of alcohol-related assault in 2005, including 24,000 people who were victims of alcohol-related domestic violence. Using national child protection data and Victorian measures of alcohol involvement, almost 20,000 children were victims of alcohol-related (substantiated) child abuse in 2006–07. In 2010, 22% of recent drinkers aged 14 or older put themselves or others at risk of harm while under the influence of alcohol in the previous 12 months. Driving a motor vehicle was the most likely risky activity undertaken while under the influence of alcohol (13% of recent drinkers). Between 2007 and 2010, there was a statistically significant increase in the proportion of the population who were victims of alcohol-related physical abuse (from 4% to 8%) (AIHW 2011a).

Alcohol use and mental health

Adults who consumed alcohol at levels that put them at risk of lifetime harm were 1.4 times as likely as low-risk drinkers to have high or very high levels of psychological distress (12% compared with 9%; Figure 5.15). Similarly, those who exceeded the 2009 guidelines for single occasion risk at least weekly experienced high or very high psychological distress at 1.7 times the rate of those who never exceeded the guidelines (13% compared with 8%). Low risk drinkers were less likely to report signs of high or very high distress than people who abstained from alcohol completely over a year or more (11%).



International comparisons

A useful comparative indicator of alcohol consumption is the annual sales of pure alcohol in litres, per person aged 15 and over. Average alcohol consumption was 9.1 litres per adult across OECD countries, according to the most recent data available (OECD 2011). France, Austria, Portugal, the Czech Republic and Estonia reported the highest consumption of alcohol, with 12.0 litres or more per person per year in 2009. Low alcohol consumption (less than 3 litres per person) was recorded in Turkey and Israel where religious and cultural traditions restrict the use of alcohol among some population groups. Australia ranks in the middle of all OECD countries at 10.1 litres of pure alcohol per person per year.

What is missing from the picture?

There are a number of areas in which there are either no alcohol data or the available data is not current. For example:

- there are no recent national data on alcohol-related serious road injury; the latest data available are from 2001
- there is little evidence about the consequences of drinking on others, particularly violence and anti-social behaviour (the 2010 NDSHS report provides limited information)
- the number of emergency department presentations caused by alcohol is unknown
- estimates of the health and social costs of alcohol could be refined if further epidemiological research was conducted on estimation of alcohol risk associated with different types of alcohol (beer, wine and spirits).

Where do I go for more information?

For more information on alcohol consumption in Australia, refer to the *2010 National Drug Strategy Household Survey report* (AIHW 2011a), *Measuring alcohol risk in the 2010 National Drug Strategy Household Survey* (AIHW 2011k), and *Drugs in Australia 2010* (AIHW 2011i), available online at: <www.aihw.gov.au/alcohol-and-other-drugs>.

5.10 Illicit drug use

At a glance

- The prevalence of recent illicit drug use among Australians aged 14 and over rose from 13% in 2007 to 15% in 2010. This included increases in the recent use of cannabis, pharmaceuticals for non-medical purposes, cocaine and hallucinogens.
- Nearly 1 in 5 secondary students had deliberately sniffed inhalants at least once during their lives; 17% had ever used tranquillisers and 14% marijuana/cannabis.



Introduction

Illicit drug use refers to the use of illegal drugs (such as marijuana/cannabis, heroin, ecstasy and cocaine), the use of volatile substances as inhalants (such as glue, solvents and petrol) and the non-medical use of pharmaceutical drugs (including over-the-counter and prescription). Illicit drug use is a risk factor for a range of health concerns, including infection with bloodborne viruses, low birthweight, malnutrition, poisoning, mental illness, suicide, self-inflicted injury and overdose (AIHW 2010b).

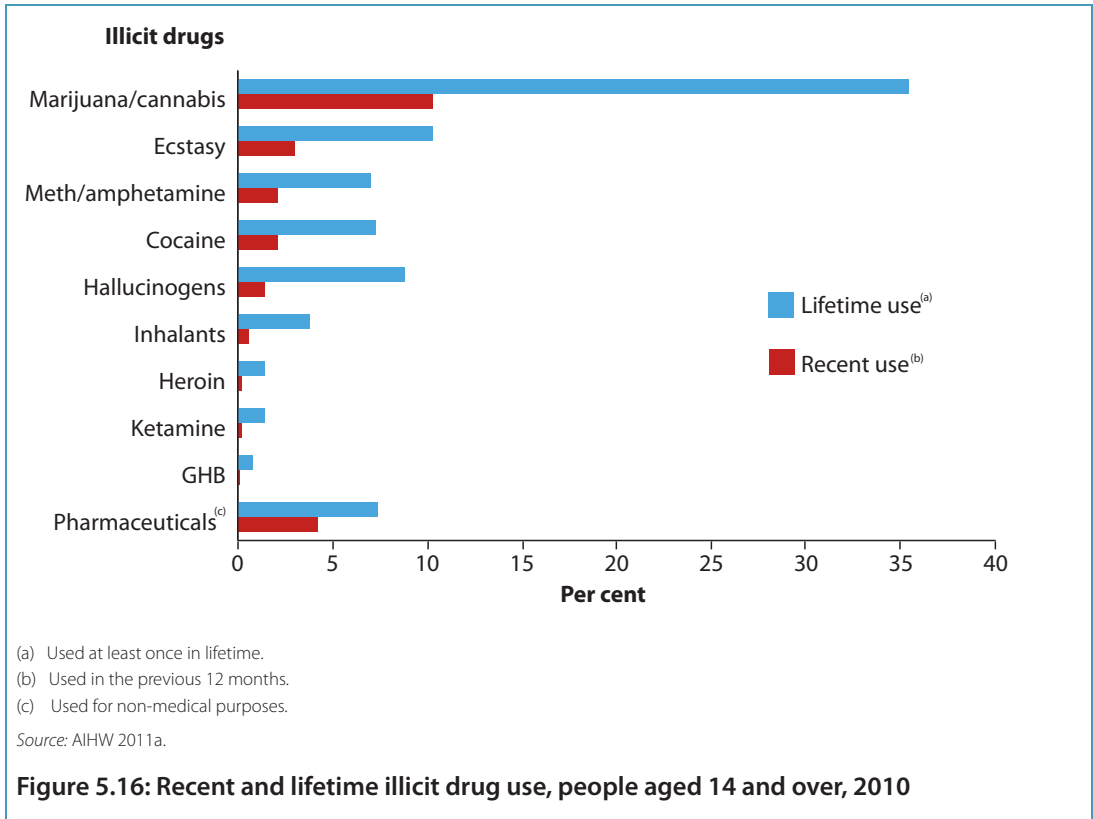
Illicit drug use was estimated to account for 2% of the burden of disease in Australia in 2003. There were an estimated 1,705 deaths in 2003 and almost 51,500 disability-adjusted life years attributable to illicit drug use (Begg et al. 2007). Illicit drug use was estimated to cost Australian society \$8.2 billion in 2004–05, most of which (84%) was the tangible costs associated with crime, lost productivity and health care (Collins & Lapsley 2008).

What do we know about illicit drug use?

Current status

Based on responses to the 2010 NDSHS, about 7.3 million people aged 14 and over in Australia (40%) have ever used an illicit drug, and almost 3 million (15%) had used an illicit drug in the 12 months before the survey (AIHW 2011a). The proportion of people recently using any illicit drug was highest in the Northern Territory (21%) and lowest in Tasmania (12%). Apart from pharmaceuticals, most people who had ever used an illicit drug had not done so in the past year (Figure 5.16).

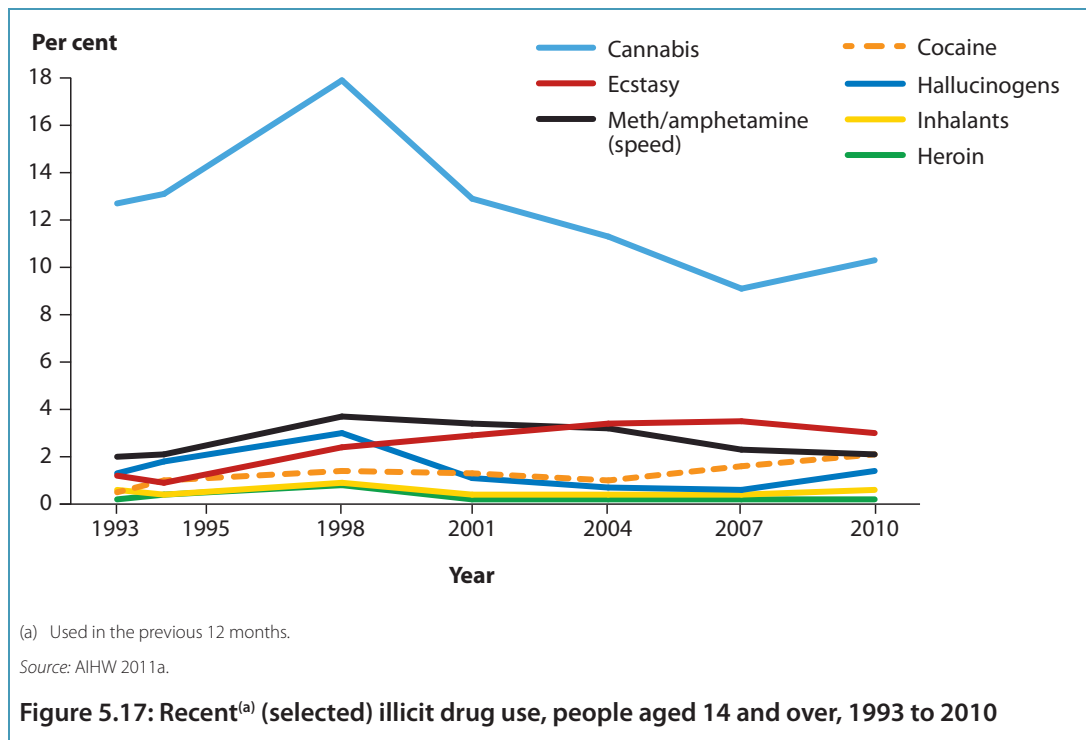




The most common drug used both recently and over the lifetime was cannabis, used in the previous 12 months by 10% of people aged 14 and over. Cannabis had the youngest average age of initiation of all illicit drugs, at 18.5 years, followed by inhalants (19.5) and hallucinogens (19.8). The first use of any pharmaceutical for non-medical purposes was, on average, later (mid-20s) (AIHW 2011a).

Trends

The proportion of people reporting recent illicit drug use in 2010 (15%) was higher than in 2007 (13%) but lower than in other preceding surveys since 1995. The recent increase was only statistically significant for females (AIHW 2011a). Specifically, illicit drug use increased since 2007 for cocaine, hallucinogens and inhalants (Figure 5.17). Cocaine use in 2010 was 4 times as high as in 1993, while use of hallucinogens and inhalants has returned to 1993 levels, having peaked in 1998. Between 1995 and 2007, recent ecstasy use rose to a peak of 4%, then declined in 2010 (3%) for the first time since 1995.

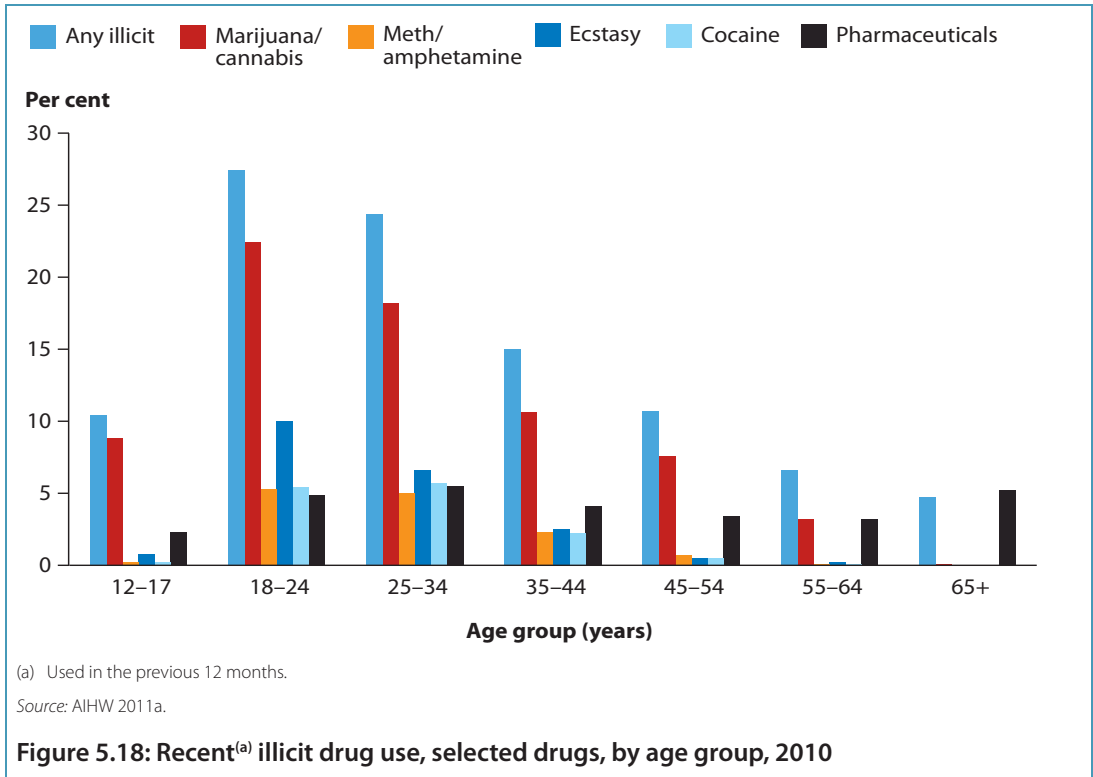


Illicit drug use by age

Across Australia, people aged 18–24 were the most likely of all age groups to have used an illicit drug in the previous 12 months (27%) (Figure 5.18). Recent cocaine use was most common among 25–34 year olds (6%) and meth/amphetamines use was most common among males in this age group (6%). Apart from pharmaceuticals, older people (65 and over) were far less likely to use illicit drugs than any other age group.

Adolescence is often characterised by rapid physical and psychological transition, experimentation and risk-taking behaviour (ABS 2008b). This may include illicit drug use that can cause both short-and long-term health problems. Those who initiate drug use early are more likely to continue into future illicit and problematic drug use (Loxley et al. 2004). Results from the 2008 Australian Secondary Students' Alcohol and Drug survey indicate that 19% of secondary students had deliberately sniffed inhalants at least once during their lives. The next two most prevalent drugs that students had ever used were tranquillisers (17%) and marijuana/cannabis (14%) (White & Smith 2009).





Illicit drug use among population groups

Patterns of drug use differ by population characteristics depending on the drug type of interest. For example:

- high proportions of Aboriginal and Torres Strait Islander people used cannabis in the previous 12 months compared with non-Indigenous Australians (18% and 10% respectively)
- unemployed people were more likely to use cannabis, ecstasy and meth/amphetamines in the previous 12 months than employed people
- homosexual/bisexual people were more likely to use an illicit drug compared with heterosexual people, and had the highest proportion of recent drug use across all subpopulations at 36%, or 2.6 times as high as for heterosexual people (AIHW 2011a).

Illicit drug use and mental health

There is a strong association between illicit drug use and mental health issues (Table 5.6). The diagnosis or treatment of a mental illness was much more common in those who had used an illicit drug in the past 12 months (19%) or in the past month (20%) (AIHW 2011a) than the general adult population (12%). Recent illicit drug users also had higher levels of psychological distress than the adult population, with higher proportions reporting very high or high distress levels.

People using meth/amphetamines in the past 12 months were more likely than any other drug users to report being diagnosed or treated for a mental illness and have greater levels of high or very high psychological distress. It is important to note that, by themselves, these findings do not establish a causal link between mental illness and drug use—the mental illness may have preceded the drug use or vice versa (AIHW 2010b).

Table 5.6: Psychological distress and mental illness, by selected drugs used, people aged 18 or older, 2010 (per cent)

Illicit drug use ^(a)	Level of psychological distress ^(b)				Diagnosed or treated mental illness ^(c)
	Low	Moderate	High	Very high	
Any illicit	57.3	25.8	12.8	4.1	18.7
Cannabis	56.7	27.0	12.7	3.6	18.7
Ecstasy	55.9	28.9	12.1	3.0	16.2
Meth/amphetamines	51.2	28.0	13.3	7.5	25.6
Cocaine	55.0	27.4	14.1	3.4	17.4
All people (18 and over)	69.6	20.5	7.4	2.4	12.0

(a) Reported use in the last 12 months.

(b) The Kessler Psychological Distress Scale-10 (K10) is used as a measure of psychological distress. A low K10 score is 10–15; a moderate score is 16–21; a high score is 22–29; a very high score is 30–50.

(c) Includes depression, anxiety disorder, schizophrenia, bipolar disorder, eating disorders and other forms of psychosis.

Source: AIHW 2011a.

Injecting drug use

Injecting drug use is a significant risk factor for transmitting bloodborne viruses, including HIV, hepatitis B and hepatitis C. Needle and syringe sharing among people who inject drugs is partly responsible for transmitting infection among drug users, although unsafe sexual behaviours also play a role.

The Australian Needle and Syringe Program Survey collects data from clients attending participating needle and syringe services during a designated survey period. Using this data, the estimated proportion of injecting drug users who report sharing needles is presented here as a performance indicator (see 'Unsafe sharing of needles' below).

Unsafe sharing of needles. The percentage of injecting drug users participating in surveys carried out at needle and syringe programs, who report sharing needles and syringes in the last month.



- About 15% of participants reported re-use of someone else's used needle and syringe in the month before the survey.
- This proportion has remained relatively stable (at between 13% and 16%) during the period 2005 to 2009.
- Among those who reported sharing, re-use after only one person was most common, typically a regular sex partner or close friend.

Source: NCHECR 2010.



International comparisons

The levels and patterns of illicit drug use internationally vary considerably, according to data collated by the United Nation Office of Drugs and Crime. Among the population aged 15–64, cannabis was the illicit drug most commonly reported as having been used in the past 12 months in all countries, ranging from 1% in Oman to 24% in Palau. Australia had the 15th highest rate of cannabis use, at 11%. Ecstasy use was most prevalent in Australia (4%) and cocaine use most common in Scotland (4%), about double the proportion of recent users in Australia (2%) (UNODC 2010).

It is important to note that different countries use various types of population surveys and other data collection methods to estimate use. The data relate to different years, and comparisons should be treated with caution. For more details on the methods and sources, see the *World drug report 2010* (UNODC 2010).

What is missing from the picture?

A key national data gap concerns the relationship between substance misuse and a wide range of social welfare issues. For example, there is little data on the extent and nature of the associations between illicit drug use and child neglect, violence, financial difficulties, social isolation, marriage breakdowns and homelessness.

There is also a lack of national data on public welfare issues, such as discarded needles and syringes, and street nuisance. Many local governments have to deal with the problem of discarded needle and syringes, and council records from either regular or ad hoc needle and syringe collections may give some indication about local conditions. A number of local government councils and other organisations have surveyed their local populations for information on these issues within their particular areas (ABS 2001).

Where do I go for more information?

For more information on illicit drug use in Australia, see the *2010 National Drug Strategy Household Survey report* (AIHW 2011a) and the *Drugs in Australia 2010* report (AIHW 2011i), available online at: <www.aihw.gov.au/alcohol-and-other-drugs>.

5.11 Sexual practices

At a glance

- Information about current sexual practices is important for estimating levels of risky behaviour within a population and for guiding the development of interventions to promote safer sex.
- Australians have poor knowledge surrounding routes of transmission for sexually transmissible infections (STIs) and blood borne viruses (BBVs), with better knowledge among those previously diagnosed with either an STI or BBV.
- Among Year 10 and 12 students in 2008, the most popular source of sexual information for boys was school programs and for girls was their mother.



Introduction

Sexual practices cover the attitudes and behaviours associated with sexual health. These include sexual identity, number of sexual partners, age at sexual debut, frequency and consistency of contraceptive use, and knowledge of transmission routes and risk factors for contracting STIs and BBVs. Information about current sexual practices is important for estimating levels of risk behaviour within a population and for guiding the development of interventions to promote safer sex.

Individuals and communities have a mutual responsibility to prevent themselves and others from becoming infected with STIs and BBVs (DoHA 2010). Unsafe sexual practices can contribute to the spread of STIs and BBVs within the population.

Sexual practices are changing in line with social attitudes. There is increasing fluidity in people's sexual identities, in the nature of their sexual relationships, and in society's attitudes toward sex and sexual health (Dowsett 2011). Historical examples of this are:

- the sexual liberalisation of women that followed the introduction of the oral contraceptive pill (the Pill) to Australia in 1961, giving women more control over their sexual and reproductive health (Tyler 1999; Golden & Katz 2000)
- the expanded public discourse around sexuality, sexual practices and safe sex after the HIV/AIDS epidemic of the late 1980s and early 1990s, in an attempt to increase public awareness about preventive methods (FHI 1996).

STIs are common in Australia and new diagnoses for some STIs, such as chlamydia and gonorrhoea, have steadily increased over the past decade (CDI 2011; Kirby Institute 2011). Factors contributing to this increase may include a new complacency about safe sex messages, increased engagement in high-risk behaviours (such as multiple and concurrent sexual partners and inconsistent condom use) and improved technology and rates for testing (DoHA 2004c; Stancombe Research and Planning 2009). This section discusses attitudes and behaviours associated with sexual health. For the incidence of selected STIs in Australia, see 'Section 6.11 Infectious diseases'.



What do we know about sexual practices?

Using data from the 2001–2002 Australian Study of Health and Relationships (ASHR), *Australia's health 2010* highlighted the demographic and socioeconomic characteristics associated with safer sexual practices. These characteristics included heterosexual orientation, younger age, higher education, lower income, living in a major city, and having more than one sexual partner in the previous year (AIHW 2010b). This edition presents further information on characteristics and behaviours that may influence sexual health, such as knowledge of STIs and BBVs, number of sexual partners and sexual history, and sources of information for secondary school students.

The ASHR—a nationally representative telephone survey—reported on levels of sexual risk behaviour among adults aged 16–59. The study showed that sexual experience differed by sexual orientation. For example, compared with heterosexual Australians, the lifetime average number of sexual partners was higher among bisexuals of both sexes, higher for homosexual males with same-sex partners, and lower for homosexual females with same-sex partners (de Visser et al. 2003; Grulich, de Visser & Rissel et al. 2003).

Overall, 20% of males and 17% of females had ever been diagnosed with an STI or BBV, and a GP was the most common source for treatment (55%), followed by self-treatment (13%) (Grulich, de Visser & Smith et al. 2003a).

Knowledge of STIs and routes of transmission among adults aged 16–59 was poor. Characteristics of those with better STI and BBV knowledge included being female, speaking English at home, being homosexual or bisexual, higher education and income, higher occupational level, and a previous STI diagnosis (Grulich, de Visser & Smith et al. 2003b).

The 2008 National Survey of Secondary Students and Sexual Health (NSSSSH)—a nationally representative survey of Year 10 and 12 students from all school sectors—collected data on sexual knowledge, feelings, attraction and experience, contraception, and sources of information about sex (Smith et al. 2009). In 2008, among Year 10 and 12 students:

- 78% had experienced some form of sexual activity, 40% had experienced sexual intercourse, and 44% had experienced oral sex
- 91% reported sexual attraction exclusively to people of the opposite sex, 1% to people of the same sex, 6% to both sexes and 2% were unsure
- knowledge about STIs, BBVs, HPV and routes of transmission was poor, and the risk of STI infection was perceived to be low
- 32% reported ever having unwanted sex—citing being drunk or feeling pressured by their partner as the main reasons for having unwanted sex
- the most popular source of sexual information among males was school programs (49%), and among females was their mother (62%).

A recent survey of secondary school teachers found that many felt unsupported in teaching sexual education to their students, with few receiving formal training in the area. Knowledge-based topics were the most commonly taught, while topics around the pleasure of sexual behaviour and activity were least discussed (Smith et al. 2011).



What is missing from the picture?

A nationally representative survey on sexual attitudes and behaviours would update the information provided in the 2001–2002 ASHR, and help to fill the picture on sexual practices in Australia, particularly for the population who have already completed secondary school.

Information surrounding knowledge, attitudes and behaviour is hard to collect and quantify. Proxy measures, such as number of teen pregnancies and rates of STI infection, do not adequately capture motivation and intent. Further, the focus on STI and BBV prevention in national strategies means that the focus of research continues to be on rates of disease diagnosis, rather than more qualitative information to help guide the development of interventions to promote safer sex.

Where do I go for more information?

For more information on the ASHR and NSSSSH surveys, as well as information regarding sexual health education in schools, see the Australian Research Centre in Sex, Health and Society website: <www.latrobe.edu.au/arcshs>.

For information on the sexual and reproductive health of Australian males aged 40 and over, see Andrology Australia's 2003 *Men in Australia Telephone Survey* (MATEs): <www.andrologyaustralia.org>.



5.12 Multiple risk factors

At a glance

- In 2007–08, nearly every Australian aged 15 and over (99%) had at least one health risk factor, such as high blood pressure, physical inactivity or obesity.
- While an individual risk factor poses a threat to health, multiple risk factors can further increase the risk of disease or other unwanted conditions or events.
- People who live in the most disadvantaged areas are more likely to report having four or more risk factors than people living in other areas.



Introduction

A risk factor is something that increases a person's risk of disease or other unwanted conditions and events. While some risk factors (such as age and genetics) are unavoidable, others (such as smoking and physical inactivity) may be modified.

Although an individual risk factor poses a threat to health, generally the more risk factors the greater the risk (Kvaavik et al. 2010). Combinations of risk factors can compound the risk of disease because certain behaviours are mutually reinforcing. For example, people who smoke may be more likely to have other risk factors (such as physical inactivity) compared with those who do not smoke (Emmons et al. 1994).

Multiple risk factors can also speed up the progression of a disease. For example, high blood pressure and abnormal levels of fat in the blood, when combined with diabetes, can accelerate the build-up of deposits in the inner walls of arteries (AIHW 2012).

The effects of multiple risk factors are difficult to measure as they affect individuals with varying levels of severity and at different points in time. For example, a person who is obese may develop very high blood pressure at a young age, while another person of similar weight may experience only slightly increased blood pressure, and at an older age. In addition, one risk factor may develop as a result of another. For instance, an increase in blood pressure may be caused by excess body weight, excess salt intake, or both (Lopez et al. 2006).

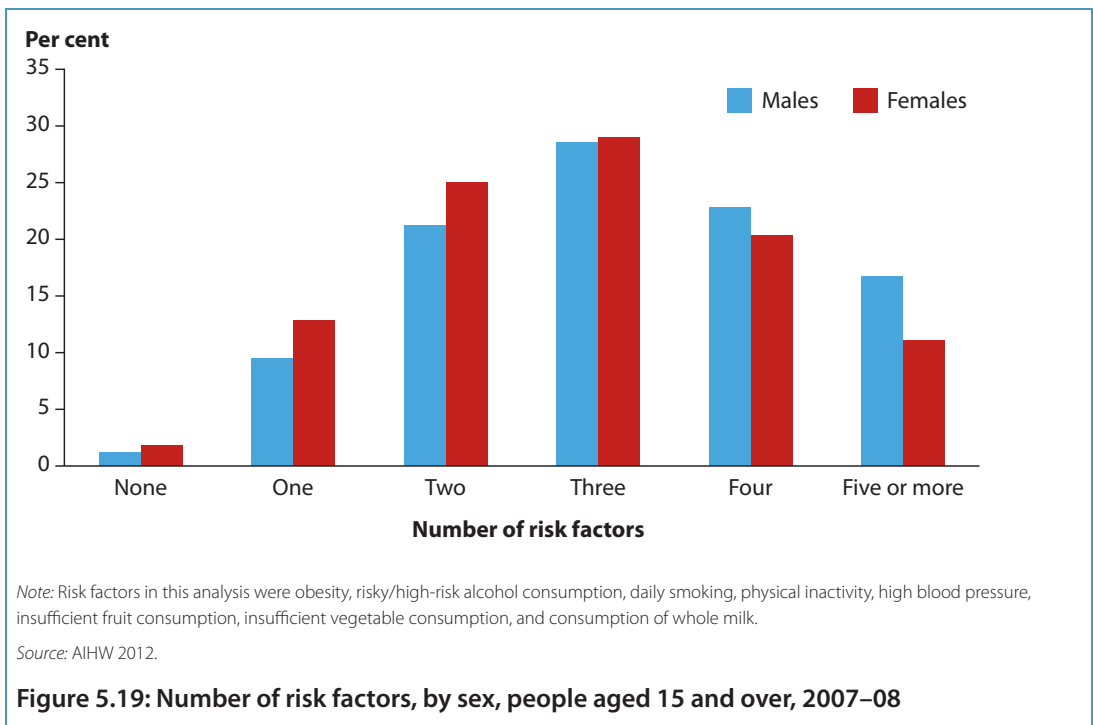
A better understanding of the relationships between multiple risk factors, including how they are combined in people, allows treatments, programs and policies to be better targeted.

Using the 2007–08 ABS National Health Survey, this section looks at the number and combination of risk factors that are measured in, or reported by, people. The eight health risk factors examined are daily smoking, risky alcohol consumption for long-term health, obesity (measured by BMI and/or waist circumference), physical inactivity, high blood pressure, insufficient fruit consumption, insufficient vegetable consumption, and consumption of whole milk (an indicator of saturated fat intake). These risk factors were chosen because they are considered largely modifiable, are of interest to researchers, policy makers and the general public, and sufficient data were available from the National Health Survey. Other risk factors, in addition to broader social and environmental determinants, can also influence health and wellbeing.

What do we know about multiple risk factors?

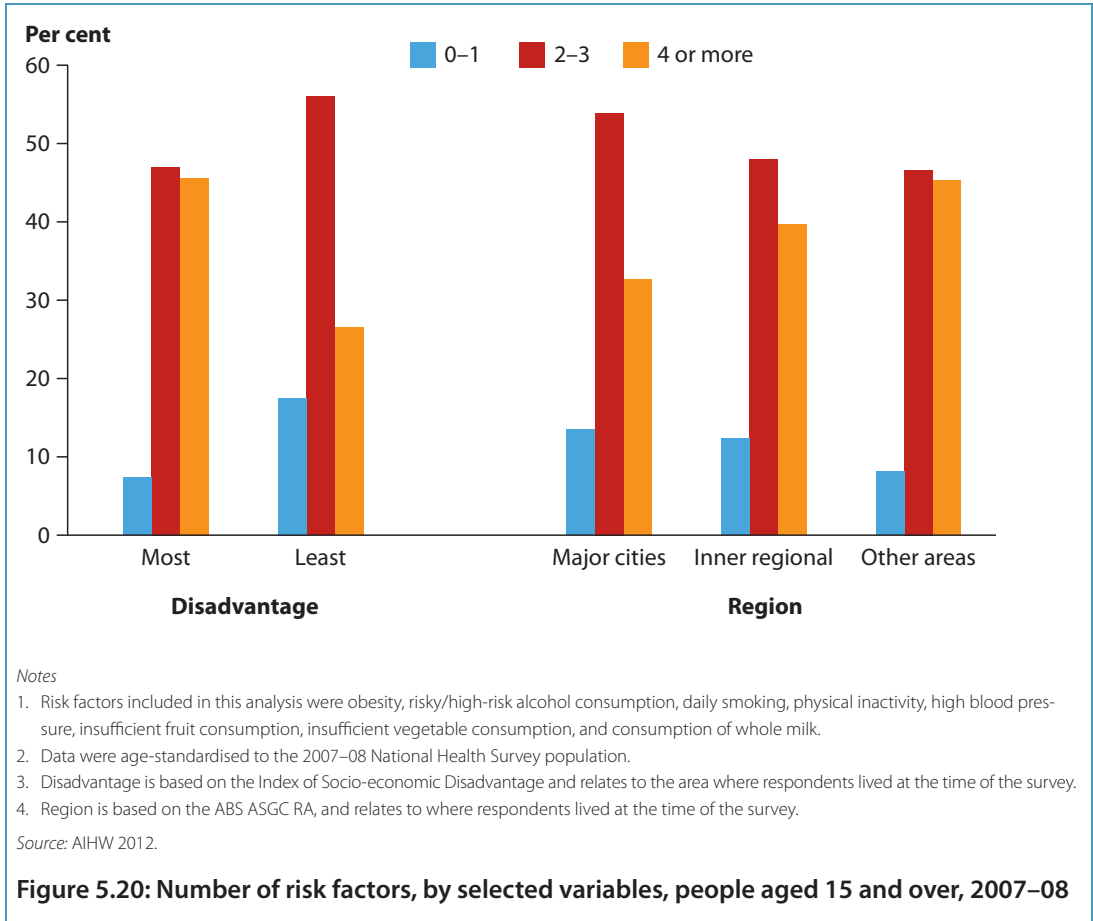
In 2007–08, almost all (99%) of Australians aged over 15 had at least one health risk factor and the most common number was three. The distribution of numbers of risk factors was similar for males and females, although a higher proportion of males reported having five or more (17% compared with 11%) (Figure 5.19).

The 45–54 age group had the highest proportion of people reporting five or more risk factors, at 21% of males and 13% of females (AIHW 2012). The age groups with the highest proportions of people reporting no risk factors were males aged 35–44 (0.7%) and females aged 75 and over (0.7%).



The number of risk factors that people have varies by where they live in Australia. Higher proportions of people who live in *Major cities* report smaller numbers of risk factors (one, two and three) compared with people who live elsewhere in Australia (Figure 5.20). People who live in *Inner regional* or *Other* areas are more likely to report four or more risk factors than people who live in *Major cities*.

Similarly, people living in more disadvantaged areas have more risk factors. For example, 17% of people living in the least disadvantaged areas report none or one risk factor, compared with 7% who live in areas that are most disadvantaged. Conversely, 27% of people living in areas of least disadvantage report having four or more risk factors compared with 46% who live in areas that are most disadvantaged.



The most common risk factor reported is insufficient consumption of vegetables, as most Australians do not eat the recommended amount each day. It features in the most common combination of risk factors for most age groups, and for some age groups, is most common by being the only risk factor present (Table 5.7).



The most common combination of risk factors for males and females aged 15–24 is insufficient fruit and vegetable consumption, whole milk consumption, and insufficient physical activity (Table 5.7). Overall, 14% of males and 12% of females aged 15–24 have this combination. While this combination is also most common for males aged 25–34 (9%) and 35–44 (8%), females differ in that insufficient vegetable consumption alone (11%) is most common for those aged 25–34, and insufficient fruit consumption and physical activity (8%) is most common for those aged 35–44.

Table 5.7: Most common combination of risk factors, by age and sex, 2007–08

Age group	Males			Females		
	Risk factor combination	Number ('000)	Per cent	Risk factor combination	Number ('000)	Per cent
15–24	F,V,M,PA	204.6	14.3	F,V,M,PA	175.4	12.4
25–34	F,V,M,PA	122.4	8.5	V	160.0	11.2
35–44	F,V,M,PA	119.6	8.0	F,PA	122.2	7.9
45–54	V	106.1	7.5	F,PA	147.9	10.1
55–64	V	94.0	8.0	V	102.0	8.7
65–74	V	44.9	6.4	V	63.4	8.6
75 +	F,PA	39.2	7.8	V,PA,HBP	43.6	6.7

Notes

1. **F** indicates the insufficient consumption of fruit, **V** indicates the insufficient consumption of vegetables, **M** indicates the consumption of whole milk (used as a proxy for saturated fat intake), **PA** indicates insufficient sessions and times spent exercising to confer a health benefit, **HBP** indicates high blood pressure.
2. Responses to the questions about risk factors that resulted in don't know, unable to measure, refusal or in determined, were excluded from the analysis.
3. Risk factors included in this analysis were obesity, risky/high-risk alcohol consumption, daily smoking, physical inactivity, high blood pressure, insufficient fruit consumption, insufficient vegetable consumption, and consumption of whole milk.

Source: AIHW 2012.

The high prevalence of risk factors among Australians suggests that opportunities for health improvement can occur by reducing the risk factor profile of the population. For example, improvements in diet and physical inactivity could assist in weight reduction and maintenance, as well as providing benefits in terms of improved nutrition and musculoskeletal health.

The National Preventative Health Strategy currently focuses on three risk factors: harmful alcohol consumption, obesity and tobacco (NPHT 2009). These risk factors are also targeted by other strategies and guidelines. Nearly one-third (30%) of people aged 15 and over have at least one of these risk factors, 8% have two, but fewer than 1% have all three (AIHW 2012).

As noted previously, certain risk factor behaviours can reinforce other risky behaviours. For example, females who smoke on a daily basis are twice as likely to consume alcohol at risky/high-risk levels as those who do not (19% compared with 10%). Similarly, males who drink at risky/high-risk levels are more than twice as likely to smoke daily as males who do not (36% compared with 17%) (AIHW 2012).



What is missing from the picture?

The effective monitoring of risk factors requires data that are current, representative and accurate. The information in this section draws on data collected in the 2007–08 ABS National Health Survey, mainly through self-reports. Several gaps in this information limit our ability to present a complete view of multiple risk factors and their effect on the chronic disease burden, such as self-reported data about high cholesterol (a major contributor to heart disease) that was collected in the 2007–08 ABS National Health Survey rather than data collected through blood samples. These data were not considered reliable for analysis and so were excluded (AIHW 2012). In addition, the data on diet including only usual daily intakes of fruit, vegetables and milk provide a restricted view of dietary intakes.

Current risk factor data—collected through measurements rather than self-reports—and more detailed data about dietary intakes are needed to draw stronger conclusions about the multiple risk factors and patterns of chronic disease. In addition, collection of biomedical samples, for example, blood and urine, provide more accurate estimates of some risk factors, such as blood cholesterol, and better reporting of some chronic diseases, such as diabetes. Much of this information will be provided by the 2011–2013 ABS Australian Health Survey.

Where do I go for more information?

The AIHW report *Risk factors contributing to chronic disease*, released in 2012, contains more detailed information on the prevalence of risk factors and the most common combinations of multiple risk factors (AIHW 2012).

More information about trends for some risk factors is in *Key indicators of progress for chronic disease and associated determinants: data report* (AIHW 2011f), and *Trends in modifiable risk factors for stroke and heart disease, diabetes and chronic kidney disease by age and sex* (AIHW forthcoming).



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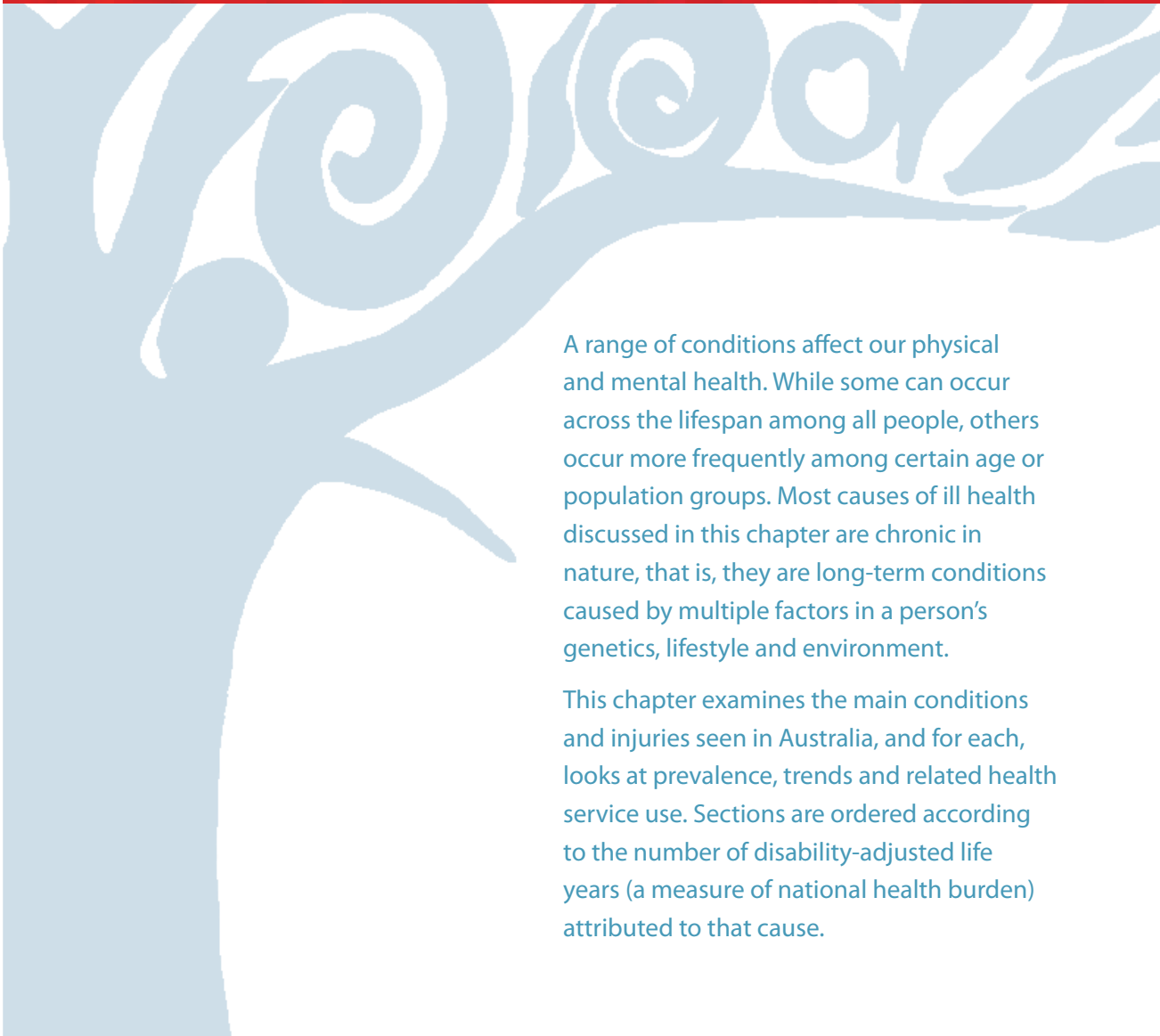
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A large, light blue silhouette of a person with their arms raised in a celebratory or joyful gesture. The figure is positioned on the left side of the page, with its arms extending towards the right. The background behind the figure is white, and the figure itself is a solid light blue color.

A range of conditions affect our physical and mental health. While some can occur across the lifespan among all people, others occur more frequently among certain age or population groups. Most causes of ill health discussed in this chapter are chronic in nature, that is, they are long-term conditions caused by multiple factors in a person's genetics, lifestyle and environment.

This chapter examines the main conditions and injuries seen in Australia, and for each, looks at prevalence, trends and related health service use. Sections are ordered according to the number of disability-adjusted life years (a measure of national health burden) attributed to that cause.



CHAPTER 6

CAUSES OF ILL HEALTH

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6.1 Cancer

At a glance

- In 2008, about 112,500 new cases of cancer were diagnosed in Australia. In 2012, this is expected to rise to 121,500.
- Cancer is a major cause of death in Australia, although mortality rates have been decreasing over the past two decades. In 2009, there were about 41,500 deaths from cancer, 29% of all deaths that year.
- Survival outcomes vary by type of cancer, remoteness from major cities and socioeconomic status.



Introduction

Cancer is a diverse group of diseases in which some of the body's cells become defective and multiply out of control. The abnormal cells invade and damage the tissues around them, and sooner or later spread (metastasise) to other parts of the body and can cause further damage and eventually death.

People diagnosed with cancer have considerably different outcomes depending on various factors, including characteristics of the individual (such as age, sex and other illnesses that the person has), the nature of the cancer (such as the part of the body affected, the particular cell type involved and how far the disease has progressed by the time it is diagnosed) and the kind of treatment and follow-up care available.

Cancer is the leading cause of the total burden of disease and injury in Australia (Begg et al. 2007) and has been a prominent policy issue for decades. In 1996, it was declared a National Health Priority Area by Australian health ministers (AIHW & DHFS 1997). In 2008, five cancers (bowel, breast, cervical, lung and melanoma) were included in the health performance indicator 'Incidence of selected cancers' as part of the National Healthcare Agreement, and are reported annually (COAG Reform Council 2011).

Information on all new cases of cancer diagnosed each year is collected by state and territory cancer registries, and compiled into the Australian Cancer Database by the AIHW (see Box 6.1).

Box 6.1: How are cancer data collected?

Registration of all cancers, excluding basal and squamous cell carcinomas of the skin, is required by law in each of the states and territories, where the data are collated by cancer registries. These registries collect clinical and demographic information about people with newly diagnosed cancer from hospitals, pathologists, cancer specialists, cancer treatment centres and nursing homes.

All state and territory cancer registries have supplied records of new cases of cancer since 1982 to the National Cancer Statistics Clearing House (NCSCH). The NCSCH is operated by the AIHW collaboratively with the Australasian Association of Cancer Registries.

Information on causes of death in Australia (including cancer) are provided by the Registrars of Births, Deaths and Marriages in each state and territory, and coded nationally by the ABS. The AIHW obtains a copy of these data to compile the National Mortality Database.

Information on admitted patient hospitalisations are supplied by state and territory health authorities and compiled at the AIHW to form the National Hospital Morbidity Database.

What do we know about cancer in Australia?

This section provides information on cancer incidence, cancer-related hospitalisations, survival of people diagnosed with cancer, and deaths from cancer. Common terms are described in Box 6.2. Information on screening for cancer is in 'Section 4.6 Cancer screening'.

The data on cancer incidence do not include basal and squamous cell carcinomas of the skin (BCCs and SCCs)—the most common types of non-melanoma skin cancer—because registration of these cancer cases is not legally required. The national incidence of these cancers is estimated from periodic national household surveys (NCCI 2003; Staples et al. 2006). Based on the most recent survey in 2002, about 474,000 new cases of these cancers are expected to be diagnosed in 2012. More information is in the publication *Non-melanoma skin cancer* (AIHW & CA 2008).

All incidence and survival data in this section refer to cancers other than BCCs and SCCs, whereas hospitalisation and mortality data do include these cancers.

Box 6.2: Terminology

Incidence is the number of new cancers diagnosed in a year. The incidence rate is the incidence expressed per 100,000 population.

Relative survival is a measure of the average survival experience of a population of people diagnosed with cancer. The standard measure of cancer survival is 5-year relative survival. A 5-year relative survival of 70% means that an 'average' person diagnosed with a particular cancer has a 70% chance of living for at least 5 more years after their diagnosis, relative to the 'average' Australian of the same sex and age.

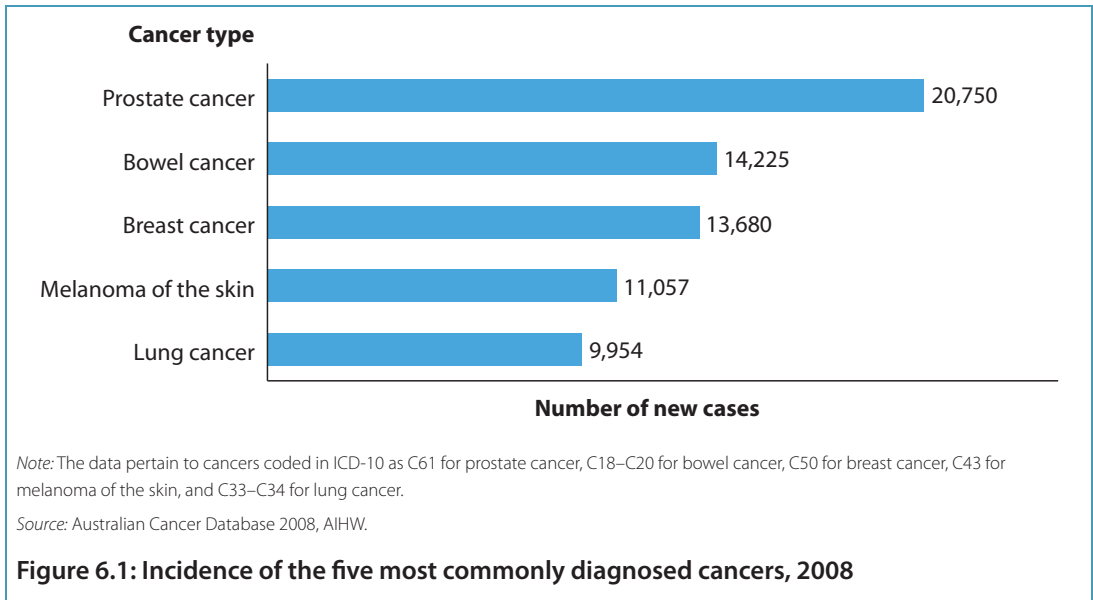
Mortality is the number of deaths in a year for which the underlying cause of death was cancer. The mortality rate is the mortality expressed per 100,000 population.

Age-standardisation is a statistical procedure used to adjust incidence and mortality rates so that populations with different age structures can be fairly compared.



Incidence

In 2008, there were 112,304 new cases of cancer diagnosed in Australia. The risk of being diagnosed with cancer by the age of 75 was 1 in 3 for males and 1 in 4 for females, and by age 85 it was 1 in 2 for males and 1 in 3 for females. The five most common cancers together accounted for 62% of all cases (Figure 6.1).



The AIHW projects that the age-standardised incidence rate of cancer in 2012 will decrease by about 2% on the 2008 rate (Table 6.1), largely due to the projected drop in the rate of prostate cancer, which is a large contributor to the overall rate. The incidence rate of prostate cancer is expected to have fallen after 2008 because of the already observed fall in the rate of PSA testing. It has been observed that the incidence rate of prostate cancer and the rate of PSA testing are highly correlated—details of this correlation as well as projections for all the major cancers are in *Cancer incidence projections, Australia, 2011 to 2020* (AIHW 2012a).

Table 6.1: Incidence of all cancers^(a) reported for 2008, and projections for 2012

Measure	Males	Females	Total
Number of new cancer cases			
2008	64,124	48,180	112,304
2012 (estimated)	68,100	53,400	121,500
Age-standardised incidence rate^(b)			
2008	598	400	490
2012 (estimated)	568	403	477

(a) Diseases coded in ICD-10 as C00–C97, D45, D46, D47.1 and D47.3, excluding BCCs and SCCs of the skin.

(b) The rates were age-standardised to the Australian population as at 30 June 2001 and are expressed per 100,000 population.

Sources: Australian Cancer Database 2008, AIHW; AIHW 2012a.

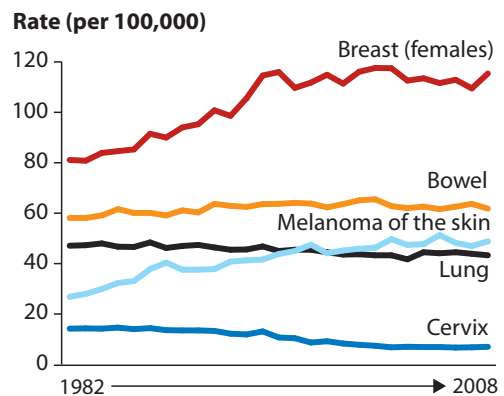
Cancer is mostly a disease of older people, so cancer statistics are dominated by the experience of cancer in that segment of the population. The most common cancers in younger people are quite different from those in older people. For example, the most common cancer diagnosed in people aged 15–29 is melanoma of the skin. For further details of cancer incidence, survival and mortality in people in this age group, see the AIHW report *Cancer in adolescents and young adults in Australia* (AIHW 2011a).

The trends in incidence rates of the five cancers reported in the performance indicator ‘Incidence of selected cancers’ are presented below. It is worth noting that the slight decline for lung cancer in the total population (8% fall over 27 years) masks very different patterns for males and females. From 1982 to 2008, the incidence rate of lung cancer in males decreased by 33% while in females it increased by 77%. Nevertheless, the rate in males was considerably higher than that in females (57 cases per 100,000 males compared with 32 cases per 100,000 females). These patterns reflect historical differences in smoking behaviour between the sexes—the smoking rate in males has been dropping since at least 1964 whereas for females it only started dropping in the late 1970s (AIHW & CA 2011).

Incidence of selected cancers. The number of new cases of breast cancer in females, bowel cancer, melanoma of the skin, lung cancer and cervical cancer. Presented as age-standardised numbers per 100,000 people (or, for breast and cervical cancer, per 100,000 females).



- Breast cancer and melanoma incidence rose during the 1980s and early 1990s but have since stabilised.
- The rate of bowel cancer has been fairly stable over the entire period.
- The rate of lung cancer fell by 8% between 1982 and 2008.
- The rate of cervical cancer fell by 51% between 1982 and 2008.



Source: Australian Cancer Database 2008, AIHW.

Hospitalisations

The number of admitted patient hospitalisations due to cancer is one measure of the impact cancer has on health services. In the 2009–10 financial year, cancer was responsible for 1 in 10 hospitalisations in Australia (Table 6.2). Of the nearly 874,000 cancer-related hospitalisations in 2009–10, 47% had a principal diagnosis of cancer, 38% were admissions for chemotherapy, and the remaining 14% were admissions for other health services, treatment or follow-up care for cancer.

Overall, 75% of cancer-related hospitalisations were same-day hospitalisations and half of these were for chemotherapy. More information on hospitalisations for cancer is in the report *Cancer in Australia: an overview 2010* (AIHW & AACR 2010).



Table 6.2: Number of cancer-related hospitalisations^(a), 2009–10

Principal diagnosis ^(b)	Same-day	Overnight	Total
Cancer	201,154	212,040	413,194
Chemotherapy session ^(c)	335,728	147	335,875
Other health services or treatment for cancer ^(d)	119,794	4,864	124,658
<i>All cancer-related hospitalisations</i>	<i>656,676</i>	<i>217,051</i>	<i>873,727</i>
All hospitalisations	4,917,624	3,613,379	8,531,003

(a) These data were coded using ICD-10-AM, 6th edition (NCCH 2008). For details about the codes used to define the groups in this table, see the report *Cancer in Australia: an overview, 2010* (AIHW & AACR 2010).

(b) Principal diagnosis is defined as the diagnosis established after study to be chiefly responsible for occasioning the episode of admitted patient care.

(c) In public hospitals in some states and territories, patients who receive same-day chemotherapy are treated as non-admitted rather than admitted patients. The data presented in this table relate to admitted patients only. Therefore, the number of chemotherapy sessions stated is less than the true national number.

(d) Includes hospitalisations for which the principal diagnosis was directly related to receiving health services or treatment for cancer, or could be related to the receipt of health services or treatment for cancer and the additional diagnosis was cancer.

Source: AIHW National Hospital Morbidity Database.

Survival

A person's chance of surviving cancer depends on many factors, including their age, sex, lifestyle, other health conditions, the type of cancer they have, how far it had progressed before being diagnosed and what kinds of treatment are available. However, information on the average survival in a population, while not relating to any particular individual, is useful for comparing the severity of the various kinds of cancer and, over time, the success of early detection programs and cancer treatments.

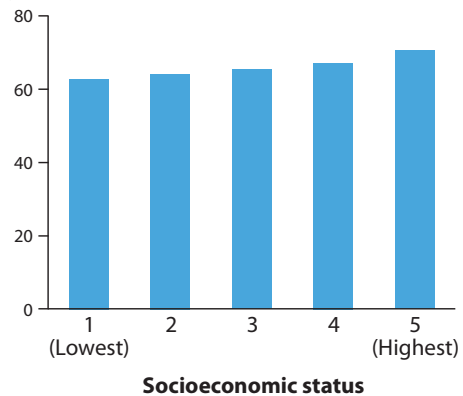
Cancer survival in Australia is generally high compared with most other countries (Coleman et al. 2011). In the period 2006–2010, the 5-year relative survival in Australia for all cancers combined was 66%. More information is reported in the performance indicator 'Survival of people diagnosed with cancer' opposite.

Survival of people diagnosed with cancer. The percentage of people diagnosed with cancer who survive for at least 5 years after diagnosis, relative to similar people in the general population.



- In 2006–2010, 5-year relative survival for all cancers combined was 65% for males and 67% for females.
- 5-year relative survival decreased with increasing remoteness. It was highest for people living in *Major cities* (67%) and lowest for people living in *Remote and Very remote* areas (63%).
- 5-year relative survival was highest for people living in the least disadvantaged areas (71%) and lowest for people living in the most disadvantaged areas (63%).

5-year relative survival (%)



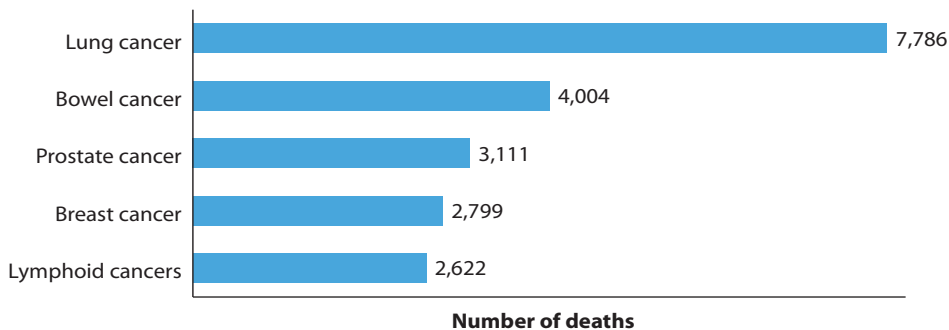
Source: Australian Cancer Database 2007, AIHW.

Mortality

Cancer is a major cause of death, accounting for 29% of all deaths registered in Australia in 2009 (AIHW analysis of ABS unpublished confidentialised data). This makes cancer the second-most common cause of death, exceeded only by cardiovascular disease (33% of deaths in 2009).

In 2009, there were 41,467 deaths from cancer. The risk of dying from cancer before the age of 75 was 1 in 8 for males and 1 in 12 for females, and 1 in 4 for males and 1 in 6 for females by age 85. The five most common causes of death from cancer (Figure 6.2) together accounted for 49% of all deaths from cancer.

Cancer type



Notes

1. The data pertain to cancers coded in ICD-10 as C33–C34 for lung cancer, C18–C20 for bowel cancer, C61 for prostate cancer, C50 for breast cancer, and C81–C85, C88, C90 and C91 for lymphoid cancers.
2. Lymphoid cancers are cancers that start in lymphocytes (white blood cells) of the immune system. The most common types are lymphoma, myeloma and lymphoid leukaemia.

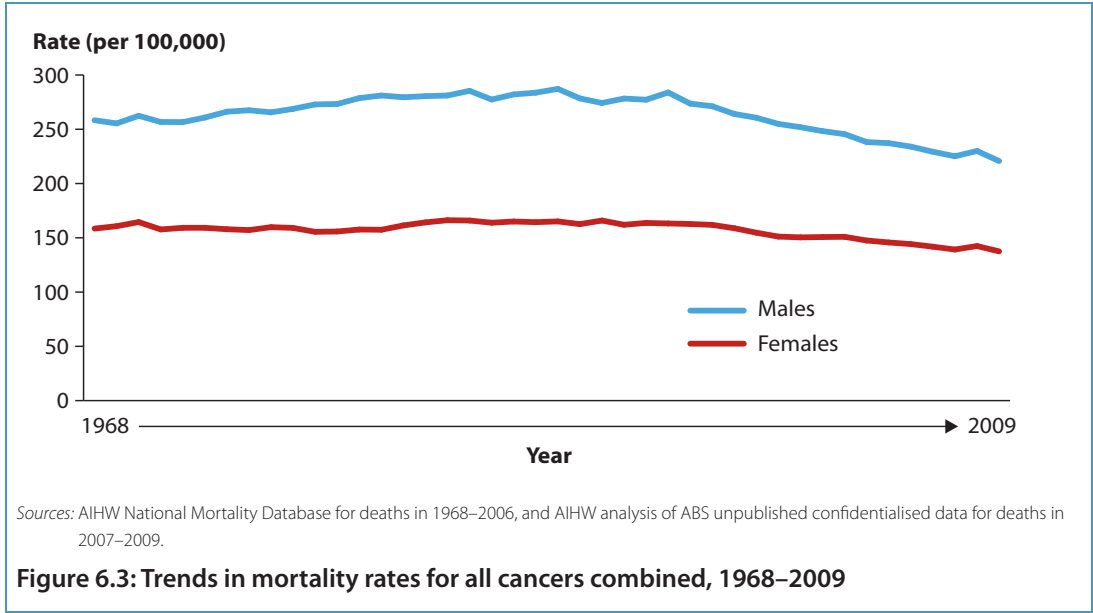
Source: ABS 2011a.

Figure 6.2: Most common causes of death from cancer, 2009



In 2009, the age-standardised death rate for all cancers combined was 174 deaths per 100,000 persons, with the death rate of males (221 per 100,000) markedly higher than that of females (138 per 100,000) (AIHW analysis of ABS unpublished confidentialised data).

Mortality rates from cancer have been decreasing over the past two decades (Figure 6.3), with a 23% fall in the rate for males and a 17% fall for females from 1989 to 2009. However, the actual number of deaths from cancer continues to increase due to the ageing and growth of the Australian population.



What is missing from the picture?

Currently there are no registered national data on the stage (severity) of cancer at diagnosis, the treatments applied to cancers or the frequency of recurrence of cancer after treatment. However, there are comprehensive national data on treatments provided through admitted patient hospitalisations, for example, surgery and non-surgical care.

Unfortunately, collecting data on stage, treatment and recurrence of cancer is difficult and expensive. Some pilot projects are under way examining ways to collect these data with the aim of expanding the methodology to national data (Cancer Australia 2010).

Where do I go for more information?

Information on cancer in Australia is on the AIHW website: <www.aihw.gov.au/cancer>. The report *Cancer in Australia: an overview, 2010* (AIHW 2010a) and other recent publications are available for free download.



6.2 Cardiovascular disease

At a glance

- Cardiovascular disease (CVD) remains a major health problem in Australia despite diminishing mortality and hospitalisation rates. There were an estimated 3.4 million people living with the disease in 2007–08.
- CVD has a greater impact on Aboriginal and Torres Strait Islander people, the elderly and people living in remote and socioeconomically disadvantaged areas than it does on other Australians.
- In 2009, more than 3 in 5 (63%) people who had a heart attack survived, compared with fewer than half (47%) in 1997.



Introduction

The term cardiovascular disease covers all diseases and conditions of the heart and blood vessels. Coronary heart disease, stroke, heart failure and rheumatic heart disease are prominent types of CVD in Australia and are examined in this section.

Based on results from the 2007–08 National Health Survey, an estimated 3.4 million people had a cardiovascular disease in 2007–08. Despite a significant fall in the death rate from CVD since the late 1960s, it was still Australia's biggest killer in 2009—recorded as the underlying cause of 46,100 deaths—more than any other disease group.

Many people remain at increased risk of CVD as a result of modifiable risk factors, such as tobacco smoking, physical inactivity, being overweight and obese, diets high in saturated fats, high alcohol consumption, high blood pressure and high blood cholesterol levels. High blood pressure is responsible for a greater contribution to the burden of CVD than any other modifiable risk factor, followed by high blood cholesterol, physical inactivity and high body mass (Begg et al. 2007). In addition, psychosocial factors, such as depression and social isolation, can affect the development of CVD. There is also growing awareness of the role played by broader social and economic circumstances, such as economic resources, education, living and working conditions, social support and access to health care (AIHW 2010b). Non-modifiable risk factors, such as age, sex, family history and ethnicity, also affect the incidence of CVD.



What do we know about cardiovascular disease?

Prevalence

About 1.6 million males and 1.8 million females were estimated to have a cardiovascular disease in 2007–08. CVD occurred more commonly among the elderly, with 62% of those aged 75 and older having a cardiovascular condition compared with 5% of those aged under 45 (AIHW 2011b).

Prescriptions

In 2008, more than 84 million prescriptions for cardiovascular disease medicines were supplied to the community at a cost to government of \$3 billion. Medicines to lower blood pressure were dispensed most often to treat CVD (51 million prescriptions), followed by medicines to control blood-lipids levels (23 million) and antithrombotics (8 million), which are medicines that prevent the formation of blood clots, or dissolve existing clots (AIHW 2011b). See the AIHW report *Cardiovascular medicines and primary health care: a regional analysis* (AIHW 2010c) for more detailed information about medicines dispensed to treat CVD.

GP visits and hospitalisations

In 2009–10, CVD accounted for 11% of the problems managed by GPs—at a rate of 17 per 100 GP encounters (AIHW: Britt et al. 2010a). It was the fourth-most common group of problems, behind respiratory diseases, general or unspecified conditions, and musculoskeletal conditions.

In 2009–10, there were 482,200 hospitalisations with a principal diagnosis of CVD (276,400 for males and 205,800 for females), comprising 6% of all hospitalisations. The age-standardised rate of CVD hospitalisations has declined over the past 15 years from 2,300 per 100,000 population in 1993–94 to 2,000 in 2009–10. CVD also commonly exists alongside other diseases and was recorded as an additional diagnosis in 640,000 hospitalisations in 2009–10.

Diagnosis and treatment

The main diagnostic procedures used for CVD are coronary angiography, echocardiography, computerised tomography (CT) and magnetic resonance imaging (MRI), while the most commonly used therapeutic procedures are percutaneous coronary interventions (PCIs) and coronary artery bypass grafting (CABG). Both PCI and CABG are used to restore good blood supply to the heart by either reducing or bypassing blockages.

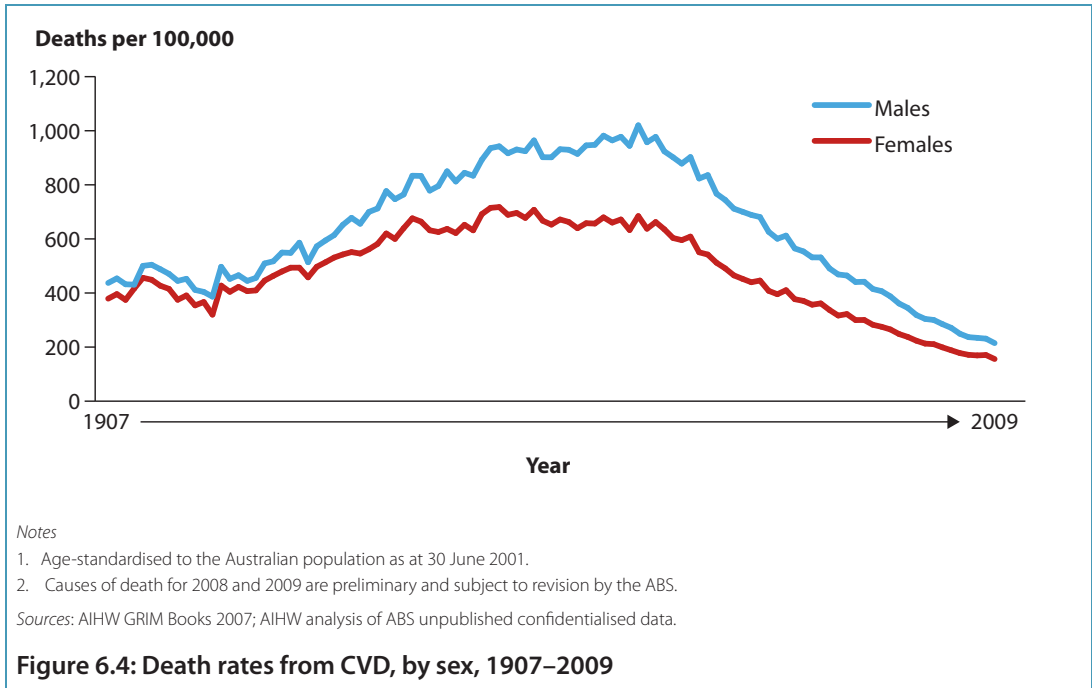
CABG was developed in the 1960s and its use increased progressively until 1996 but has since declined. PCI was introduced in Australia in the 1980s and its growth has been rapid, particularly with the advent of the coronary stent (widespread in Australia since 1995). PCI is less invasive than CABG and is therefore often used in preference to CABG where possible, but PCI cannot be used in all types of coronary vessel obstruction. In 2007–08, a total of 35,000 PCIs and 13,600 CABG procedures were performed in hospital, and of these about three-quarters were for males. Between 2000–01 and 2007–08, the number of PCIs increased by 57% but the number of CABG procedures fell by 19%, suggesting considerable substitution of PCI for CABG over that period (AIHW 2011b).



Mortality

The age-standardised CVD death rate fell from 831 per 100,000 population in 1968 to 183 in 2009, a fall of 78% (Figure 6.4). If the rate had remained at its 1968 peak, 202,400 people would have died from CVD in 2009 instead of the 46,100 who did. This represents a saving of more than 156,000 lives in 2009 alone. By way of comparison, there were 141,000 deaths from all causes in 2009.

Both males and females have benefited from the decline in CVD death rates, although age-standardised rates for males are still markedly higher than for females (in 2009, 215 per 100,000 compared with 156).



CVD death rates increase sharply with age. In 2009, there was a threefold difference between those aged 55–64 and those aged 65–74, and a fourfold difference between the 65–74 and 75–84 age groups. The highest CVD death rates occurred in those aged 85 and over. Male rates were higher than female rates across all age groups, with males aged 45–64 experiencing death rates three times as high as those for females of the same age (AIHW 2011b).

Aboriginal and Torres Strait Islander people, people in the lower socioeconomic groups and those living in regional and remote Australia generally have higher rates of death from CVD than other Australians (AIHW 2011b).

In 2006, Australia had the fifth-lowest age-standardised CVD death rate among the 29 OECD countries for which 2006 data were available (OECD 2011a).



Coronary heart disease

Coronary heart disease (CHD), also known as ischaemic heart disease, is the most common form of cardiovascular disease in Australia. There are two major clinical forms—heart attack (often known as acute myocardial infarction) and angina. A heart attack is a life-threatening event that occurs when a blood vessel supplying the heart itself is suddenly blocked completely, threatening to damage the heart muscle and its functions. Angina is a chronic condition in which short episodes of chest pain can occur periodically when the heart has a temporary deficiency in its blood supply. Heart attacks and the most serious form of angina, known as ‘unstable angina’, are considered to be part of a continuum of acute coronary artery diseases, described as ‘acute coronary syndrome’. The major risk factors for CVD also increase the risk of developing CHD.

Prevalence

Based on the 2007–08 National Health Survey, an estimated 685,000 people reported a long-term condition of CHD—353,000 for angina and 449,000 for other coronary heart diseases or heart attack, although a person may report more than one disease. The prevalence of CHD was twice as high for males as for females, at 4% and 2% respectively (AIHW 2010b).

Hospitalisations

In 2009–10, there were 154,000 hospitalisations with a principal diagnosis of CHD, 2% of all hospitalisations and 32% of all CVD hospitalisations. The CHD hospitalisation rate was between two and four times as high for males as it was for females in most age groups. Overall, 61% of hospitalisations with CHD occurred among those aged 65 and over.

Between 1998–99 and 2009–10, the rate of hospitalisation with a principal diagnosis of CHD fell from 881 to 643 per 100,000 population. This downward trend was more pronounced for males than females, although males continued to be hospitalised at much higher rates than females.

Mortality

CHD remains the largest single cause of death in Australia, accounting for 22,500 deaths (16% of all deaths) in 2009. Three-quarters of these deaths occurred among those aged 75 and over and just 5% among those aged under 55. The male age-standardised CHD death rate in 2009 (117 per 100,000 population) was 75% higher than the female rate (67 per 100,000) (AIHW analysis of ABS unpublished confidentialised data).

CHD death rates are declining but the rates of decline are not consistent across age groups, with some age groups showing a levelling off or plateauing while others continue to decline at accelerated rates. For example, there was a levelling off among those aged 35–54 with the average annual rate of decline in CHD death rates reducing from 6% per annum across the period 1987–1998 to 3% across the period 1999–2009. In contrast, the average annual rate of decline among people aged 55–74 accelerated from 6% in 1987–1998 to 7% in 1999–2009. Among those aged 75 and over, the rate increased from 3% to 5% (AIHW analysis of ABS unpublished confidentialised data).

Australia's CHD death rates compare favourably with countries such as the United Kingdom, United States and New Zealand, but are still more than twice as high as those in Japan, Korea and France after adjusting for age (OECD 2011a).



Heart attacks

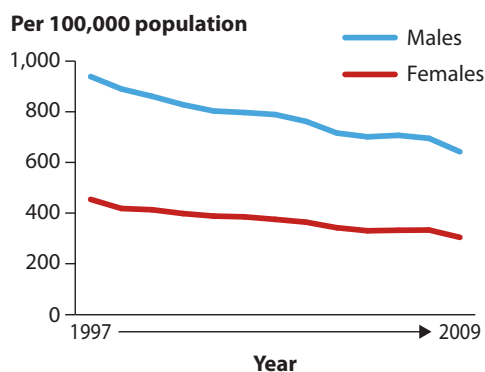
An estimated 47,700 people aged 40–90 had a heart attack in 2009 and, of these, 63% survived. Males were twice as likely as females to have a heart attack but survival rates are similar.

The performance indicators 'Incidence of heart attacks' and 'Survival following heart attack' are shown below. It is important to note that the considerable changes in diagnostic techniques and clinical practice that have occurred in the past decade may affect the way these findings are interpreted in future. See the AIHW report *Monitoring acute coronary syndrome using national hospital data: An information paper on trends and issues* (AIHW 2011c) for more information.

Incidence of heart attacks. The number of major coronary events among people aged 40–90; that is, the number of deaths from coronary heart disease (heart attacks) plus the number of non-fatal hospitalisations for heart attacks. Presented as an age-standardised number per 100,000 people.



- There were about 47,700 coronary events in 2009—463 per 100,000 people.
- Coronary events were twice as common for males as for females.
- The rate fell by almost one-third between 1997 and 2009, despite increased use of more sensitive diagnostic tests that may have led to a rise in the number of less severe heart attacks being diagnosed over time.

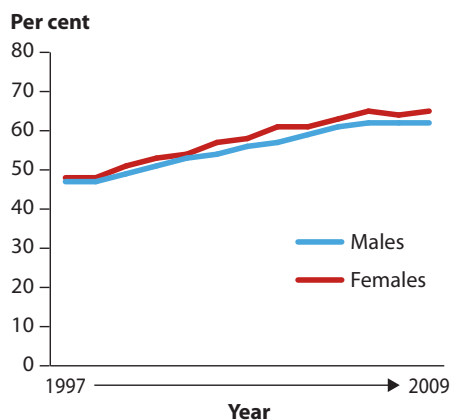


Sources: AIHW National Hospital Morbidity Database, AIHW National Mortality Database, AIHW analysis of ABS unpublished confidentialised data.

Survival following heart attack. People aged 40–90 who survive an acute coronary heart disease event (heart attack). Presented as an age-standardised percentage.



- Survival rates are similar for males and females.
- In 2009, more than 3 in 5 (63%) people who had a heart attack survived, compared with fewer than half (47%) in 1997.
- Part of the improvement in survival rates over time may be due to an increase in the diagnosis of milder forms of acute coronary events, as diagnostic techniques have become increasingly sensitive over time.



Sources: AIHW National Hospital Morbidity Database, AIHW National Mortality Database, AIHW analysis of ABS unpublished confidentialised data.



Stroke

Stroke occurs when an artery supplying blood to the brain either suddenly becomes blocked (ischaemic stroke) or begins to bleed (haemorrhagic stroke). Either may result in part of the brain dying, leading to sudden impairment in activities such as speaking, thinking, moving and communicating (AIHW 2010b).

Prevalence

There are no national data on the incidence of stroke in Australia; however, it is possible to estimate the prevalence of stroke from the ABS 2009 Survey of Disability, Ageing and Carers. Based on this survey, an estimated 375,800 people (205,800 males and 170,000 females) had suffered a stroke at some time in their lives. After standardising to account for age differences, it was estimated that 1.9% of males and 1.3% of females had ever suffered a stroke. Compared with estimates from the 2003 Survey of Disability, Ageing and Carers, there was very little change in the age-standardised prevalence of stroke between 2003 and 2009.

Hospitalisations

In 2009–10, there were 35,300 hospitalisations in Australia with a principal diagnosis of stroke (0.4% of all hospitalisations). Stroke hospitalisation rates increased rapidly with age, with rates for those aged 85 and over being twice as high as for the 75–84 age group and 11 times as high as the rate for those aged 55–64.

Between 1998–99 and 2009–10, there was a 16% decrease in the age-standardised rate of hospitalisation for stroke. The male rate fell from 200 to 169 hospitalisations per 100,000 population and the female rate from 150 to 124 per 100,000.

Mortality

In 2009, there were 8,300 deaths from stroke in Australia—6% of all deaths and 18% of CVD deaths, which makes it the second-most common cause of CVD death after CHD. More females (5,000) died from stroke than males (3,300), although age-specific death rates were generally higher among males. Stroke deaths increased greatly with age, with 82% of deaths occurring among those aged 75 and over (AIHW analysis of ABS unpublished confidentialised data).

Stroke mortality has been declining for several decades. The age-standardised stroke death rate fell from 104 deaths per 100,000 population in 1980 to 33 deaths per 100,000 in 2009. For both males and females, death rates fell by almost 70% in this period (AIHW analysis of ABS unpublished confidentialised data). The reduction in stroke mortality can be attributed, at least partly, to a reduction in risk factors such as tobacco smoking and high blood pressure (Gillum 1997; OECD 2011b). Improvements in medical treatment for stroke have also increased survival (National Stroke Foundation 2010; OECD 2011b).



Heart failure and cardiomyopathy

Heart failure occurs when the heart begins to function less effectively in its role of pumping blood around the body. It can result from a variety of diseases and conditions that impair or overload the heart, notably heart attack, high blood pressure, a damaged heart valve, or various forms of cardiomyopathy.

Cardiomyopathy refers to a situation where the entire heart muscle, or a large part of it, is weakened by various causes, including viral infections and severe alcohol abuse. The heart can become enlarged, thickened or dilated. Symptoms include shortness of breath, lethargy, fatigue, palpitations and sometimes chest pains.

Because of the close relationship between heart failure and cardiomyopathy, they are often analysed together. There are no national data on the prevalence of heart failure or cardiomyopathy.

Hospitalisations

In 2009–10, there were 49,600 hospitalisations in Australia with a principal diagnosis of heart failure or cardiomyopathy—0.6% of all hospitalisations. Heart failure was the principal diagnosis in 45,000 (91%) of these hospitalisations, with cardiomyopathy accounting for the other 4,600 (9%). Heart failure or cardiomyopathy was listed as an additional diagnosis in a further 86,700 hospitalisations, demonstrating the high frequency with which they occur with other diseases.

Mortality

There were 3,500 deaths in Australia in 2009 where heart failure or cardiomyopathy was the underlying cause (1,600 males and 1,900 females) (ABS 2011a). However, because of the way causes of death are coded in Australia, conditions like heart failure are less likely to be coded as the underlying cause of death than as an associated cause (Najafi et al. 2006). In 2009, heart failure alone was the underlying or associated cause of death in 17,900 cases (ABS 2011a).

Acute rheumatic fever and rheumatic heart disease

Acute rheumatic fever (ARF) is a condition caused by an untreated infection of Group A *Streptococcus* bacteria. It can cause permanent damage to the heart known as rheumatic heart disease (RHD).

Although ARF and RHD are now uncommon diseases in the broader Australian community, they still have a substantial impact on Aboriginal and Torres Strait Islander people, with nearly all new cases of ARF confined to this population group.

Incidence and prevalence

There are no national data on the incidence of ARF and little on the prevalence of RHD. However, the Northern Territory RHD registry records both the prevalence of RHD, and new and recurrent cases of ARF. Between 2006 and 2009, there were 216 new and recurrent cases of ARF in the Northern Territory, of which almost all were Indigenous Australians (213 cases) (AIHW 2011d). Of the new and recurrent cases of ARF in Indigenous people in the Northern Territory over the 4 years, 62% occurred in Indigenous children aged 5–14 and 61% in Indigenous females. As at 31 December 2009, there were 1,479 cases of RHD in the Northern Territory, of which 1,374 (93%) were among Indigenous Australians (AIHW 2011d). Indigenous females had a significantly higher prevalence of RHD (32 cases per 1,000) than their male counterparts (17 per 1,000).



Hospitalisations

In 2009–10, there were 2,700 hospitalisations with a principal diagnosis of ARF or RHD—0.6% of all CVD hospitalisations, equating to an age-standardised rate of 12 per 100,000 population. Females generally had higher hospitalisation rates than males, and rates increased sharply with age. In 2007–08, in those jurisdictions with acceptable Indigenous identification, the hospitalisation rate of ARF or RHD for the Indigenous population was 67 per 100,000 people, eight times as high as the rate for other Australians (AIHW 2011b).

Mortality

In 2009, RHD was the underlying cause in 313 deaths. More females (217) than males (96) died from the disease and death rates were higher for females aged 50 and over. RHD death rates also increased rapidly with age, with the highest rates among those aged 85 and over (AIHW analysis of ABS unpublished confidentialised data).

What is missing from the picture?

There are no reliable national data on the incidence (new cases) of any cardiovascular disease, apart from the estimates of 'heart attack' derived for the performance indicator reported. In addition, the most recent measures of the prevalence (the number of existing cases) of some modifiable risk factors for CVD, such as high blood cholesterol or high blood pressure, rely upon self-reported survey information rather than measured data, such as blood samples or physical measurements. Measured data are regarded as more reliable than self-reported information. It is anticipated that new estimates for a range of risk factors, such as blood pressure and cholesterol, will become available from the 2011–2013 Australian Health Survey.

Where do I go for more information?

For more information about cardiovascular disease in the Australian population, see the following publications available at <www.aihw.gov.au>:

- *Cardiovascular medicines and primary health care: a regional analysis* (AIHW 2010c)
- *Cardiovascular disease mortality: trends at different ages* (AIHW 2010d)
- *Cardiovascular disease: Australian facts 2011* (AIHW 2011b).

6.3 Mental illness

At a glance

- There is a high prevalence of mental disorders in the Australian population—45% of Australians aged 16–85 have experienced a mental disorder sometime in their lifetime.
- There are high rates of comorbidity between different mental disorders and between mental and physical conditions—about 1 in 9 Australians aged 16–85 have a mental disorder and a physical condition concurrently.
- The effects of mental health issues are substantial. People with mental disorders suffer greater psychological distress and a higher rate of profound/severe disability than those without mental disorders.



Introduction

Mental illness comprises a wide spectrum of disorders and varies in its severity. Its effect on individuals and families can be severe, and its influence is far-reaching for society as a whole. Social problems commonly associated with mental illness include poverty, unemployment or reduced productivity, and homelessness. Those with mental illness often experience problems such as isolation, discrimination and stigma (WHO 2003).

The 2007 National Survey of Mental Health and Wellbeing (SMHWB, see Box 6.3) estimated that 1 in 5 Australians aged 16–85 experienced one or more of the common mental disorders in the 12 months before the survey. These were affective disorders (such as depression), anxiety disorders and substance use disorders. An additional one-quarter of the population, while not experiencing one of these disorders in the 12 months beforehand, had done so at some time in the past. Altogether, 45% of Australians aged 16–85, that is, 7.3 million people, had experienced a mental disorder in their lifetime.

The profile of mental health in the Australian political landscape has grown in recent years. It was a major issue in the 2010 election campaign, with both major parties pledging increased mental health funding, and the elected government subsequently established the National Mental Health Commission in January 2012 to promote best practice and measure the performance of the mental health system. Western Australia established a mental health commission in March 2010 and New South Wales and Queensland have recently signalled their intention to do so.



Box 6.3: Measuring the prevalence of mental health problems

Data on the prevalence of mental health problems (the extent of the problems in the population) used in this section come from three main sources:

- The second National Survey of Mental Health and Wellbeing was conducted by the ABS in 2007. The survey was a general household survey and therefore did not include people in prisons, hospitals and nursing homes. There were more than 8,800 responding households in the survey, and a response rate of 60%. While it is believed that the survey underestimates the true prevalence of mental disorders in the Australian population, it is thought that the extent of this underestimation is small (Slade et al. 2009). The survey collected information on the more common or high-prevalence mental disorders, namely affective, anxiety and substance use disorders.
- The second National Survey of Psychotic Illness was conducted by the University of Western Australia in 2010 (Morgan et al. 2011). The survey drew on two main samples—one of people in contact with public specialised mental health services between April 2009 and March 2010, and the other of people receiving mental health services from government-funded non-government organisations in March 2010. Both samples were screened for psychosis and then random subsamples were interviewed, with a weighting towards those screened positive for psychosis.
- The ABS National Health Survey of 2007–08 included two measures of the prevalence of mental health problems. The first was self-reported information about long-term conditions that had been identified by a medical professional. The second was the Kessler Psychological Distress Scale–10 (K10).

What do we know about mental illness?

In *Australia's health 2010*, we presented findings of the 2007 SMHWB on the more common mental disorders—anxiety disorders afflicting 14% of the population on a 12-month basis, affective (mood) disorders (6%) and substance use disorders (5%) (AIHW 2010b). This prevalence was highest in young people and decreased as age increased.

In this edition we update the picture with additional analysis of the SMHWB data and extend it with data from more recent surveys, in particular the second National Survey of Psychotic Illness. Psychotic illnesses are less common, but more severe, forms of mental illness that are characterised by distortions of thinking, perception and emotional response. The most common psychotic illness is schizophrenia. In March 2010, there were an estimated 3.1 people per 1,000 population aged 18–64 who had a psychotic illness and were in contact with public specialised mental health services. In addition, there were an estimated 0.4 people per 1,000 population with psychotic illness who were solely using mental health services provided by non-government organisations.

While the participants in this survey were all health system users by definition, 44% reported at least one hospitalisation and 41% had visited an emergency department in the past year. 'Section 7.6 Specialised mental health services' notes that people with schizophrenia are the leading users of community and residential mental health care services.

The prevalence of psychotic disorders was higher in males (3.7 cases per 1,000) than females (2.4 cases per 1,000). Males aged 25–34 had the highest rates of psychotic illness (5.2 cases per 1,000). Almost two-thirds (65%) of people experienced their first episode before the age of 25, with the mean age of onset being 23 for men and 24 for women.

There was a high rate of suicidal thoughts and behaviours among those surveyed, with 50% reporting they had attempted suicide at some point in their lifetime compared with 3.7% in the general population. Females were more likely to have attempted suicide than males (57.5% and 44.2% respectively).

Of those surveyed, 33% had been in paid employment in the previous year and government payment was the main source of income for 85%. Nearly 13% had experienced periods of homelessness over the year. Only 12% of the males were in a married or de facto relationship, though 25% of the women were. About 56% of the women had children of any age, and 24% had children living at home with them.

The physical health of those suffering psychosis is poor compared with the general population, due to factors such as medication side effects, lifestyle and genetic predisposition. For example, more than 20% had diabetes, about three times the rate in the general population. Nearly one-third experienced chronic back, neck or other pain and one-third experienced frequent and/or severe headaches and migraines. More than one-quarter (27%) had heart or circulatory conditions and 30% had asthma. Levels of tobacco smoking were very high (71% of males and 59% of females) and there was no reduction in tobacco use evident since the survey was first conducted in 1997–98, in contrast to trends in the general population. There were also high rates of comorbidity of mental illnesses among the survey respondents, with more than half experiencing either anxiety (60%) or depression (55%) in addition to psychosis. There were also high rates of drug and alcohol abuse.

Comorbidity

Comorbidity—defined for this section as involving more than one mental disorder, or at least one mental disorder and one or more physical conditions—is common among those with mental illness, and people with multiple disorders are more disabled and consume more health resources than those with only one disorder. Analysis of the SMHWB data indicates that 12% of Australians aged 16–85 had a mental disorder and a physical condition concurrently, and that these people were more likely to be female, and aged in their early forties (AIHW 2012b).

The most common comorbidity (9%) was an anxiety disorder combined with a physical condition and possibly other mental disorders, affecting about 1.4 million Australian adults. This was consistent for most age and sex groups, with the exception of younger males (aged 16–24) for whom substance use disorder combined with a physical condition was most common (5%).

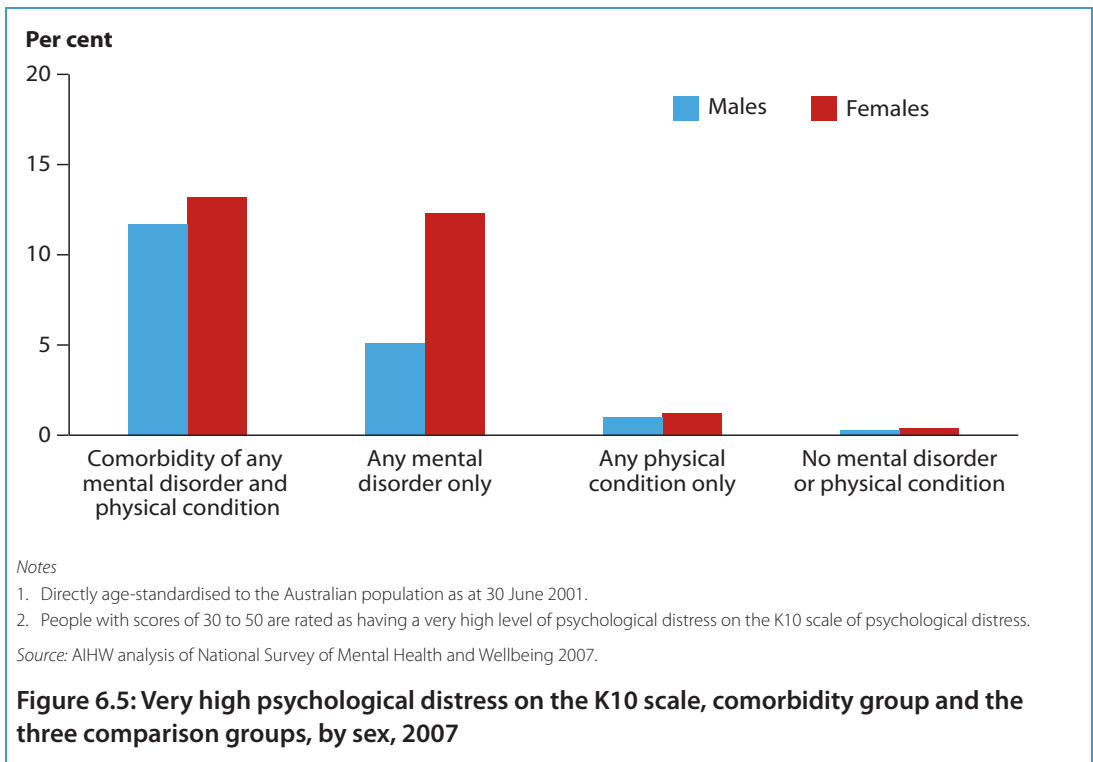


In general, comorbidity increased with increasing disadvantage. For example, people living in the most disadvantaged areas of Australia were 65% more likely to have comorbidity than those living in the least disadvantaged areas.

Health risk factors, for example, smoking, were generally more prevalent among people who had a mental disorder and highest among those suffering comorbidity, although it is important to note that there are no causal pathways implied by this finding.

People with a comorbidity of any mental disorder and physical condition had higher rates of hospitalisation than the comparison groups considered in the study.

The coexistence of mental and physical conditions had an effect on quality of life. For example, on the K10 scale of psychological distress (Kessler & Mroczek 1994), people in the comorbidity group were more than 10 times as likely to report high levels of psychological distress as the groups with no mental disorder (Figure 6.5).



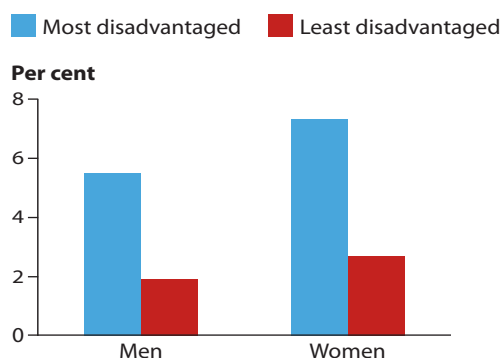
The overall proportion of Australians with very high psychological distress is presented here as a performance indicator (see 'Psychological distress' below).

Psychological distress. Adults who have very high levels of psychological distress as measured using the Kessler 10 scale.



- In 2007–08, 3.5% of adults had very high levels of psychological distress.
- Women (4.1%) were more likely than men (2.8%) to report very high levels of distress.
- There was no change in the overall proportion over time.

Sources: ABS 2009; AIHW analysis of the ABS 2007–08 National Health Survey.



Psychiatric disability

In 2009, the Survey of Disability, Ageing and Carers estimated that 4.0 million people in Australia (18% of the population) had a disability, with 17% of these people having a mental or behavioural disorder as their main health condition (ABS 2010). Those with a disability whose main condition was a mental or behavioural disorder were more likely to have a severe or profound core activity limitation—that is, they sometimes or always needed help with self-care, mobility or communication—than those whose main disability was physical (48% compared with 28%). This finding is partly influenced by those with dementia or Alzheimer disease as their main condition, but the proportion remains high (42%) even after excluding this subgroup.

The rates of disability due to mental or behavioural disorder were highest in the older age groups (11.2% for those aged 85 and over and 4.4% for those aged 75–84) due mainly to dementia and Alzheimer disease. The next highest rate was in the youngest age group (0–14), where intellectual and developmental disorders were the dominant conditions.

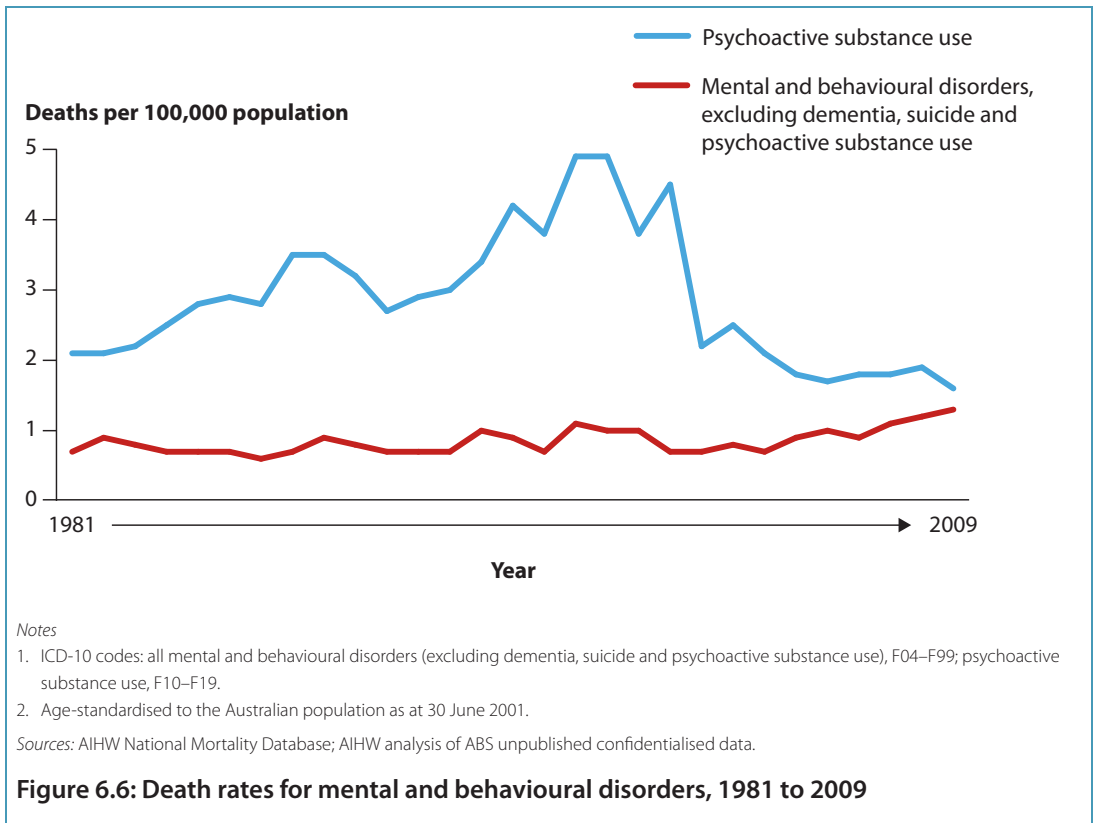
Of the 793,000 Australians receiving the disability support pension at June 2010, 29% had a psychological or psychiatric condition. In line with this, in 2009–10, 27% of grants of disability support pension (91,100) were for those with a psychological or psychiatric condition (FaHCSIA 2010). The number of grants for those with a psychological condition increased by 64% in the 3 years to 2009–10, compared with an overall increase of 46%.



Mortality

A mental or behavioural disorder was recorded as the underlying cause for 686 deaths in 2009—0.5% of all deaths in that year. These deaths exclude suicide and dementia, which are included in other sections in this report (see ‘Section 6.5 Injury’ and ‘6.9 Dementia’). The majority of deaths with a mental or behavioural disorder as the underlying cause were due to the use of psychoactive substances, such as alcohol and heroin. However, this proportion fell from 87% in 2000 to 54% in 2009 (Figure 6.6). The form of presentation of this chart in previous editions of *Australia’s health* tended to hide the convergence of these two components of the mental and behavioural disorders death rate series.

The number of deaths attributed to mental and behavioural disorders in 2009 was much greater overall for males than females, with males accounting for 61% of total deaths due to this cause. Psychoactive substance use was a dominant cause of death for males in the age groups from 15–74, but for females this was the case only for those aged 35–64.



What is missing from the picture?

The scope restrictions and the small sample size of the 2007 SMHWB make it difficult to estimate the prevalence of mental disorders within population subgroups such as those in more remote geographic regions and those in prisons, hospitals and nursing homes. This, in turn, limits the analytical potential for indicators such as treatment rates. Further, the SMHWB has only been repeated with a 10-year interval, so more up-to-date mental health prevalence rates for adults aged 16–85 are unlikely to be available in the near future.

Additionally, the child and adolescent component of the National Survey of Mental Health and Wellbeing conducted between February and April 1998 is yet to be repeated. Consequently, more recent data on the prevalence of mental health problems for children and adolescents aged 4–17 are not available. A second national child and adolescent survey is planned with developmental work now underway. It is anticipated the survey will be in the field in 2013.

Where do I go for more information?

Further analysis of the comorbidity aspect of the 2007 SMHWB is in the publication *Comorbidity of mental disorders and physical conditions, 2007* (AIHW 2012b).

Other relevant data are in the *National mental health report* (DoHA 2010a) and on the *Mental health services in Australia* website: <mhsa.aihw.gov.au/home>.



6.4 Chronic respiratory conditions

At a glance

- Based on survey data, about 6 million Australians have a chronic respiratory condition.
- Allergic rhinitis (hay fever) is one of the most common chronic respiratory conditions, affecting about 3 million Australians. Asthma and COPD are two of the conditions that create the greatest health burden in Australia.
- After declining steadily during the 1990s and early 2000s, the rate of health service use related to asthma has not changed substantially over recent years, whereas the available data suggest that the burden of COPD is continuing to decline.



Introduction

Respiratory conditions include a diverse range of conditions that affect the airways causing ill health, disability and death.

Bettering the Evaluation and Care of Health (BEACH) survey data suggest that respiratory conditions are the most commonly managed problems in general practice, at a rate of 22 per 100 encounters in 2009–10 (AIHW: Britt et al. 2010a). In 2009, there were 11,049 deaths where a respiratory condition was the underlying cause (ABS 2011a). This was the third most common cause group.

Respiratory conditions that are chronic or long-lasting (in some cases lifelong), particularly asthma and COPD, place a considerable burden on the community. According to the 2007–08 National Health Survey, about 6 million Australians suffer from a chronic respiratory condition (ABS 2009).

Many individuals suffer from more than one chronic respiratory condition as well as experiencing acute respiratory conditions. For example, estimates from the 2007–08 National Health Survey were that 41% of those who had asthma also had sinusitis or rhinitis, and 9% had COPD.

This section focuses on three common chronic respiratory conditions: allergic rhinitis, asthma and COPD.

What do we know about allergic rhinitis?

Allergic rhinitis—commonly referred to as hay fever—may include a runny or blocked nose and/or sneezing and watery eyes triggered by an allergic reaction. Triggers can occur seasonally or throughout the year, and can include house dust, animal fur, pollens, fungal spores, air pollutants, breads and cereals, or small animals. Hay fever is commonly used to describe allergic rhinitis caused by seasonal exposure to pollen.

Allergic rhinitis is one of the most common chronic respiratory conditions in Australia. Estimates from the 2007–08 National Health Survey suggest it affects about 15% of the Australian population (3.1 million people). Unlike many health conditions, it is more common in those aged 15–54 than in those aged under 15 and over 54.

According to the National Health Survey, the Australian Capital Territory and Western Australia have the highest rates of allergic rhinitis in Australia. Reasons for this are not clear, but the high rates may reflect regional differences in allergen exposure.

The main medicines used to treat allergic rhinitis are intranasal corticosteroids and oral antihistamines. The amount of money paid by community pharmacies to wholesalers for these medicines doubled between 2001 (\$108 million) and 2010 (\$227 million) (IMS Health 2011). Comprehensive data are not available on the supply of these medicines to patients. While not all of these medicines would have been used for allergic rhinitis, treatment of this condition may have accounted for a large proportion of the increase.

What do we know about asthma?

Asthma is a common chronic condition of the airways that can affect people of all ages. It causes episodes of wheezing, breathlessness and chest tightness due to widespread narrowing of the airways resulting from inflammation.

Although the underlying causes of asthma are not well understood, there is evidence that environmental and lifestyle factors, as well as genetic factors such as an allergic tendency, may increase the risk of developing asthma (Gilmour et al. 2006; Koeppen-Schomerus et al. 2001). Episodes can be triggered by a wide range of exposures, including viral infections, exercise, air pollutants and tobacco smoke. They can also be triggered by allergens, such as house dust mites, pollens, mould spores, skin, hair or feathers shed from animals, and may be related to certain occupations.

The effects of asthma range from mild, intermittent symptoms causing few problems, to severe and persistent wheezing and shortness of breath. For some people, asthma has a severe adverse impact on quality of life and may be life-threatening.

People with asthma of all ages and both sexes rate their general health less favourably than people without the disease. For example, in the 2007–08 National Health Survey, 25% of people aged 15 and over with current asthma rated their health as 'poor' or 'fair' compared with 14% of the same age group without asthma.

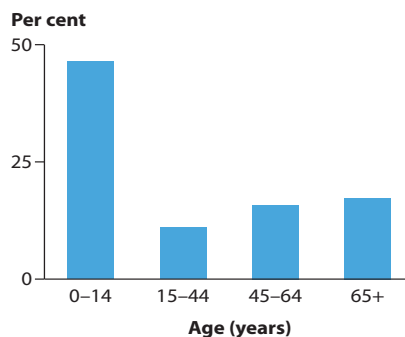
Written asthma action plans have formed part of national guidelines for asthma management in Australia since 1989 (National Asthma Council Australia 2006). A written asthma plan enables people with asthma to recognise deterioration in their condition promptly and respond appropriately (AIHW: Australian Centre for Asthma Monitoring 2011). The 'Proportion of people with asthma who have a written asthma plan' is presented here as a performance indicator.



Proportion of people with asthma who have a written asthma plan. The proportion of participants in the National Health Survey who reported having asthma, who said they had a written asthma plan.



- In 2007–08, 20% of people who reported asthma as a long-term condition also reported having a written asthma action plan.
- Children with asthma were much more likely (46%) than those of other ages to have a written asthma plan.



Source: AIHW analysis of the ABS 2007–08 National Health Survey.

Prevalence

About 10% of the Australian population have current asthma, based on data from the 2007–08 National Health Survey. Females had a higher prevalence of asthma (11%) than males (9%), but the difference between the sexes varied with age. Among those aged under 15, the prevalence of asthma was higher for males than females, but among those aged 15 and over the reverse was true. The highest prevalence in any age group was in males aged 5–9 (15%) (AIHW 2010b).

The proportion of people with asthma is also not the same across other population groups. Results from the 2007–08 National Health Survey suggest that asthma prevalence was higher among people:

- from an English-speaking background aged under 35 (13%) than among those from a non-English-speaking background of the same age (3%)
- living in *Inner regional* areas (12%) compared with those living in *Major cities* (9%)
- living in the least advantaged areas (12%) compared with those living in the most advantaged areas (8%).

In 2004–05, the National Aboriginal and Torres Strait Islander Health Survey estimated that the overall prevalence of asthma was higher among Aboriginal and Torres Strait Islander Australians (17%) than non-Indigenous Australians (10%) (AIHW 2010b).

The prevalence of asthma in Australia among children aged 0–15 declined significantly from 14% in 2001 to 11% in 2004–05 and 10% in 2007–08. In the same period, there was no change in the prevalence of asthma among people aged 35 and over (AIHW: Australian Centre for Asthma Monitoring 2011).

There is no agreed method for comparing asthma prevalence internationally. Several studies have, however, suggested that Australia has a relatively high prevalence.

- In 2002, the International Study of Asthma and Allergies in Childhood showed the prevalence of asthma symptoms was highest in Australia, the United Kingdom, New Zealand and Latin America (Lai et al. 2009).
- In a review of a range of studies from 2005 and earlier, Patel and his colleagues found that Australia and the United Kingdom had the highest rates of asthma in the world (Patel et al. 2008).

During the 1980s and early 1990s, there was a substantial worldwide increase in the prevalence of asthma, but since then there has been no clear pattern (Eder et al. 2006).

Health service use

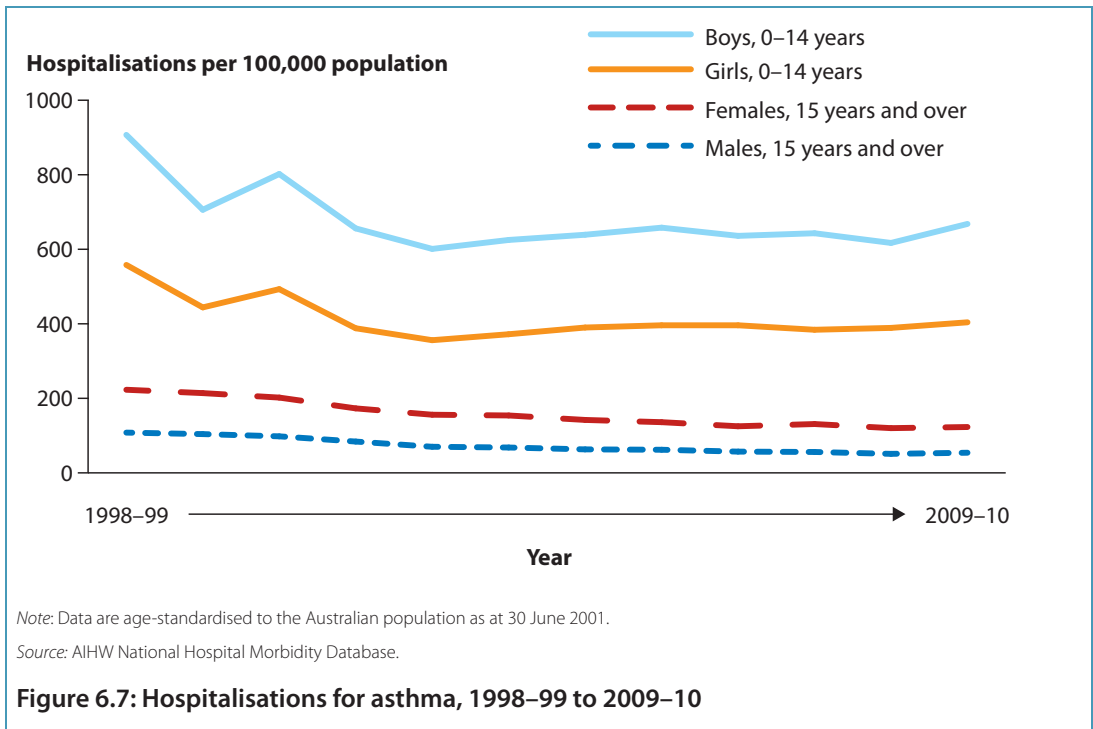
After declining steadily during the 1990s, and continuing to decline until about 2005, the rate of health service use related to asthma did not change substantially between 2005 and 2010.

Data from surveys of general practice activity show that the rate of GP encounters for asthma among children decreased steadily between 2000–01 and 2006–07 (from 23.2 to 14.8 per 100 population). It has risen slightly since then to 16.9 per 100 in 2009–10.

When asthma becomes difficult to manage or life threatening, hospitalisation can occur. In 2009–10, there were about 39,300 hospitalisations with a principal diagnosis of asthma, representing close to 1 in 200 of all hospitalisations during that year.

Between 1998–99 and 2002–03, there was a substantial fall in the rate of hospitalisations for asthma in both children (35%) and adults (31%). Since 2002–03, these rates have remained relatively stable (Figure 6.7).

Boys aged 0–14 were more likely to be admitted to hospital for asthma than girls, however, over the age of 15, females were more likely to be admitted (Figure 6.7).



Mortality

Asthma death rates in Australia are high by international standards, although asthma is not a leading cause of mortality. Since a peak in deaths from asthma in the late 1980s, the mortality rate has fallen by about 70%, although there has been little change in recent years.

Asthma was certified as the underlying cause of 411 deaths in 2009. This corresponds to an asthma mortality rate of 1.7 per 100,000 population, representing 0.3% of all deaths in that year (ABS 2011a). The rate was higher in females than males.

What do we know about chronic obstructive pulmonary disease?

COPD limits airflow in the lungs. This can lead to mild or severe shortness of breath that is not fully reversible even with treatment. People with COPD often have emphysema (damaged lung tissue) and/or chronic bronchitis (indicated by a frequent cough caused by excessive mucus production). The term COPD encompasses both of these conditions.

Over time, COPD may become disabling. People with COPD tend to rate their health worse than people without the condition. In the 2007–08 National Health Survey, 27% of those aged 55 and over with COPD rated their health as poor, compared with 13% of those without it.

There are treatments for people with COPD that can improve health-related quality of life and decrease health care utilisation. These include medications, pulmonary rehabilitation and long-term home oxygen therapy used most commonly for advanced COPD.

Smoking is the most important but not the only cause of COPD. It was estimated that 74% of COPD deaths in Australia in 2003 could be attributed to tobacco smoke (Begg et al. 2007). COPD death rates have declined after declines in tobacco consumption over the past 50 years.

Prevalence

The prevalence of COPD is difficult to determine and currently available data sources vary in their estimates. The 2007–08 National Health Survey estimated the prevalence of COPD was 5% among people aged 55 and over, but other studies have estimated the prevalence at closer to 10% (Buist et al. 2007).

Despite these limitations, the available data do show some signs that the prevalence of COPD has been declining over recent years. Based on National Health Surveys, the estimated prevalence for people aged 55 and over was 6.8% in 2001, 6.6% in 2004–05 and 5.3% in 2007–08. These changes are reflected in declines in health service use and deaths due to COPD.



Health service use

The rate of GP encounters where COPD was a problem managed fell from 15.8 per 100 population in 2000–01 to 13.9 per 100 population in 2009–10.

Hospitalisations for men aged 55 and over declined 20% in the past decade, from 1,545 per 100,000 population in 1998–99 to 1,236 per 100,000 in 2009–10. The female rate, while varying a little over the same period, was slightly higher in 2009–10 (870 per 100,000 population) than in 1998–99 (835 per 100,000 population).

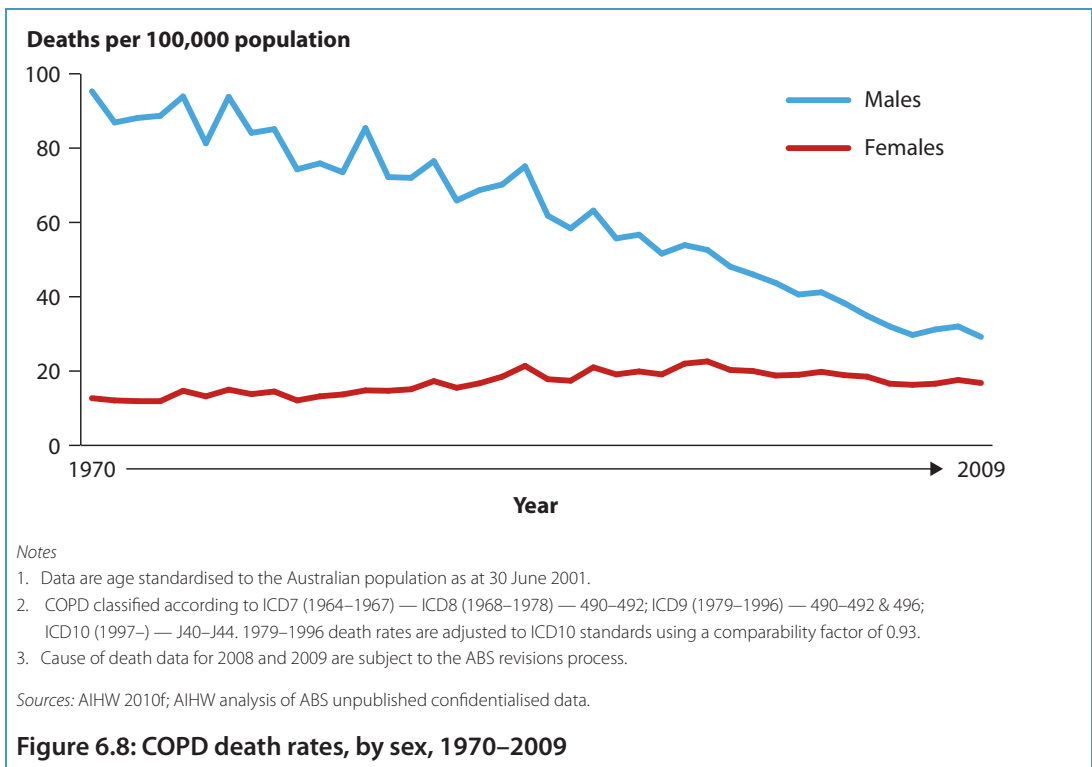
Indigenous Australians were hospitalised at about five times the rate of other Australians for COPD in 2006–08 (AIHW 2011d).

Mortality

Over the past century, changes in male COPD death rates tended to occur about 15 years after changes in tobacco consumption (AIHW 2010e).

After having increased rapidly for several decades, in 1970 the male death rate peaked at 95 deaths per 100,000 population. In 2009, the male rate had fallen to 29 per 100,000—less than one-third of the rate in 1970 (Figure 6.8).

The female rate has consistently been much lower than the male rate and peaked much later at 24 per 100,000 population in 1996. The higher male rates decreased from eight times the female rate in 1970 (95 compared with 13 per 100,000) to double the female rate in 2009 (29 compared with 17 per 100,000) (Figure 6.8).



What is missing from the picture?

There is insufficient information to explain the relatively high prevalence of asthma in Australia and the recent declines in asthma among Australian children (among other patterns). Further research to understand the environmental and lifestyle factors that underlie variation in the prevalence of asthma would be valuable.

There are important interventions that have been shown to improve outcomes for patients with COPD but for which little data are available. For example, long-term home oxygen therapy can improve survival and possibly quality of life for people with COPD and others with low levels of oxygen in the blood, but no data are available on its availability and use nationally.

Similarly, while national guidelines for the management of COPD recommend pulmonary rehabilitation for people with moderate to severe disease, a lack of data prevents analysis of its availability and use.

Where do I go for more information?

For information on the monitoring of chronic respiratory conditions, visit the AIHW website: www.aihw.gov.au/asthma-and-chronic-respiratory-diseases.

For more detailed monitoring and analyses of chronic respiratory conditions in Australia, see the following AIHW reports:

- *Allergic rhinitis ('hay fever') in Australia* (AIHW 2011e)
- *Asthma in Australia 2011* (AIHW: Australian Centre for Asthma Monitoring 2011)
- *Asthma, chronic obstructive pulmonary disease and other respiratory diseases in Australia* (AIHW 2010e).

6.5 Injury

At a glance

- Injury contributes substantially to the burden of disease. In 2010, injury was estimated to account for 6.5% of the total burden of disease in Australia.
- Each year about 400,000 people suffer an injury severe enough to be admitted to a hospital. The number of hospitalised cases increased by about 10,000 cases per year between 1999–00 and 2009–10; however, after allowing for the ageing of the population, the overall rate of injury for all Australians remained steady over this period.
- Older people, particularly women, have higher rates of injury as a result of falls.



Introduction

Injury has a major, but often preventable, impact on Australia's health. It affects Australians of all ages, is the greatest cause of death in the first half of life, and leaves many with serious disability or long-term conditions. In 2010, injury was estimated to account for 6.5% of the total burden of disease in Australia (Begg et al. 2007). For these reasons, injury prevention and safety promotion is a National Health Priority Area. Injury is also the subject of three national prevention plans: the National Injury Prevention and Safety Promotion Plan: 2004–2014 (NPHP 2005a), National Falls Prevention for Older People Plan: 2004 onwards (NPHP 2004) and the National Aboriginal and Torres Strait Islander Safety Promotion Strategy (NPHP 2005b).

An injury is the physical damage (for example, a bruise, broken bone or brain damage) that results when a human body is suddenly or briefly subjected to intolerable levels of energy (Langley & Brenner 2004). There are many causes of injury, including being struck by an object (a car, for example), cut by a knife, falling, or coming in contact with fire or with a toxic chemical. The focus here is on the causes of injury (referred to as 'external causes') rather than the physical damage.

While the majority of injuries are relatively minor and require little or no treatment, this section provides a summary of those more serious injuries that require hospitalisation, and includes analysis of injury by age, gender, Indigenous status and remoteness (see Box 6.4). A detailed analysis of injury deaths is in *Australia's health 2010* (AIHW 2010b).



Box 6.4: Hospitalised injury

Serious hospitalised injuries are defined as requiring admission to hospital as a result of the injury event and can range from simple fractures to catastrophic injuries, such as spinal cord injury, which result in lifelong disability at a substantial cost to the health system. Episodes of hospital care that occur in emergency departments or outpatient settings are not included.

Injuries reported in this section (hospital records with a principal diagnosis in the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) range S00–T75 or T79) are defined as injuries usually sustained within the community setting, such as in the home, workplace, educational institution, street or natural environment (Berry & Harrison 2007). Other injuries that occur in the context of surgical or medical care are not reported in this section. See 'Section 7.9 Admitted hospital care' for some information on safety and quality in hospitals.

Injuries are further categorised into two main types—unintentional (for example, motor vehicle crashes, falls) and intentional (for example, assault, self-harm).

What do we know about injury?

In 2009–10, injury accounted for more than 1 in 20 hospitalisations in Australia (or about 453,300 hospitalisations) (Table 6.3). The estimated number of people hospitalised (a lower number, because some injuries result in more than one episode in hospital) was about 421,000 people.

Consistent with findings presented in previous editions of *Australia's health*, males are more likely than females to be hospitalised for most types of injury and injuries overall. However, the average length of stay is longer for females than males, reflecting the large number of older females hospitalised for hip fractures (Bradley & Harrison 2012).

Injuries can be classified according to the likelihood that a patient with that injury will die in hospital. Cases with a predicted risk of dying of about 6% or higher are classified as high threat to life (Stephenson et al. 2003). Injuries of this severity are likely to have a large impact on the patient, often with persisting problems and ongoing need for health care services. The number of high threat to life cases has increased over time and accounted for 15% of all hospitalised injury cases in 2009–10 (13% of the male cases and 18% of the female cases).

Table 6.3: Hospitalisations and hospitalised cases due to injury^(a), 2009–10

Measure	Males	Females	Total ^(b)
Hospitalisations			
Due to injury	260,668	192,632	453,301
Due to all causes	4,042,026	4,488,869	8,531,003
Injury as a proportion of all causes (%)	6.4	4.3	5.3
Cases ^(c)			
Estimated number of hospitalised injury cases	242,478	178,586	421,065
Crude number per 100,000 population	2,198.4	1,605.7	1,900.8
Age-standardised number per 100,000 population ^(d)	2,210.9	1,473.8	1,858.3
Number of patient days	805,808	862,653	1,668,462
Average length of stay per case	3.3	4.8	4.0
Number of high threat to life cases ^(e)	31,838	31,739	63,577

(a) Includes records where the principal diagnosis was ICD-10-AM S00–T75 or T79.

(b) Includes records where sex is missing or indeterminate.

(c) Excludes inward transfers from acute hospitals.

(d) Data are directly age-standardised to the Australian population as at 30 June 2001.

(e) Cases with a predicted risk of dying of about 6% or higher (Stephenson et al. 2003).

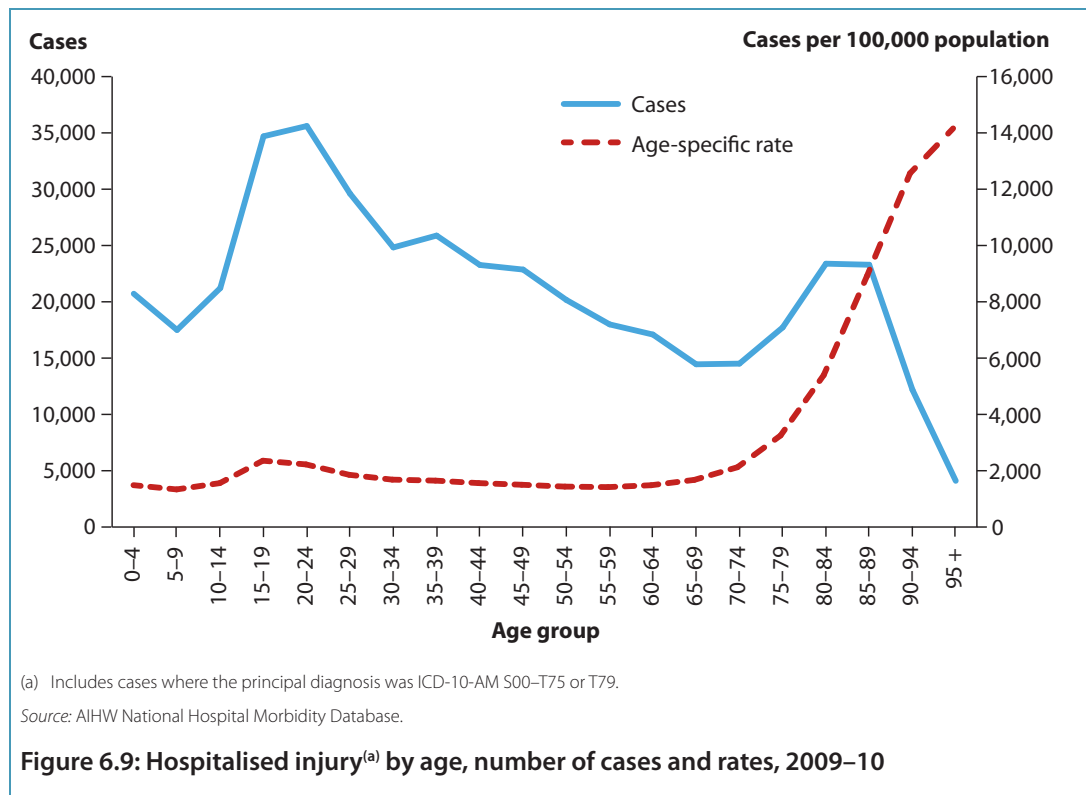
Source: AIHW National Hospital Morbidity Database.

In 2009–10, the number of hospitalised injury cases varied with age; it was highest for teenagers and young adults aged 15–24, especially males (Figure 6.9). While rates were higher for that age group than for younger people, the overall highest rates were in the oldest age groups. The rate of hospitalised injury for people aged 90 and older was just under 13,000 per 100,000 population; that is, more than 1 in every 10 people aged 90 and over were admitted to hospital because of injury during 2009–10. This high rate was almost entirely due to injury from unintentional falls (Bradley & Harrison 2012). Further discussion on injury and age is provided later in this section.

The rate of hospitalised injury for males was greater than for females in every age group below the age of 65. This was largely due to transport injury (mainly road crashes) and interpersonal violence. For people aged 65 and over, the female hospitalisation rate exceeded the male rate, due mainly to injury from unintentional falls (Bradley & Harrison 2012).

The great majority (85%) of injury cases admitted to hospital in 2009–10 were unintentional—that is, the injuries were not caused deliberately (Table 6.4). Falls and transportation (mostly motor vehicles) were common external causes of injury (49% of all hospitalised injury cases).





Between 1999–00 and 2009–10, the number of hospitalised injury cases increased by about 10,000 cases per year. Much of the rise in the number of cases was due to the increase in the number of older people in Australia and the falls they experienced (Bradley & Harrison 2012). However, after allowing for the ageing of the population, the overall rate of injury for all Australians remained similar from year to year. The rate was 1,724 per 100,000 of the population in 1999–00 and 1,858 per 100,000 in 2009–10. Across the period, age-standardised rates for males were consistently higher than for females.

Table 6.4: Hospitalised injury cases^(a) by external cause groups, 2009–10

External cause of injury ^(b)	Males		Females		Persons ^(c)	
	Number	Per cent	Number	Per cent	Number	Per cent
Unintentional						
Falls	68,645	28.3	86,332	48.3	154,977	36.8
Transportation	36,139	14.9	16,679	9.3	52,818	12.5
Poisoning, pharmaceuticals	2,993	1.2	3,156	1.8	6,149	1.5
Exposure to heat, fire, smoke and hot substances	3,776	1.6	2,042	1.1	5,818	1.4
Poisoning, other substances	1,644	0.7	1,089	0.6	2,733	0.6
Drowning and submersion	351	0.1	178	0.1	529	0.1
Other unintentional ^(d)	94,118	38.8	39,118	21.9	133,237	31.6
<i>Total unintentional</i>	<i>207,666</i>	<i>85.6</i>	<i>148,594</i>	<i>83.1</i>	<i>356,261</i>	<i>84.5</i>
Intentional						
Self-inflicted	9,537	3.9	16,148	9.0	25,685	6.1
Inflicted by another person	17,165	7.1	5,798	3.2	22,963	5.5
<i>Total intentional</i>	<i>26,702</i>	<i>11.0</i>	<i>21,946</i>	<i>12.2</i>	<i>48,648</i>	<i>11.6</i>
Undetermined intent	3,031	1.3	2,608	1.5	5,639	1.3
Other and missing	5,079	2.1	5,438	3.0	10,517	2.5
Total	242,478	100.0	178,586	100.0	421,065	100.0

(a) Includes cases where the principal diagnosis was ICD-10-AM S00–T75 or T79.

(b) ICD-10-AM external causes codes as aggregated in Berry & Harrison 2007; excludes cases with external causes of medical misadventure, complications of care and sequelae of external causes.

(c) Includes records where sex is unknown.

(d) Other unintentional injury includes a broad range of causes, such as Exposure to inanimate mechanical forces (W20–W49), Exposure to animate mechanical forces (W50–W64), Other accidental threats to breathing (W75–W84), Exposure to electric current, radiation and extreme ambient air temperature and pressure (W85–W99), Contact with venomous animals and plants (X20–X29), Exposure to forces of nature (X30–X39), Overexertion, travel and privation (X50–X57), and Accidental exposure to other and unspecified factors (X58–X59).

Source: AIHW National Hospital Morbidity Database.



Injury among Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander Australians experience a disproportionate burden of injury compared with other Australians (AIHW 2011d). Injury-related deaths are almost three times as high for Indigenous people than other Australians and injury-related hospitalisations are twice as common.

Data for those jurisdictions where the quality of Indigenous identification in hospital data is considered adequate for reporting show that the rate of hospitalised injury for Indigenous people was almost twice as high as the rate for other Australians in 2009–10 (3,687 compared with 1,911 per 100,000 population) (Table 6.5).

Accidental falls (21%) and transport-related injuries (10%) were the most prominent external causes of hospitalised unintentional injury. While hospitalised injuries due to *Exposure to heat, fire, smoke and hot substances* in Indigenous people represented a relatively small proportion of total Indigenous injury hospitalisations, the rate of Indigenous hospitalisation for this injury was 2.6 times that of other Australians.

The most common cause of intentional hospitalised injury in Indigenous Australians was injury inflicted by another person, which occurred at a rate of 1,020 per 100,000 population. This rate was almost 12 times that of other Australians (86 per 100,000 population).

The distribution of hospitalised injury by age differs for Indigenous and other Australians (Figure 6.10). In all age groups, except those aged 65 and over, rates of injury were higher among Indigenous Australians. Unlike other Australians, rates of injury among Indigenous Australians were highest for those aged 30–34. The difference in rates of injury between the two population groups was greatest at ages from about 20–44.

Table 6.5: Hospitalised injury cases^(a), by Indigenous status^(b) and external cause groups, selected jurisdictions^(c), 2009–10

External cause of injury ^(d)	Indigenous			Other Australians			Rate ratio ^(f)
	Number	Per cent	Number per 100,000 ^(e)	Number	Per cent	Number per 100,000 ^(e)	
Unintentional							
Transportation	1,845	10.0	333.0	10,973	2.8	246.8	1.3
Drowning & submersion	20	0.1	2.3	509	0.1	2.5	0.9
Poisoning, pharmaceuticals	345	1.9	65.7	5,804	1.5	27.8	2.4
Poisoning, other substances	113	0.6	18.2	2,620	0.7	12.6	1.4
Falls	3,772	20.5	855.9	51,205	13.1	702.6	1.2
Exposure to heat, fire, smoke and hot substances	413	2.2	67.8	5,405	1.4	26.4	2.6
Other unintentional ^(g)	4,992	27.1	901.3	28,245	7.2	617.0	1.5
Intentional							
Self-inflicted	1,460	7.9	281.6	24,225	6.2	117.3	2.4
Inflicted by another person	5,097	27.7	1,019.7	17,866	4.6	86.4	11.8
Undetermined intent	368	2.0	68.2	5,271	1.3	25.4	2.7
Total	18,425	100.0	3,686.6	392,123	100.0	1,911.3	1.9

(a) Includes cases where the principal diagnosis was ICD-10-AM S00–T75 or T79.

(b) No adjustment has been made for under-identification of Indigenous people in hospital records. Other Australians includes hospital records for non-Indigenous people and those for whom Indigenous status was not stated.

(c) Includes New South Wales, Victoria, Queensland, Western Australia, South Australia and Northern Territory (public hospitals) (See 'Section 7.9 Admitted patient care').

(d) ICD-10-AM external causes codes aggregated as in Berry & Harrison 2007; excludes cases of medical misadventure, complications of care and sequelae of external causes.

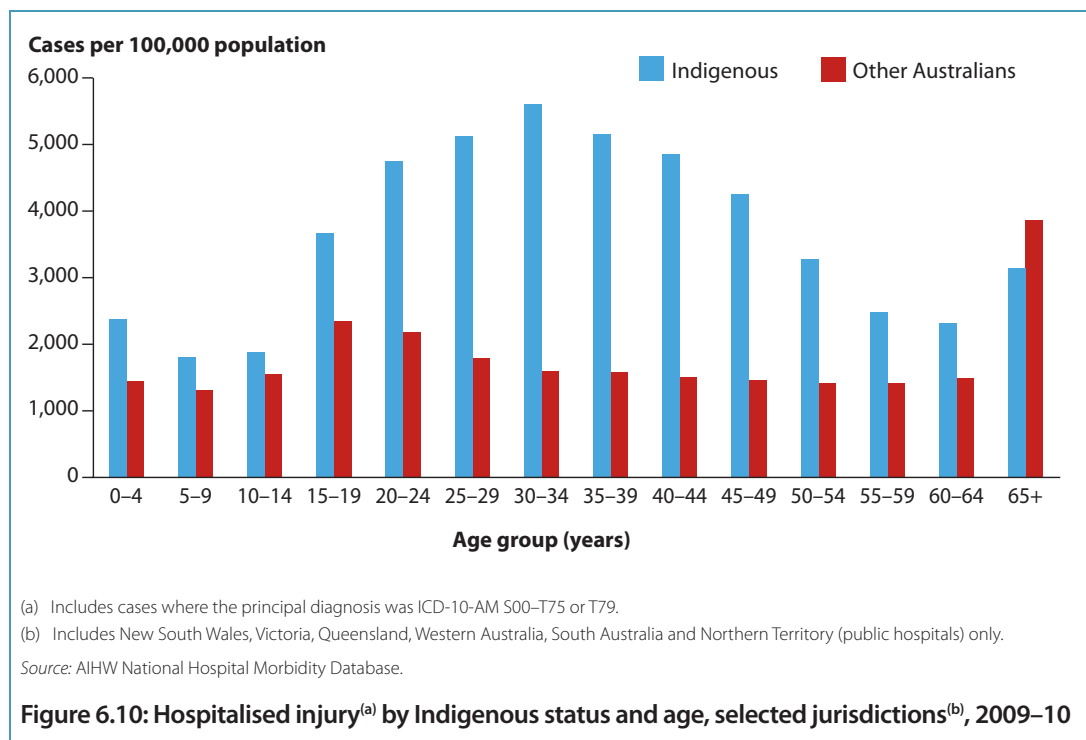
(e) Data are directly age-standardised to the Australian population as at 30 June 2001.

(f) Indigenous rate divided by Other Australians rate.

(g) Other unintentional causes includes a broad range of causes, such as Exposure to inanimate mechanical forces (W20–W49), Exposure to animate mechanical forces (W50–W64), Other accidental threats to breathing (W75–W84), Exposure to electric current, radiation and extreme ambient air temperature and pressure (W85–W99), Contact with venomous animals and plants (X20–X29), Exposure to forces of nature (X30–X39), Overexertion, travel and privation (X50–X57), and Accidental exposure to other and unspecified factors (X58–X59).

Source: AIHW National Hospital Morbidity Database.





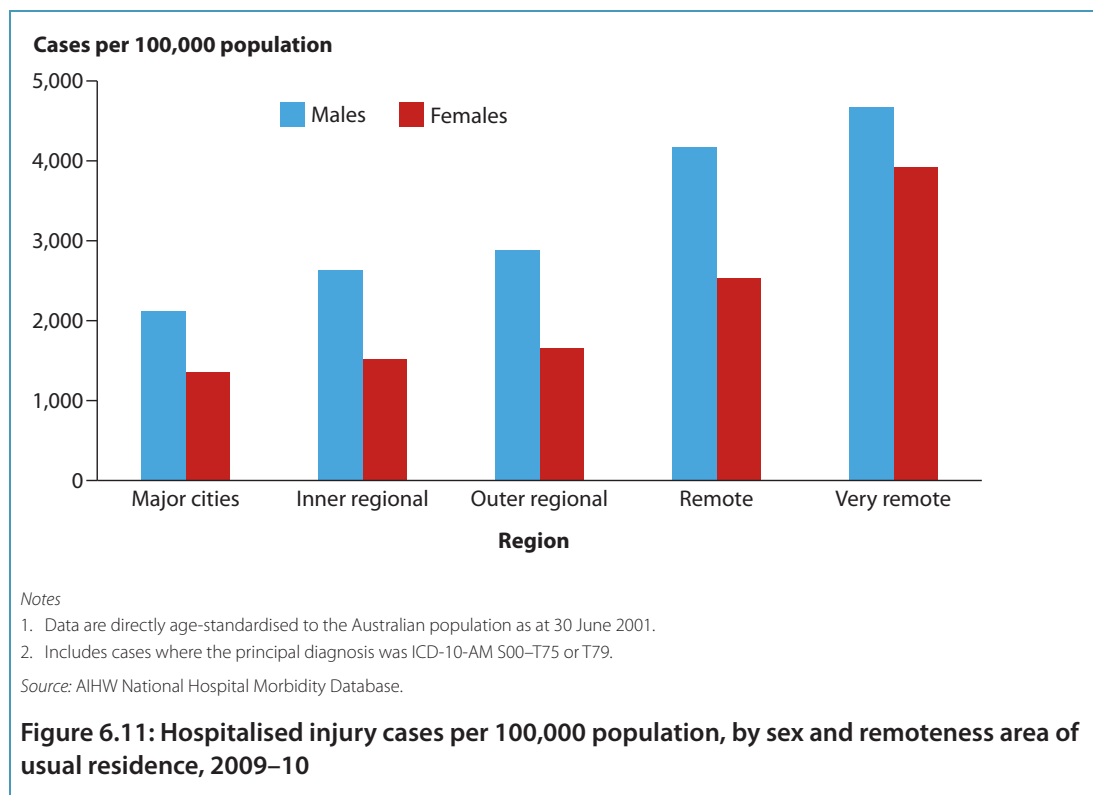
Injury and remoteness

In 2009–10, the age-standardised rate of hospitalised injury cases increased with remoteness of the person's place of usual residence; the lowest rate was for residents of *Major cities* (1,728 per 100,000 population) and the highest for residents of *Very remote* areas (4,299 per 100,000 population) (Figure 6.11). This pattern was observed for males and females and is partly attributed to the higher rates of injury among Indigenous people who comprise a higher proportion of the population in more remote areas.

In 2000–02, for most external causes, and for injury overall, hospitalisation rates for Aboriginal and Torres Strait Islander people and for other Australians increased with remoteness of usual place of residence (Helps & Harrison 2006).

Injury and socioeconomic status

Injury, like most causes of ill health, tends to occur at higher rates among people living in areas classified as the most socioeconomically disadvantaged. In Australia in 2003, the health burden due to injury was higher for people living in the most disadvantaged areas compared with those living in the least disadvantaged (Begg et al. 2007). For example, burden due to unintentional injury was 58% higher for those in the most disadvantaged group than in the least disadvantaged group, and burden due to intentional injury was 75% higher.



Injury and age

The main causes of injury vary with age. For example, the causes of injury for children and younger people are often linked to developmental stages and differ from those for older people. Injury severity also varies by age, reflecting in part, the different causes. Some types of hospitalised injury occur at all ages (for example, falls) while others are specific to certain age groups (for example, smoke, fire and flames, heat and hot substance injuries) (Table 6.6).

Falls were the most common cause of hospitalised injury for people aged 0–14, accounting for 44% of all hospitalised injury cases in 2009–10 (Table 6.6). While drowning and submersion cases were not in the top five causes of hospitalised injury, 82% of these cases were classified as high threat to life.

For people aged 15–24 and 25–64, other unintentional injuries, falls and transportation-related injuries were common causes of hospitalised injury (ABS 2011a). Fall-related injuries (72%) accounted for the majority of all hospitalised injury cases among people aged 65 and over.



Table 6.6: Top 5^(a) external causes of all hospitalised injury^(b), by age group (years), 2009–10

Rank	0–14	15–24	25–64	65 and over
1	Falls	Other unintentional ^(b)	Other unintentional ^(b)	Falls
2	Other unintentional ^(b)	Transportation	Falls	Other unintentional ^(b)
3	Transportation	Falls	Transportation	Transportation
4	Smoke, fire and flames, heat and hot substances	Intentional, inflicted by another	Intentional, self-inflicted	Poisoning, pharmaceuticals
5	Poisoning, pharmaceuticals	Intentional, self-inflicted	Intentional, inflicted by another	Intentional, self-inflicted

(a) By proportion.

(b) Other unintentional injury includes a broad range of causes, such as Exposure to inanimate mechanical forces (W20–W49), Exposure to animate mechanical forces (W50–W64), Other accidental threats to breathing (W75–W84), Exposure to electric current, radiation and extreme ambient air temperature and pressure (W85–W99), Contact with venomous animals and plants (X20–X29), Exposure to forces of nature (X30–X39), Overexertion, travel and privation (X50–X57), and Accidental exposure to other and unspecified factors (X58–X59).

Source: AIHW National Hospital Morbidity Database.

What is missing from the picture?

Data on injury hospitalisations provide important information on the severity and burden of many injuries in the community; however, information on less serious injuries that do not require hospitalisation (or result in death) is not routinely available in Australia. People with these less serious injuries often interact with the health system, for example, by visiting a hospital emergency department or GP. In addition, their injury may result in time off work and lost productivity. According to the 2004–05 National Health Survey, 18% of the population (3.6 million people) sustained an injury in the 4 weeks before being surveyed and, of those, 16% visited a doctor or other health professional (ABS 2006a). About 22% of people who experienced a recent injury decreased their usual activities as a result. Data on less serious injuries are not available in more recent National Health Surveys and alternative sources of data on this topic are needed.

The most recent mortality data for Australia are available in tabulated format (ABS 2011a). However, to conduct useful analyses of injury mortality, data are required at the unit-record level, that is, where information about each individual death is available for analysis. Due to changes in the process for releasing unit-record mortality data to researchers (including the AIHW), the latest unit-record-level data available at the time of drafting were for deaths reported in 2007. As a result, the timeliness of some mortality analyses has diminished substantially in Australia.

Another change affecting analysis of injury mortality in Australia is that, since 2007, the cause of death codes for cases referred to a coroner (which includes most external causes deaths) are subject to revision by the ABS to take account of coroner findings that are not initially available. This improves the reliability of codes but means that finalised cause(s) of death for a year are not available for more than 3 years after the deaths are registered. See 'Section 3.8 Mortality' for more information.

While most people who are injured recover well, some do not. Traumatic brain injury, spinal cord injury and some other injuries can result in lifelong reduction of functioning and well-being. The need to measure and monitor the lasting burden of injury is becoming well recognised, but information systems to allow this to be done are limited.

Where do I go for more information?

For more information on hospitalised injury, see the AIHW publications *Hospitalisations due to falls in older people, Australia, 2008–09* (Bradley & Harrison 2012) and *Hospital separations due to injury and poisoning, Australia, 2008–09* (McKenna & Harrison forthcoming).

For more information on injury across the lifespan, see *Trends in childhood injury in Australia 1999–2007* (Pointer & Helps forthcoming).

For more information on injury among Indigenous Australians, see *Hospitalised injury of Australia's Aboriginal and Torres Strait Islander people, Australia, 2007–08* (Pointer forthcoming) and *Injury experience of Aboriginal and Torres Strait Islander people: analysis of the 2004–05 National Aboriginal and Torres Strait Islander Health Survey* (Elnour et al. forthcoming).

The publication *Causes of death, Australia 2009* (ABS 2011a) has additional information on injury mortality.



6.6 Diabetes

At a glance

- In 2007–08, based on self-reports, an estimated 898,800 people had been diagnosed with diabetes at some time in their lives.
- Between 1989–90 and 2007–08, the age-standardised prevalence of diabetes more than doubled, increasing from 1.5% to 4.1% of the Australian population.
- After accounting for age differences between the two populations, Aboriginal and Torres Strait Islander people were more than three times as likely as non-Indigenous Australians to report having diabetes.



Introduction

Diabetes mellitus (diabetes) is a chronic condition marked by high levels of glucose in the blood. This condition is caused either by the inability to produce insulin (a hormone produced by the pancreas to control blood glucose levels), or by the body not being able to use insulin effectively, or both (WHO 1999).

After a diagnosis of diabetes, the demands on an individual's lifestyle in terms of monitoring the disease, controlling blood glucose and taking insulin safely (if needed), can be considerable (Craig et al. 2011). If left undiagnosed or poorly controlled, diabetes can lead to a range of complications, including coronary heart disease, peripheral vascular disease, stroke, diabetic neuropathy (nerve disease), kidney failure, limb amputations and blindness (IDF 2006). The combined effect of diabetes and these complications places a large burden on individuals, their families and community. However, while there is currently no cure, people with diabetes can live an enjoyable life by learning about the disease and managing it effectively (Diabetes Australia 2011).

There are several types of diabetes with different causes and clinical histories. The three main types are Type 1, Type 2 and gestational diabetes (Box 6.5).

Type 2 diabetes is on the rise in Australia and internationally. In Australia, this increase is thought to be intertwined with a marked increase in the prevalence of obesity (Colagiuri et al. 2006).



Box 6.5: Main types of diabetes

Type 1 diabetes is an auto-immune condition that usually first occurs in children or young adults, although it can start at any age. It is marked by the inability to produce any insulin, and those affected need insulin replacement for survival. Type 1 diabetes is believed to be caused by particular biological interactions and exposure to environmental agents among genetically predisposed people (Atkinson & Eisenbarth 2001). It accounts for about 10% of all diabetes cases.

Type 2 diabetes is the most common form of diabetes, accounting for about 85% to 90% of all cases. It occurs mostly in people aged 50 and over, and is uncommon in childhood, although there is evidence that it may be increasing among younger adults. People with Type 2 diabetes produce insulin but may not produce enough of it or cannot use it effectively. It is influenced by both non-modifiable risk factors, such as age, family history and ethnic background, and modifiable risk factors, such as obesity, physical inactivity and unhealthy diet (Shaw & Chisholm 2003).

Gestational diabetes is a form of diabetes that develops in some women during pregnancy. It involves higher blood sugar levels appearing for the first time during pregnancy in women not previously diagnosed with other forms of diabetes. Gestational diabetes is short-term and, although it usually disappears after the baby is born, it can recur in later pregnancies. Gestational diabetes is also a marker of increased risk of developing Type 2 diabetes later in life. The risk factors are similar to those for Type 2 diabetes, with women being at higher risk of the condition if they are obese or aged over 30 when pregnant (Virjee et al. 2001).

Why is diabetes important?

There is significant potential for health improvements through the prevention of Type 2 diabetes and treatment programs for all types of diabetes.

Diabetes can result in a range of short- and long-term complications, and these are the major causes of deaths and hospitalisations among people with the disease. In 2003, diabetes accounted for 8.3% of the total burden of disease in Australia when the increased risk of coronary heart disease and stroke that diabetes carries with it is included (Begg et al. 2007). Diabetes contributed to 1 out of every 10 deaths in 2009 (ABS 2011a) and one out of every 25 hospitalisations in 2009–10 in Australia.



What do we know about diabetes?

Incidence

The National Diabetes Register (NDR) monitors the number of new cases (incidence) of insulin-treated diabetes in Australia. As a result, almost all people with Type 1 diabetes are recorded in the register as they all require insulin for survival. The NDR also provides information on people with insulin-treated Type 2, gestational or other types of diabetes.

Of the 222,544 people who began using insulin to treat their diabetes between 2000 and 2009, 77% had Type 2 diabetes, 12% had gestational diabetes and 10% had Type 1 diabetes. A small proportion (7%) were under 25 years old, 18% were aged 25–39 and the remaining 75% were aged 40 or older.

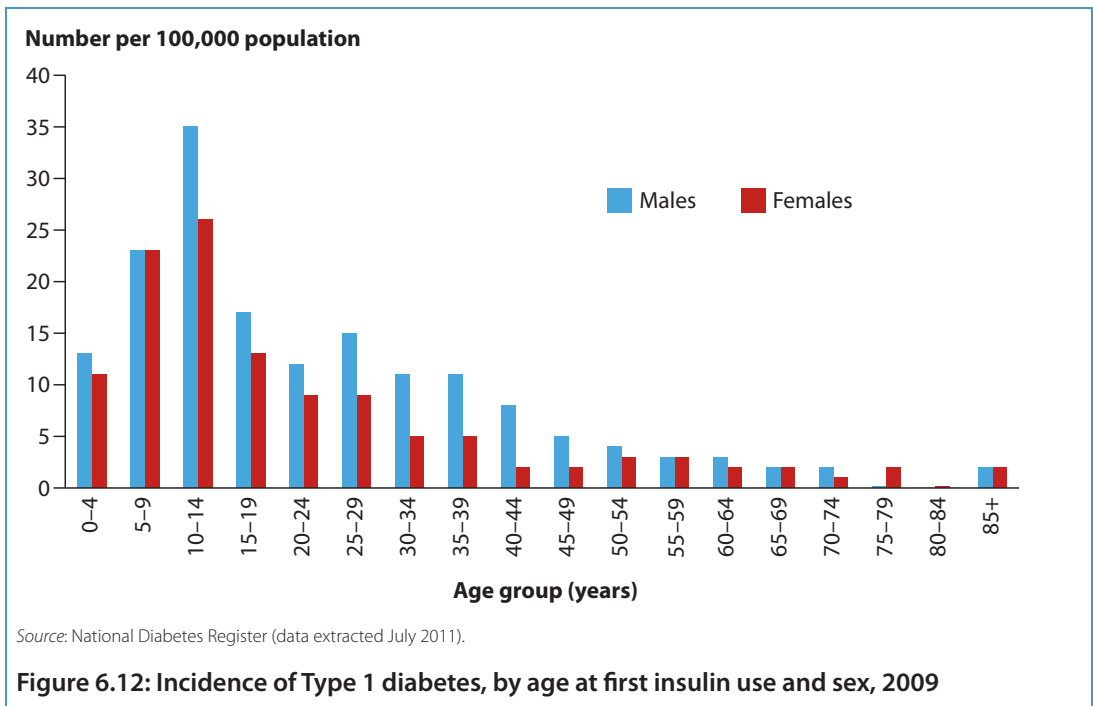
Type 1 diabetes

The onset of Type 1 diabetes can occur at any age, however, it most commonly occurs in childhood. Most cases are thought to result from an interplay of genetic or environmental factors but the environmental triggers (viral, dietary or chemical) remain largely unknown (Craig et al. 2011).

In 2009, 913 new cases of Type 1 diabetes were recorded for children aged under 15. This equates to an incidence rate of 22 cases per 100,000 children aged under 15 (about 1 in 4,500) and represents a 16% increase in the rate of new cases when compared with the rate in 2000 (19 per 100,000).

For people aged 15 and over, there were 1,142 new cases of Type 1 diabetes in 2009. This equates to an incidence rate of 7 cases per 100,000 people aged 15 and over. Compared with the incidence rate in 2000 (10 per 100,000), the incidence rate in 2009 (7 per 100,000) had decreased for people aged 15 and over.

In 2009, the highest incidence rates were for children aged 5–9 and 10–14, and the rate was higher for males than females in most age groups (Figure 6.12).



Type 2 diabetes

In 2009, 23,588 people with Type 2 diabetes began using insulin to treat their disease, which represents a rate of 117 per 100,000 population. There are no data for the incidence of non-insulin treated Type 2 diabetes.

Insulin-treated diabetes

Between 2000 and 2009, there were 23,064 new cases of Type 1 diabetes and 172,246 people with Type 2 diabetes who had started using insulin. Overall, the incidence rate for Type 1 diabetes remained relatively stable over this period (about 16 per 100,000 population), however, this varied with age. The rate increased for those aged under 15 and decreased for those aged 15 and over.

For people with insulin-treated Type 2 diabetes, the rate increased from 74 per 100,000 population in 2000 to 117 per 100,000 in 2009. It is likely that this rise reflects both an increased use of insulin to treat diabetes and a rise in the number of cases.

Prevalence

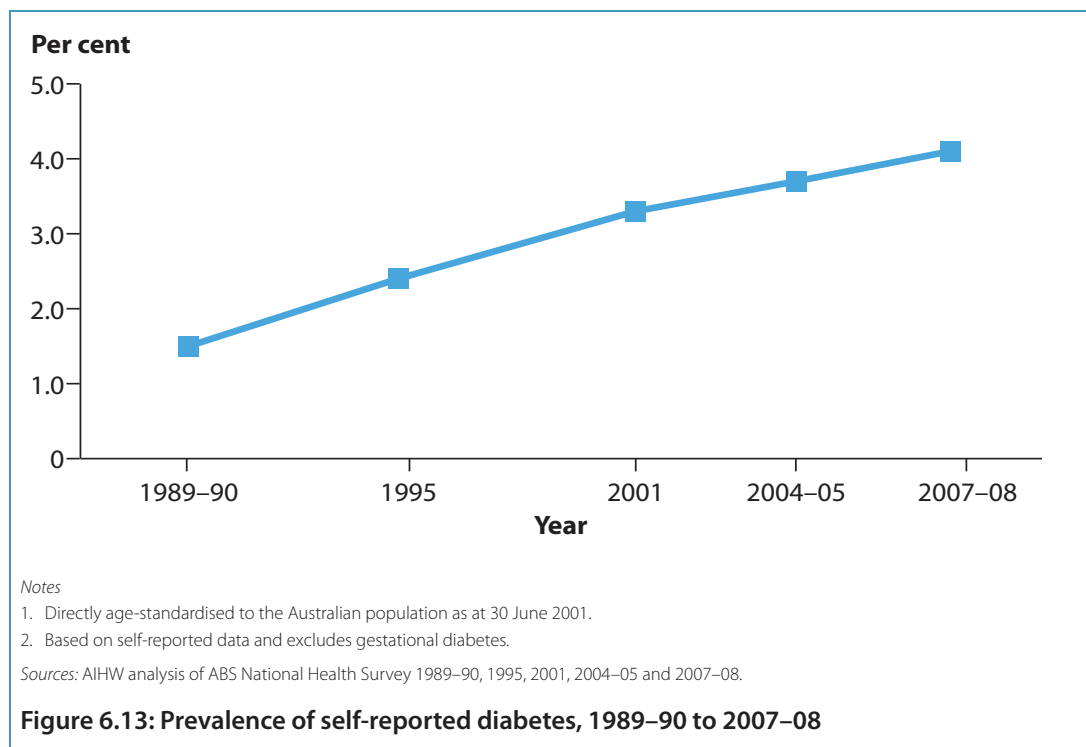
The diabetes prevalence estimates presented in this section differ from those in previous AIHW reports and in ABS publications. Previous estimates did not include people who had been told they had diabetes but had stated that it was not current. See the AIHW report *Diabetes prevalence in Australia: detailed estimates for 2007–08* for more information (AIHW 2011f).

According to the self-reported 2007–08 ABS National Health Survey, an estimated 898,800 people had been diagnosed with diabetes (excluding gestational diabetes) at some time in their lives. Of these, 56% were male (501,300) and 44% were female (397,500). The prevalence of diabetes increased with age and about 72% of people with diabetes were aged 55 or more (AIHW 2011f).

Based on self-reports, 87,100 people had Type 1 diabetes and 787,500 had Type 2 diabetes. (AIHW 2011f). For the rest, the type of diabetes was not known.

The age-standardised prevalence of diabetes in Australia more than doubled between 1989–90 and 2007–08, from 1.5% to 4.1% (Figure 6.13).





Type 1 diabetes in children

The AIHW estimates that in 2008 there were 5,700 Australian children aged 0-14 with Type 1 diabetes. This equates to 138 cases per 100,000 children in this age group. The prevalence increased with age, from 29 cases per 100,000 in 0-4 year olds to 256 cases per 100,000 in 10-14 year olds (AIHW 2011g).

Diabetes in pregnancy

Between 2005-06 and 2007-08, about 40,800 women (5%) who gave birth in hospital had been diagnosed with gestational diabetes. The proportion increased with age from 4.1% for women aged under 35 to 7.3% for women aged 35-39 and 10.3% for women aged 40 or over.

Pre-existing diabetes affected 0.5% of pregnancies (AIHW 2010g). Mothers with pre-existing or gestational diabetes were more likely to have a pre-term birth, pre-term induced labour, caesarean section, high blood pressure, and a longer stay in hospital than mothers without diabetes in pregnancy (AIHW 2010g). In addition, babies of mothers with pre-existing or gestational diabetes had higher rates of still birth, high-level resuscitation and admission to special care nurseries/neonatal intensive care units; worse Apgar scores (used to indicate a baby's condition at 1 minute and 5 minutes after birth); and longer stays in hospital (AIHW 2010g).

Poor mental health

The association between diabetes and poor mental health has been increasingly recognised. In 2007–08, those who had hospitalisations for diabetes were more likely to also have a mental health condition recorded than those who had hospitalisations for conditions other than diabetes (age-standardised rates of 8.4% and 7.5% respectively) (AIHW 2011h).

After adjusting for age differences, results from the 2007–08 National Health Survey indicate that adults with diabetes had a significantly higher prevalence of either medium, high or very high psychological distress (43%) than those without diabetes (32%) (AIHW 2011h).

Complications

Diabetes can cause both short- and long-term complications. Short-term complications are considered a medical emergency and may lead to coma and death in a short time. They include diabetic ketoacidosis (which can result from a severe lack of insulin in those with Type 1 diabetes) and hypoglycaemia (low blood glucose, which is a complication of treatment). About 3.2% of Australian adults with diabetes who attended specialist diabetes services in 2009 had had at least one episode of severe hypoglycaemia in the previous 12 months (Flack & Colagiuri 2009).

Long-term complications of diabetes develop over a number of years and include disease of the large blood vessels (macrovascular disease), which may lead to conditions such as coronary heart disease, stroke and peripheral vascular disease; and disease of the small blood vessels (microvascular disease) that can cause chronic kidney disease, nerve damage and loss of vision. Of those people who reported having diabetes in the 2007–08 National Health Survey, more than half (58%) reported also having cardiovascular disease and about 11% reported having visual loss (AIHW 2012c). Diabetes complications often result in hospitalisations as described in the hospitalisation section below.

Visits to general practitioners

According to the 2009–10 BEACH survey, diabetes accounted for 2.4% of all problems managed by GPs that year, making it the fourth-most frequently managed chronic condition in general practice. In 2000–01, diabetes was managed by GPs at the rate of 2.8 per 100 encounters, significantly lower than the 2009–10 rate of 3.7 per 100 encounters (AIHW: Britt et al. 2010b).

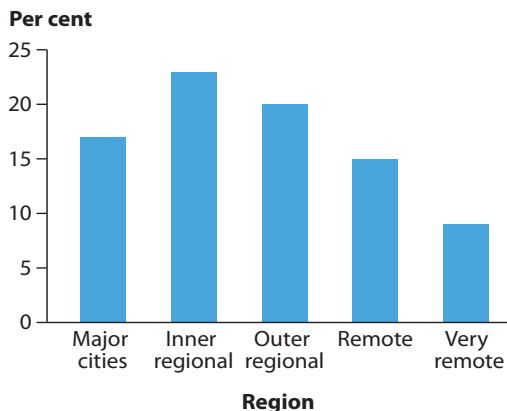
The performance indicator 'Proportion of people with diabetes who have a GP annual cycle of care' is presented here. A GP annual cycle of care is a detailed set of patient management steps that can be claimed through Medicare (AIHW 2012c). However, this may be an underestimate as not all GPs are eligible to have these services subsidised through Medicare.



Proportion of people with diabetes who have a GP annual cycle of care. The percentage of people with diabetes who received a Medicare Benefits Scheme-funded GP annual cycle of care.



- Almost 1 in 5 (19%) people with diabetes in 2010–11 had a GP annual cycle of care.
- The rate varied between 9% for those living in *Very remote* areas and 23% for *Inner regional* areas.
- It is not known if or how uptake differs between people with Type 1 and Type 2 diabetes.



Sources: Medicare Australia (numerator) and National Diabetes Services Scheme (denominator).

Hospitalisations

Diabetes was the principal diagnosis in 96,166 hospitalisations in 2009–10 and an additional diagnosis in a further 248,514, accounting in total for 4.0% of all hospitalisations in that year. In 2009–10, the rate of hospitalisations involving any diagnosis of diabetes was 15.4 per 1,000 persons. Of those hospitalisations, 57% were for people aged 65 and over. These figures are considerably lower than in previous years because the hospital coding for additional diagnoses of diabetes has been amended.

In 2009–10, the average length of hospital stay was higher for hospitalisations with a principal diagnosis of diabetes (4.3 days) or additional diagnosis of diabetes (8.0 days) than all hospitalisations (3.1).

Of hospitalisations with a principal diagnosis of diabetes, 71% were for Type 2 diabetes, 18% for Type 1 diabetes, 10% for diabetes in pregnancy, 0.5% for other types of diabetes and 0.7% were for unknown type of diabetes.

Of hospitalisations with Type 2 diabetes as a principal diagnosis, almost half (44%) were for eye complications of diabetes, mainly cataracts. Other common causes of Type 2 diabetes hospitalisations were multiple complications (17%), kidney complications (9%), circulatory complications (7%), poor diabetes control (7%) and hypoglycaemia (5%).

The most common causes of hospitalisations with Type 1 diabetes were ketoacidosis (26%), diabetes without complication (16%), eye complications (15%), poor diabetes control (14%) and hypoglycaemia (11%).



Lower limb amputations

Nerve damage and poor circulation in the lower limbs are serious complications of diabetes. They can lead to foot ulcers and infection, which, if severe, may require amputation of all or part of the lower limb (Jeffcoate & Harding 2003). Between 2001 and 2007–08, the rate of hospitalisations for lower limb amputations among those with diabetes declined, particularly among males, where the rate fell from 7.3 to 5.6 hospitalisations per 1,000 males with diabetes (AIHW 2012c). In 2007–08, the rate of hospitalisations for lower limb amputations in males with diabetes was over twice that of females with diabetes.

Aboriginal and Torres Strait Islander people

Estimates from the self-reported 2004–05 ABS National Aboriginal and Torres Strait Islander Health Survey showed that the age-standardised prevalence of diabetes among Aboriginal and Torres Strait Islander people was more than three times that of non-Indigenous Australians (AIHW 2012c). In 2004–08, Indigenous Australians died from diabetes at seven times the rate of non-Indigenous Australians (AIHW 2011d).

In 2005–07, pre-existing diabetes affecting pregnancy was three times as common among Indigenous mothers as among non-Indigenous mothers, and gestational diabetes was twice as common (AIHW 2010g). Adverse pregnancy outcomes, such as pre-term birth, were more common in Indigenous mothers with diabetes than in non-Indigenous mothers with diabetes.

Mortality

Diabetes was either an underlying or associated cause in 14,286 deaths in Australia in 2009 (10% of all deaths). It was listed as the underlying cause of 4,170 deaths and as an associated cause in a further 10,116 (ABS 2011a). Where diabetes was the underlying cause of death, conditions commonly listed as associated causes included coronary heart disease (50% of cases), kidney-related diseases (31%), heart failure (20%) and stroke (22%).

Diabetes-related deaths include deaths with an underlying cause, or associated cause, of diabetes and also deaths with an underlying cause relating to diabetes, such as cardiovascular disease. Between 1997 and 2007, age-standardised death rates from diabetes-related causes fell by 18%, from 39 to 32 deaths per 100,000 population. Male rates were 36% higher than female rates in 2007 (AIHW 2012c).

International comparisons

The OECD estimates diabetes prevalence in Australia in 2010 to be 5.7%—lower than the OECD average of 6.3%. In contrast, the OECD estimates the incidence of diabetes in Australia to be higher than the OECD average, at 22.4 per 100,000 population compared with 17.7 (OECD 2009).

What is missing from the picture?

The National Diabetes Services Scheme (NDSS) database is another source for prevalence estimates of all types of diagnosed diabetes in Australia. The NDSS provides information about individuals who register. It is updated regularly and provides both demographic and diagnostic information. However, there are some limitations in data items, such as diabetes type and insulin-use status, and also in how the data were recorded on the database historically.



There are no current estimates of the numbers of Australians living with undiagnosed diabetes. This is largely because symptoms are often absent in the early stages of diabetes. A national survey that includes a blood test to detect diabetes has not been undertaken since the AusDiab study in 1999–2000. The 2011–2013 Australian Health Survey will measure levels of fasting plasma glucose and glycated haemoglobin. This may help to fill the information gap regarding undiagnosed diabetes in the population.

Where do I go for more information?

For more information about diabetes in the Australian population, see the following publications available at <www.aihw.gov.au>:

- *Diabetes: Australian facts 2008* (AIHW 2008a)
- *Diabetes in pregnancy: its impact on Australian women and their babies* (AIHW 2010g)
- *Diabetes prevalence in Australia: detailed estimates for 2007–08* (AIHW 2011f)
- *Prevalence of Type 1 diabetes in Australian children, 2008* (AIHW 2011g)
- *Diabetes and poor mental health and wellbeing: an exploratory analysis* (AIHW 2011h)
- *Diabetes indicators in Australia* (AIHW 2012c).

6.7 Vision and hearing disorders

At a glance

- In 2007–08, 52% of Australians had at least one long-term vision disorder, the most common being long- and short-sightedness.
- In the same period, 13% of Australians had at least one long-term hearing disorder, the most common being complete or partial deafness.
- Australia is the only developed country in the world to have endemic blinding trachoma.



Introduction

Vision and hearing are the primary senses involved in communication, mobility and learning. Impaired vision or hearing can have implications for education, employment, social participation and independent living.

Vision disorders affect the eyes and eyesight, and are commonly termed vision loss or blindness. These disorders can be present from birth, result from an acute illness or injury, or develop over time because of chronic illness or ageing (WHO 2011).

Hearing disorders affect the ears and hearing, and can also impede balance and body positioning. These disorders can range from disrupted hearing to complete deafness, and are commonly termed hearing impairment. They can develop because of an inherited condition, problems during pregnancy and delivery, infectious diseases, neurological disorders, injury or excessive noise, or develop over time with age (WHO 2010).

What do we know about vision disorders?

Vision disorders are common. In 2007–08, the ABS National Health Survey showed that 11 million Australians (52%) had at least one long-term vision disorder. The most common disorder was long-sightedness, affecting 26% of the population, followed by short-sightedness (23%). Cataract, glaucoma, and macular degeneration combined affected 3% of the population. Other major causes of vision loss in Australia are retinal disease associated with diabetes, and eye injury (Australian Government 2005).

Ageing is the major contributing factor to vision disorders. In 2007–08, the proportion of people affected increased with age, from 10% of children aged 0–14 to 94% of people aged 65 and over (Figure 6.14). While National Health Surveys do not show an overall increase in vision disorders in recent years, it is expected that the proportion of the population affected will increase as the population ages (AIHW 2005a).



In 2007–08, there were differences in rates of vision disorders by population group. When age differences were accounted for, vision disorders were more common in:

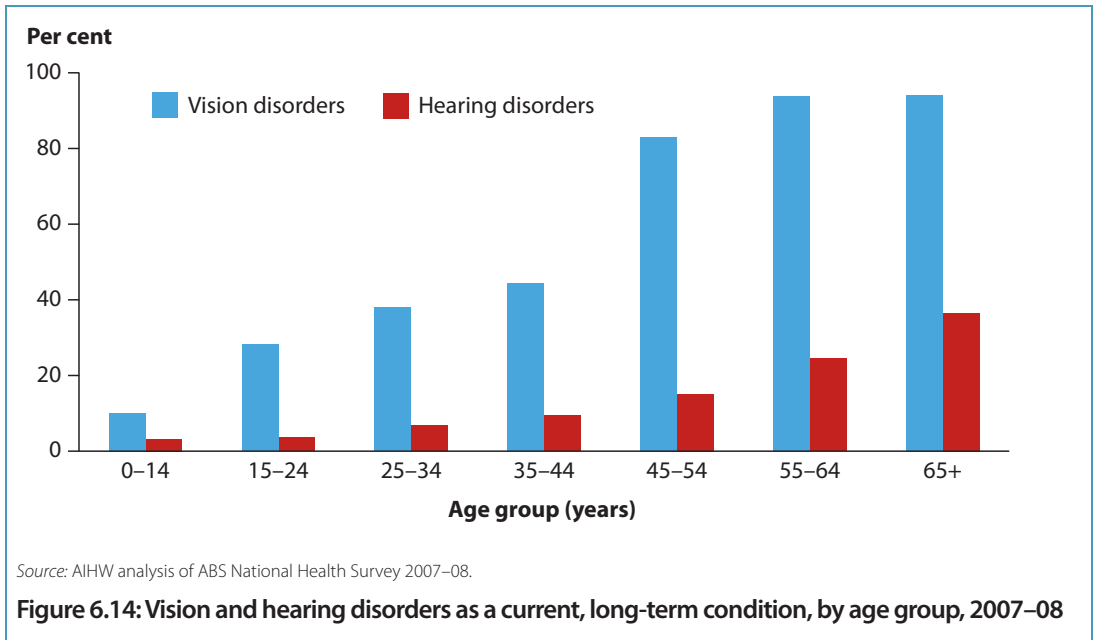
- females (55%) than males (49%)
- people living in the least socioeconomically disadvantaged areas (54%) than those living in the most disadvantaged areas (50%).

While infectious diseases and nutritional deficiencies are leading causes of low vision and blindness globally, only trachoma is significant in Australia. Trachoma is a bacterial infection of the eye found almost exclusively in remote areas, and is a significant health concern for Aboriginal and Torres Strait Islander people (Australian Government 2005). Despite being both preventable (with good facial hygiene) and treatable (with antibiotics), in 2010, active trachoma was found in 11% of Indigenous children aged 1–14 living in 150 communities screened for trachoma (Kirby Institute 2011a). Untreated and recurrent trachoma infections can cause scarring of the eye and lead to irreversible blindness. Australia is one of 55 countries globally, and the only developed country, to have endemic blinding trachoma (Polack et al. 2005).

Living with a vision disorder can disadvantage people in many aspects of their lives, from delayed childhood learning to reduced participation in education, employment and socialisation in adulthood (WHO 2010).

Fewer than 1% of Australians with a disability reported disorders of the eye as their main disabling condition in 2009, and vision disorders caused by both chronic and infectious conditions contributed nearly 2% of the burden of disease and injury among Australians in 2003 (Begg et al. 2007; ABS 2010).

In 2009–10, more than 263,000 (3%) hospitalisations had eye-related conditions as the main reason for hospitalisation. Cataract accounted for 66% of these—more than 203,500 hospitalisations involved a cataract procedure.



What do we know about hearing disorders?

Hearing disorders are relatively common. In 2007–08, the ABS National Health Survey showed 3 million (13%) Australians had at least one long-term hearing disorder. The most common disorder was complete or partial deafness, affecting 10% of the population, followed by tinnitus (ringing in the ears), affecting 2%.

Hearing disorders increased with age, from 3% of children aged 0–14 up to 37% of people aged 65 and over (Figure 6.14, opposite). Previous National Health Surveys do not show an overall increase in hearing disorders in recent years, however, the proportion of the population affected is expected to increase with the ageing of the Australian population (Access Economics 2006).

In 2007–08, the rates of hearing disorders differed by population group. When age differences were accounted for, hearing disorders were more common among:

- males (17%) than females (9%)
- people living outside *Major cities* (15%) than those living in *Major cities* (12%)
- people born in Australia (14%) than those born overseas (10%).

In 2004–05, 12% of Aboriginal and Torres Strait Islander people had hearing loss or diseases of the ear (ABS 2006b). This was the fifth most commonly reported long-term health condition among Indigenous Australians in 2004–05. Indigenous children aged 0–14 had more than three times the rate of disease of the ear and mastoid process than non-Indigenous children (AIHW 2011d).

In response to high rates of ear and hearing problems among Indigenous children, the Australian Government funded audiology and ear, nose and throat (ENT) services in prescribed areas of the Northern Territory. Between August 2007 and May 2011, 7,421 audiology and 3,838 ENT services were provided to 4,993 and 2,670 children respectively (AIHW 2011i). During these services, children were tested for ear health problems and the status of their hearing.

About 66% of children were diagnosed with at least one type of middle ear condition during an ENT assessment or audiology check. The most common middle ear conditions diagnosed were otitis media with effusion (27% of children), followed by dry perforation (16%) and chronic suppurative otitis media (12%). Overall, 9% of children were diagnosed with Eustachian tube dysfunction and 7% were diagnosed with acute otitis media (AIHW 2011i).

Each year in Australia, about 480 children are born with moderate to profound permanent childhood hearing impairment in one or both ears (Alliance for Deaf Children 2009). Early detection and access to an appropriate intervention has the potential to improve communication and language skills in these children, and minimise the longer-term impact of hearing impairment on education, employment and social participation (Moeller 2000; Yoshinaga-Itano 2003).

Just over 1% of Australians with a disability reported hearing disorders as their main disabling condition in 2009, and otitis media (inflammation of the middle ear) and adult-onset hearing loss contributed nearly 3% of the overall burden of disease and injury in Australia in 2003 (Begg et al. 2007; ABS 2010).

In 2009–10, nearly 56,000 (1%) hospitalisations had ear-related conditions as the main reason for hospitalisation. Otitis media accounted for 51% of these, occurring mostly in children under 10. In 2009–10, there were 155 hospitalisations with a procedure to attach a hearing aid or prosthetic ear.



What is missing from the picture?

Australia is a signatory to the global initiative Vision 2020—the right to sight, which aims to eliminate preventable and avoidable blindness by the year 2020 (Australian Government 2005). The Australian Government's 2008 progress report on the National Framework for Action to Promote Eye Health and prevent avoidable blindness details the eye health and vision care initiatives undertaken by governments across the country in 2005–2008 in support of this initiative (Eye Health Working Group of the Australian Population Health Development Principal Committee of the Australian Health Ministers Advisory Council 2008). An evaluation report is expected to be released in early 2012. However, due to limitations in the availability and completeness of eye health data, it is not currently possible to measure Australia's progress towards eliminating preventable and avoidable blindness.

Australian data on hearing disorders are similarly limited. In recognition of the importance of early diagnosis and appropriate intervention for childhood hearing loss, all states and territories have, or are implementing, infant hearing screening, with varying levels of coverage.

Where do I go for more information?

The AIHW has produced a number of publications on vision disorders and eye health in Australia. For more information, see *Eye health in Australia: a hospital perspective* (AIHW 2008b), *Eye health among Australian children* (AIHW 2008c), and *Eye-related injuries in Australia* (AIHW 2009a). For more information on childhood hearing impairment, see *A picture of Australia's children 2009* (AIHW 2009b).

6.8 Arthritis and other musculoskeletal conditions

At a glance

- Arthritis and other musculoskeletal conditions affect about 6.3 million Australians.
- These conditions are among the leading causes of employment restrictions (among people aged 15–64): 66% of people with arthritis, 74% with osteoporosis and 80% with back problems report employment restrictions.
- Total hip and knee replacements are common procedures for those who receive hospital care for arthritis. Rates of total hip replacement procedures increased from 85.2 to 145.3 procedures per 100,000 population over the 10 years to 2009–10.



Introduction

Arthritis involves inflammation of the joints, causing pain, stiffness and disability. Other musculoskeletal conditions, such as osteoporosis, back problems and gout, affect the muscles, bones and joints. There are more than 150 forms of arthritis and musculoskeletal conditions. The more common forms examined in this section are described in Box 6.6.

These conditions are large contributors to illness, pain and disability in Australia. In addition to being highly prevalent, these conditions place a substantial burden on the community through the use of hospital and primary health care services, disruptions to daily life, and lost productivity through disability (AIHW 2005b). In view of this large burden, health ministers declared arthritis and osteoporosis a National Health Priority Area in 2002.

What do we know about arthritis and other musculoskeletal conditions?

Prevalence

According to the 2007–08 National Health Survey, 6.3 million Australians (31% of the total population) had arthritis and/or other musculoskeletal conditions. Of the total population, more than 3.1 million (15%) were diagnosed with some form of arthritis, including osteoarthritis (8%) and rheumatoid arthritis (2%). Back problems affected 2.8 million people (14%).

Almost 700,000 Australians (3%) are believed to have been diagnosed with osteoporosis (ABS 2009). However, data about diagnosed cases underestimate the actual prevalence of this condition; because osteoporosis has no symptoms, it is often not diagnosed until a fracture occurs. Most cases of osteoporosis occur after the age of 55, and 82% of those reporting a diagnosis of the condition are female (AIHW 2011j).



Box 6.6: Common musculoskeletal conditions

Osteoarthritis A degenerative joint condition that mostly affects the hands, spine and joints, such as the hips, knees and ankles. Its main feature is the breakdown of the cartilage that overlies the ends of the bones in the joints. Age is the strongest factor in the development and progression of osteoarthritis. Modifiable risk factors are: being overweight, physical inactivity, joint trauma and repetitive joint loading tasks (for example, kneeling, squatting and heavy lifting).

Rheumatoid arthritis An auto-immune disease—one where the body's immune system mistakenly attacks its own tissues. The immune system attacks the tissues lining the joints (called the synovial membranes), causing pain, swelling and stiffness. Over time there is progressive and irreversible joint damage, resulting in deformities and severe disability. Rheumatoid arthritis is a systemic disease, meaning that the whole body, including the organs, is affected. This can lead to problems with the heart, respiratory system, nerves and eyes.

Juvenile arthritis A common term used to describe arthritis occurring in children under the age of 16. The condition typically has an unpredictable pattern of activity, with periods of being well followed by a resurgence of signs and symptoms (known as flare-ups). The cause of juvenile arthritis is unknown.

Osteoporosis Thinning and weakening of bones often occurs with age, increasing the risk of fracture. Osteoporosis occurs in both sexes but is more common in women. The risk factors associated with the development of osteoporosis include increasing age and female sex, family history of the condition, low vitamin D levels, low intake of calcium, low body weight, smoking, excess alcohol consumption, physical inactivity, long-term corticosteroid use and reduced oestrogen levels.

Back problems Back problems are a group of conditions whose causes include the displacement of an intervertebral disc and/or muscle damage. Most back problems and complaints are short term but in some cases they can become chronic. The occurrence of back problems has been associated with several factors, the main cause being the structure of the skeletal muscle of the back and synovial joints (most moveable type of joints) of the spine (Bogduk 2005). Other factors, such as age, physical fitness, smoking, being overweight and type of occupation (for example, those requiring lifting, bending, twisting, pulling and pushing), may play a role.

National Health Survey data between 2001 and 2007–08 show no change in the overall prevalence of osteoarthritis and rheumatoid arthritis. The reported prevalence rate for osteoporosis more than doubled over the same period (from 1.6% to 3.4%), a statistically significant difference. Whether this increase is due to an increase in the underlying prevalence or to improved awareness and detection of the condition is not known. In 1999, the WHO endorsed the Bone and Joint Decade 2000–2010 initiative to curb the predicted increase in the prevalence of musculoskeletal conditions in the context of population ageing. Among other factors, this worldwide initiative may have increased awareness of osteoporosis.

The prevalence of back problems appears to have declined. However, the fall in the reported prevalence is considered to be primarily due to a change in survey methodologies. In the 2001 National Health Survey, back problems (for example, back pain, a 'bad back') were classified together as a single category. In the 2004–05 and 2007–08 surveys, respondents reporting these conditions were asked to provide more information if possible. This enabled some of those cases to be classified to other condition categories.

Functioning and disability

Arthritis, osteoporosis and back problems are a substantial cause of disability, limiting physical functioning in everyday tasks, thus reducing the quality of life of those affected. According to the 2009 Survey of Disability, Ageing and Carers, 44% of all people with these long-term conditions report activity restrictions in their daily tasks. Most of these restrictions appear to be mild to moderate (67%), while 33% reported severe or profound activity restrictions in their daily life.

Employment restrictions

Arthritis and musculoskeletal conditions are among the leading causes of restrictions at work (Punnett & Wegman 2004) and productivity loss (Loeppke et al. 2007).

Some people with these conditions experience employment restrictions such as being unable to work, being restricted in the type or hours of work they can do, or needing special assistance in the workplace. The extent of disability, however, varies from condition to condition. In 2009, 80% of people aged 15–64 with back problems had an employment restriction. Among those with osteoporosis and arthritis, the proportions were 74% and 66% respectively.

Of those people who had an employment restriction, 41% reported being permanently unable to work (55% osteoporosis, 47% arthritis, and 36% back problems).

Mental health

The functional limitations and chronic pain associated with musculoskeletal conditions is associated with a variety of mental health problems. According to the 2007 National Survey of Mental Health and Wellbeing, people with musculoskeletal conditions were 1.5 times as likely to report mental disorders than those without musculoskeletal conditions (AIHW 2010h).

The strongest association was between back and neck problems, and affective disorders, such as depression. Affective disorders were 2.5 times as likely among those with back problems than those without.

Health service use

Arthritis and musculoskeletal conditions are treated in a variety of settings, including general practice, hospitals and allied health services.

Visits to general practitioners

In 2009–10, it is estimated that arthritis and musculoskeletal conditions were managed in general practice at a rate of 16.8 per 100 GP–patient encounters, making it one of the conditions most commonly managed by GPs (Table 6.7) (AIHW: Britt et al. 2010a).



Of the arthritis and musculoskeletal conditions, back problems and osteoarthritis were the two most commonly managed problems in general practice (at a rate of 3.3 and 2.9 per 100 encounters, respectively). Depending on the nature of the problem, GPs manage these in variety of ways. The most common way osteoarthritis and back problems were managed by GPs was through medicines (AIHW 2010i; AIHW: Britt et al. 2010a). Other management activities included ordering of imaging or pathology tests, coordinating referrals to specialists, and giving patients advice on self-management of the condition.

Rheumatoid arthritis is not as common as back problems or osteoarthritis in general practice (at a management rate of less than 0.5 per 100 GP–patient encounters). Similar to back problems and osteoarthritis, treatment with medicines is the mainstay of the management of this condition. Medical specialists play a particular role in the management of rheumatoid arthritis as only they are authorised to prescribe some of the key medicines needed to treat this condition.

Hospitalisations

In 2009–10, there were about 460,000 hospitalisations with a principal diagnosis of a musculoskeletal condition (Table 6.7).

Consistent with general practice activity, osteoarthritis and back problems were the most common musculoskeletal conditions receiving admitted patient care in hospitals.

Osteoporosis is not often the principal diagnosis for hospitalisation. However, people with the condition may become hospitalised as a result of minimal trauma fractures caused by underlying osteoporosis. Minimal trauma fractures are those caused by a fall from standing height or less. The hip and pelvis are the most common sites of minimal trauma fracture (AIHW 2011j). In 2009–10, the number of hospitalisations with osteoporosis and minimal trauma fractures as a principal diagnosis was about 7,000 and 87,000 respectively.

Table 6.7: Health services for musculoskeletal conditions, 2009–10

Problem managed	GP visits	Hospitalisations		
	Number per 100 encounters	Principal diagnosis	Number	Per cent
Osteoarthritis	2.9	Osteoarthritis	95,500	20.8
Rheumatoid arthritis	<0.5	Rheumatoid arthritis	10,300	2.2
Back problems	3.3	Back problems	90,800	19.8
Osteoporosis	0.9	Osteoporosis	6,900	1.5
		Minimal trauma fracture	86,600	18.8
All musculoskeletal conditions	16.8	All musculoskeletal conditions	459,700	100.0

Sources: AIHW: Britt et al. 2010a; AIHW National Hospital Morbidity Database.



The new frontier

This section outlines recent notable development in the management of specific musculoskeletal conditions.

Arthritis and joint replacement

Arthritis, in particular osteoarthritis, can severely damage joints. This is particularly the case for large joints, such as the knee and hip. In many cases, the damaged joint can be removed and replaced with an artificial one—a procedure called arthroplasty.

Joint replacement has been one of the most notable advancements in the management of osteoarthritis during the past few decades. This procedure has become safer because of improvements in surgical techniques and anaesthesia, and better blood products used during the surgery (Hart 2004; Kakar et al. 2011).

In the 10 years from 2000–01 to 2009–10, the rate for total knee replacement increased from 85.2 procedures per 100,000 population to 145.3. In the same period, the rate for total hip replacement also increased, from 71.2 procedures per 100,000 population to 94.1. In 2009–10, there were about 34,700 total hip replacements and 22,400 total knee replacements.

Early diagnosis and interventions for rheumatoid arthritis

The current clinical guidelines for the treatment of rheumatoid arthritis recommend early diagnosis and appropriate treatment to slow disease progression and alter the course of the disease (RACGP 2009a). This contrasts with a previous approach focusing on using symptom-modifying drugs, such as paracetamol and non-steroidal anti-inflammatory drugs, for many months and even years.

One factor that contributed to this change is the emerging body of evidence that joint destruction occurs early in the condition, even in the first year of the disease (van der Heijde et al. 1992).

Another contributor was the increasing availability of disease-modifying anti-rheumatic drugs (DMARDs). DMARDs are a group of anti-inflammatory and immune-suppressing agents that are used to treat autoimmune diseases, predominantly rheumatoid arthritis. Biologic DMARDs, a new class of DMARD introduced in Australia in 2003, have been shown to be more effective and better tolerated than the traditional DMARDs (Kukar et al. 2009). Since their introduction, the supply of biologic DMARDs has increased rapidly. The total subsidies paid through the PBS for these medications tripled from \$41 million in 2003 to \$124 million in 2007.

Primary prevention of osteoporosis

Management of osteoporosis in Australia before 2007 centred on the prevention of subsequent minimal trauma fractures. Until then, the PBS subsidy for bone preserving medications for management of osteoporosis was only available for those who sustained a minimal trauma fracture confirmed by X-ray or similar tests.

The MBS subsidy for bone mineral density testing—the gold standard for diagnosis of osteoporosis—was subsidised only for those who had doctor-diagnosed osteoporosis, had one or more minimal trauma fractures, or used corticosteroids for a prolonged period.



Medicare subsidy guidelines effective since 2007 allow Australians aged 70 and older, regardless of fracture status, to claim the cost of a bone mineral density test every 2 years.

Also, in 2007, the PBS subsidy was extended for supply of bone-preserving medications for management of osteoporosis. Currently, this PBS subsidy is available to Australians over the age of 70 with significant bone loss and those on long-term corticosteroid therapy with intermediate to high bone loss.

What is missing from the picture?

The National Health Survey is the main source of data on the prevalence of musculoskeletal conditions in Australia. However, this survey does not include people living in institutions (for example, hostels and residential care units). Since arthritis and musculoskeletal conditions are more prevalent among older age groups, the absence of this information may underestimate the true prevalence of these conditions. Vitamins and nutritional supplements are used to manage musculoskeletal conditions (RACGP 2009a, 2009b, 2010). The supply of these medicines is not as strictly regulated as other medicines, and there is no national database for monitoring their use.

The 2007–08 National Health Survey suggests that more people in higher socioeconomic groups with musculoskeletal conditions use these medicines than those in lower socioeconomic groups with the conditions (AIHW 2011j). More data are required to better understand the effectiveness of these substances and how they are used.

Where do I go for more information?

For more information, see the National Centre for Monitoring Arthritis and Musculoskeletal Conditions web page: <www.aihw.gov.au/arthritis-and-musculoskeletal-conditions>.



6.9 Dementia

At a glance

- An estimated 222,100 Australians (1.0%) had dementia in 2011; this is projected to increase to more than 464,000 (1.6%) by 2031.
- In 2009, about 1 in 5 people with dementia who lived in the community received assistance from informal sources (family and friends) only, while about 3 in 4 received assistance from both informal and formal (organisations or paid help) sources. Very few relied solely on formal support.
- While current drug interventions do not halt the progression of the disease, they can slightly improve cognitive functioning or slow the decline of cognitive functioning for some people.



Introduction

Dementia is a syndrome associated with a range of diseases that are characterised by impairment of brain functions, including memory, understanding and reasoning. Many diseases can cause dementia, with the most common being Alzheimer disease (see Box 6.7 for the most common types of dementia). Symptoms of dementia vary widely from individual to individual and often relate to the underlying cause of the dementia (see Box 6.7). In the early stages of the condition, close family and friends may notice symptoms such as memory loss and difficulties with finding familiar words, but the casual observer may not notice any symptoms. In the mid-stages, difficulties may be experienced with familiar tasks, such as shopping, driving or handling money. In the latter stages, difficulties extend to basic or core activities of daily living, such as self-care activities, including eating, bathing and dressing.

What do we know about dementia?

Prevalence

Dementia is increasingly common with age but it is not an inevitable part of ageing and can affect people as young as 30. Projections based upon results from European studies estimate that about 222,100 people in Australia had dementia in 2011 (or 1.0% of the population; AIHW 2007). The prevalence of dementia is expected to rise in the coming decades, due mainly to population ageing and population growth. In 2031, 464,600 people (or 1.6% of the population) are expected to have the condition (AIHW 2007). Dementia is increasingly common with advancing age, affecting fewer than 1% of people aged under 65 and nearly 1 in 4 people aged 85 or over. More females (63% projected for 2011) than males have dementia, with sex difference greater in the older age groups (Table 6.8) (AIHW 2007). This pattern is partly explained by the longer lifespans of females and the fact that dementia is age-related.



Recent studies suggest that prevalence of dementia in Australia may be substantially higher than reported here (Alzheimer Disease International 2009; Anstey et al. 2010). The AIHW is developing a methodology that incorporates these findings to calculate more up-to-date prevalence estimates and projections of dementia in Australia (see *Dementia in Australia* forthcoming).

Box 6.7: Causes and types of dementia

There are more than 100 illnesses and conditions that can result in dementia (WHO 1992). The most common types of dementia are:

- **Alzheimer disease**, estimated to be responsible for about 50–75% of dementia cases, which involves abnormal plaques and tangles in the brain
- **Vascular dementia**, resulting from significant brain damage caused by cerebrovascular disease, such as stroke; onset may be sudden or gradual
- **Dementia with Lewy bodies**, in which abnormal proteins (Lewy bodies) form in brain cells affecting brain functioning; progress of the disease is more rapid than for dementia in Alzheimer disease
- **Frontotemporal lobe dementia** in which damage starts in the front part of the brain, with personality and behavioural symptoms commonly occurring in the early stages (Alzheimer Disease International 2009).

There are also a number of less common types of dementia, including dementia in Parkinson disease, Huntington disease, alcohol-induced dementia, drug-related dementia, and head injury dementia (Draper 2011).

Table 6.8: Projected prevalence of dementia, by age and sex, 2011

Age group	Rate (per cent)			Number		
	Men	Women	Total	Men	Women	Total
0–64	0.1	0.0	0.1	6,700	3,300	10,000
65–74	2.0	1.7	1.9	16,700	14,900	31,600
75–84	7.3	9.4	8.4	33,000	51,500	84,500
85 and over	17.6	26.1	23.1	25,700	70,300	96,000
<i>Total 65 and over</i>	<i>5.9</i>	<i>8.2</i>	<i>7.2</i>	<i>75,400</i>	<i>136,700</i>	<i>212,100</i>
Total	0.7	1.2	1.0	82,100	140,000	222,100

Source: AIHW 2007 based on methods from Lobo et al. (2000) and Harvey et al. (2003).

Younger onset dementia

Younger onset dementia is where the onset of symptoms occurs before the age of 65. There are no accurate estimates of its prevalence in Australia. Projections based on a United Kingdom study suggest that about 10,000 people in Australia had younger onset dementia in 2011, equating to 51 per 100,000 (AIHW 2007; see *Dementia in Australia* forthcoming, for updated and revised estimates). Studies suggest the most common types of dementia among this age group are similar to those among people aged 65 or over (such as Alzheimer disease, vascular dementia, frontotemporal lobe dementia), albeit at lower prevalence (Harvey et al. 2003; Rossor et al. 2010). Types of dementia that appear more prevalent among people aged under 65 include dementia associated with alcohol abuse, head trauma, HIV and metabolic causes (Harvey et al. 2003; McMurtray et al. 2006). Given these types of dementia are potentially more treatable and preventable, researchers argue that it is particularly important to examine the causes of these types of conditions (McMurtray et al. 2006).

Younger onset dementia presents unique problems. Misdiagnosis and delays in diagnosis are proportionally more common than for later onset dementia, as the clinical features of the condition are more varied and dementia might not be considered a primary diagnosis for people in this age group (Mendez 2006). This, in turn, leads to delays in appropriate management and assistance.

Research shows that carers of people with younger onset dementia also experience high levels of stress, depression and problems specific to their life stage; for example, carers of people with younger onset dementia often have financial and family responsibilities, including for young children (Vliet et al. 2010).

Dementia among Aboriginal and Torres Strait Islander people

There are no national studies of the prevalence of dementia among Indigenous Australians, but a few small, localised studies suggest the rate is disproportionately higher than in the general population. For example, a study in the Kimberley region of the Northern Territory found a prevalence of 12% among Indigenous Australians aged 45 and over (Smith et al. 2008). Dementia was more common in Indigenous males than females. The potentially higher rates among Indigenous people are not surprising given that the social and health profile of this population places them at greater risk of the condition (Seeher et al. 2011).

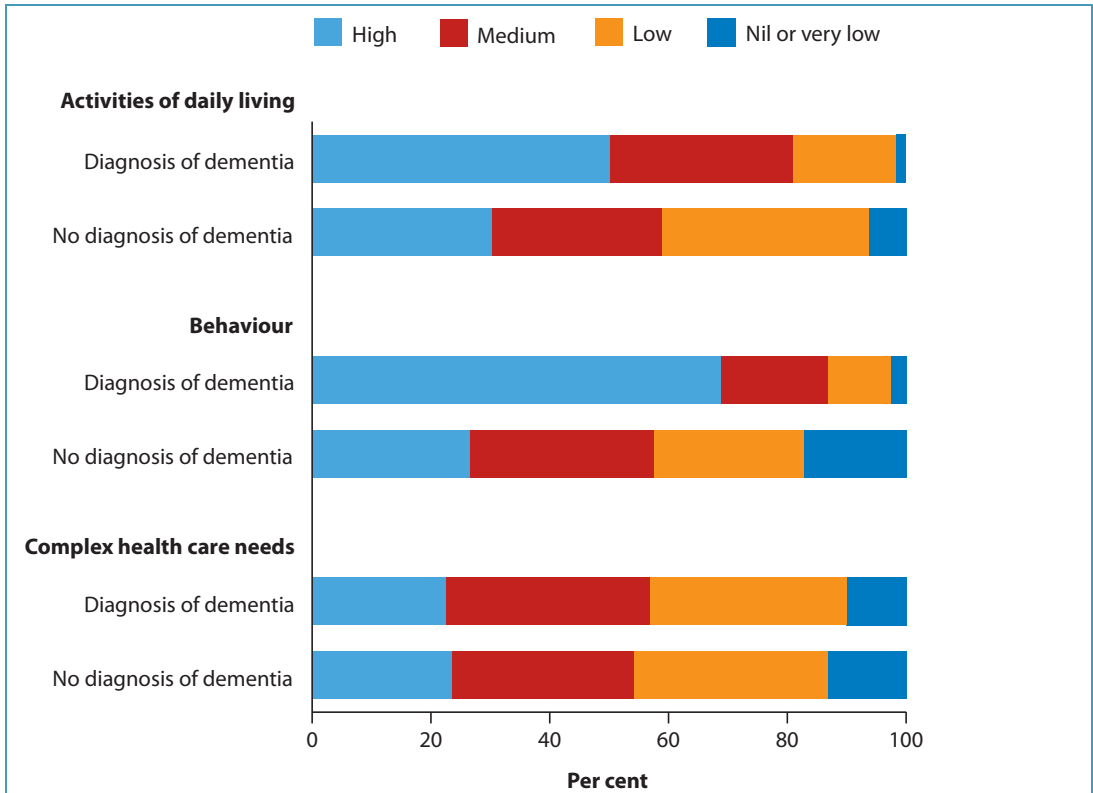
Disability and functioning

Because dementia is a progressive condition, the impact on an individual's functioning increases with the growing severity of the disease. People with severe or advanced dementia may require a variety of assistance, including help with one or more core activities that relate to communication, mobility and/or self-care, including understanding family and friends, getting in or out of a chair, bathing and eating. AIHW analysis of the 2009 Survey of Disability, Ageing and Carers (which is likely to under-report those with mild dementia) suggests that 84% of people with dementia in the community sometimes or always required assistance with core activities and 93% received some type of assistance as a result of the condition.



Very few older people rely solely on formal support and this is also the case for people with dementia. Of people with dementia who received support in 2009, about 1 in 5 living in the community received assistance from informal sources (family and friends) only, while about 3 in 4 received assistance from both informal and formal (organisations or paid help) sources, partly reflecting the extent and complexity of care required (AIHW analysis of ABS SDAC 2009).

While most people with dementia live in the community, some also live in cared accommodation, such as residential aged care facilities. The Aged Care Funding Instrument (ACFI) appraises the care needs of residents in aged care facilities in three domains: activities of daily living, behaviour, and complex health-care needs (see AIHW 2011k for more information). Data from the ACFI at 30 June 2011 show that residents with dementia have substantially higher care needs than residents without dementia in two of the three domains (Figure 6.15). One in 2 residents with dementia (50%) needed high-level care with the activities of daily living compared with 30% of residents without dementia; in relation to care needs for behaviour, the figures were 69% for residents with dementia and 26% for those without. Care needs regarding complex health conditions for both groups were similar.



Source: AIHW analysis of ACFI data.

Figure 6.15: Level of care requirements across Aged Care Funding Instrument domains for permanent residents of aged care facilities, by dementia status, 30 June 2011



Service use

People with dementia use a substantial amount of aged care and health services, including primary health services, community aged care, residential aged care and hospital services (AIHW 2007; AIHW forthcoming). In 2008, people with dementia comprised:

- 14% of the Community Aged Care Packages (CACP) recipients
- 18% of the Extended Aged Care at Home (EACH) recipients
- 88% of the Extended Aged Care at Home Dementia (EACHD) recipients (DoHA 2010b).

In 2010, 53% of permanent residents in residential aged care had a diagnosis of dementia (AIHW 2011).

Other services used by people with dementia and their carers include health services, such as hospitals; and other care services, such as the Transition Care Program, Home and Community Care services, Veterans' Home Care services, community nursing services, Aged Care Assessment Program and respite services for carers.

Information about the nature of services accessed by Aboriginal and Torres Strait Islander people with dementia is sparse. Identification of Indigenous Australians in program data is often poor in quality, if present at all, limiting availability of information about patterns and extent of service use by this population group. However, one study using a combination of methods, including a literature review and interviews with key stakeholders, has investigated the extent of, and barriers to, service use by Indigenous Australians with dementia (Alzheimer's Australia Northern Territory 2002). The results suggest that in remote areas availability of culturally appropriate services influenced access, whereas in urban areas reduced access was more related to social isolation and other personal and health factors. This study found services required included community support, diagnostic, management and residential aged care. Researchers advocate an approach to dementia in this population that takes into account the impact of history, context and culture (Arkles et al. 2010).

Treatment for dementia

Timely diagnosis of dementia is required for appropriate treatment and care. There is no cure for dementia, but some interventions that can help manage the symptoms of the disease are available. Interventions fall into two groups: drug and non-drug.

Drug interventions target cognitive functioning, behavioural and psychological symptoms of dementia (BPSD) or other co-occurring diseases (Seeher et al. 2011). Currently available drug interventions can slightly improve cognitive functioning or slow the decline of cognitive functioning, although these still do not halt the progression of the disease (Raina et al. 2008).

BPSD include challenging behaviours, such as aggression, wandering and agitation, and other mental illnesses, such as depression and anxiety. Anti-psychotics are sometimes used to manage challenging behaviours and have a sedative effect. While there is evidence that some people with severe BPSD may benefit from these medications, there are also considerable risks associated with them, including an increased risk of stroke and mortality (Ballard & Waite 2006).



There is a wide range of non-drug interventions reported to improve cognitive symptoms, including cognitive training, reminiscence therapy, validation therapy and physical exercise, but the evidence base for these is not yet fully developed. Research suggests that engaging more frequently in cognitive activity is associated with a lower risk of developing dementia (Wilson et al. 2007), but the efficacy of cognitive training for those who already have dementia has not yet been demonstrated (Seeher et al. 2011). Current studies suggest that improvements may be possible and that these can result in other benefits, such as better mood, quality of life and social functioning (Boccardi & Frisoni 2006).

Non-drug treatments to improve BPSD are recommended over drug treatments (Seeher et al. 2011). In particular, research indicates an individually tailored behaviour management approach is effective (Livingston et al. 2005). This involves investigating and, where possible, treating the causes of the disturbed mood or behaviour, such as untreated pain and other medical conditions.

Mortality

Dementia is one of the leading causes of death in Australia. From 1997 to 2009, the number of deaths with dementia as the underlying cause increased steadily from 3,400 to 8,600 (from 21 to 33 deaths per 100,000 population). From 2000 to 2009, dementia rose from seventh to third leading cause of death in Australia. However, it is important to note that part of the increase was due to changes in coding instructions in ICD-10 and the *Veterans' Entitlements Act 1986* and *Military Rehabilitation and Compensation Act 2004* between 2005 and 2006 (ABS 2006c; AIHW analysis of ABS unpublished confidentialised data).

What is missing from the picture?

There are several gaps in our understanding of dementia in Australia. First, there are no readily available dementia prevalence or incidence data. Thus, modelling is required to produce estimates. Second, no nationwide prevalence or incidence data exist for several important population groups, including Indigenous Australians, people from culturally and linguistically diverse backgrounds and people with younger onset dementia. This information is required for appropriate and targeted service planning and policy development purposes. Third, many of the datasets relating to service use are maintained separately. People with dementia and their carers often access multiple services, which means that these data do not provide a comprehensive picture of the nature and extent of services individuals use. There are, however, several large data linkage projects currently under way that will help fill some of these information gaps, including the Pathways in Aged Care Project and Hospital Dementia Services Project. These are being undertaken by a consortium of researchers across the AIHW and other institutions. Finally, identification of people with dementia varies in approach and quality across data sets.

Where do I go for more information?

For more information about people with dementia, see the following AIHW publications: *Dementia in Australia* (AIHW forthcoming); *Transitions in care of people with dementia* (AIHW: Runge et al. 2009); *Aged care packages in the community 2009–10* (AIHW 2011m) and *Dementia among aged care residents* (AIHW 2011k).



6.10 Chronic kidney disease

At a glance

- Chronic kidney disease (CKD) is more common than is widely known, affecting 1 in 7 Australian adults to some degree. One in 10 deaths has CKD listed as a contributing factor (underlying or associated cause of death).
- At 31 December 2009, about 18,300 people in Australia were receiving regular dialysis treatment or had a functioning kidney transplant—an increase of more than sevenfold since 1977.
- The total incidence rate of end-stage kidney disease (ESKD) is six times as high among Aboriginal and Torres Strait Islander people as it is among non-Indigenous Australians, and Indigenous people are eight times as likely to begin dialysis or receive a kidney transplant for their ESKD.



Introduction

The kidneys are two bean-shaped organs, about the size of a person's fist, located at the back of the abdomen. They continuously filter and clear waste products from the bloodstream. They also play a vital role in controlling the body's level of water and various chemicals, and produce certain essential hormones.

CKD refers to all conditions of the kidney, lasting at least 3 months, where a person has had evidence of kidney damage and/or reduced kidney function (National Kidney Foundation of America 2002).

CKD is categorised into five stages according to the level of reduced kidney function and evidence of kidney damage (see Box 6.8). Many people do not know they have kidney disease as up to 90% of kidney function can be lost before symptoms appear. By the time Stage 5 CKD—end-stage kidney disease—has been reached, kidney function has deteriorated so much that kidney replacement therapy in the form of dialysis (an artificial way of removing waste substances from the blood) or kidney transplantation is required for the patient to survive.



Box 6.8: Stages of chronic kidney disease

Stages of CKD are measured by the glomerular filtration rate (GFR), which is the amount of blood the kidneys clear of waste products in 1 minute. Because GFR cannot be measured directly, current practice is to estimate GFR (eGFR) by applying a formula based on age, sex and creatinine levels in the blood.

Stage 1: Kidney damage (GFR at least 90)

Evidence of kidney damage but without decreased GFR. Most patients have no symptoms.

Stage 2: Kidney damage (GFR 60–89)

Evidence of kidney damage with some reduction in GFR. Most patients have no symptoms.

Stage 3: GFR 30–59 (with or without evidence of kidney damage)

GFR substantially reduced. Patients may show signs of kidney damage and dysfunction in other organs; often without symptoms, despite a reduction in kidney function of up to 70%.

Stage 4: GFR 15–29 (with or without evidence of kidney damage)

Kidney function substantially reduced. Blood levels of urea and creatinine increased, and greater evidence of dysfunction in other organs. Patients usually only report mild symptoms.

Stage 5: Kidney failure (GFR less than 15) (with or without evidence of kidney damage)

Various symptoms and defects in several organ systems are collectively referred to as uraemia. Kidney replacement therapy (dialysis or transplant) is required when kidney function is no longer sufficient to sustain life, typically at a GFR of about 7–8.

Source: Adapted from Obrador & Pereira 2002.

What do we know about chronic kidney disease?

CKD is common and often preventable, because many of its risk factors are modifiable, including tobacco smoking, being overweight or obese, high blood pressure and diabetes. People with multiple risk factors can have a considerably increased risk of developing CKD (AIHW 2009c).

The number of people treated with dialysis or living with a functioning kidney transplant for ESKD increased dramatically in Australia over the past 3 decades, from about 2,200 in 1977 to almost 18,300 in 2009. The number continues to rise each year as a result of both increasing incidence and better survival. The treatment of CKD and especially ESKD is costly, and accounted for almost 2% of total health care expenditure in 2004–05 (AIHW 2009d).

The best estimate of the number of cases of diagnosed and undiagnosed CKD in Australia (the prevalence) comes from the 1999–2000 AusDiab study, which found that 16% of Australian adults aged over 65 had at least one indicator of kidney disease (Atkins et al. 2004; Chadban et al. 2003), and 30% of those aged over 65 had CKD at Stages 3–5 (AIHW 2009c). There are no national data for the number of new cases (the incidence) of CKD.

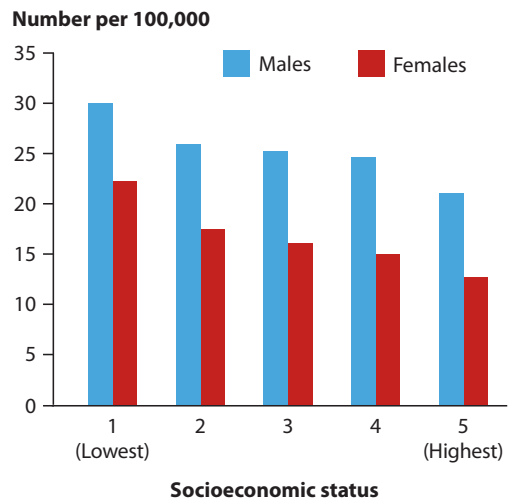
End-stage kidney disease

Before 2010, information on ESKD in Australia was only available for people who were treated with dialysis or a kidney transplant because they were registered with the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA). Information on the total incidence of ESKD that includes those not receiving dialysis or a transplant is important to help understand the full burden of the disease in Australia. Therefore, the AIHW has recently developed a method for estimating the total incidence that combines data from the ANZDATA registry with information about deaths due to ESKD (AIHW 2011n). It is used to measure the incidence of ESKD in the performance indicator 'Incidence of end-stage kidney disease' shown below.

Incidence of end-stage kidney disease. Presented as age-standardised number per 100,000.



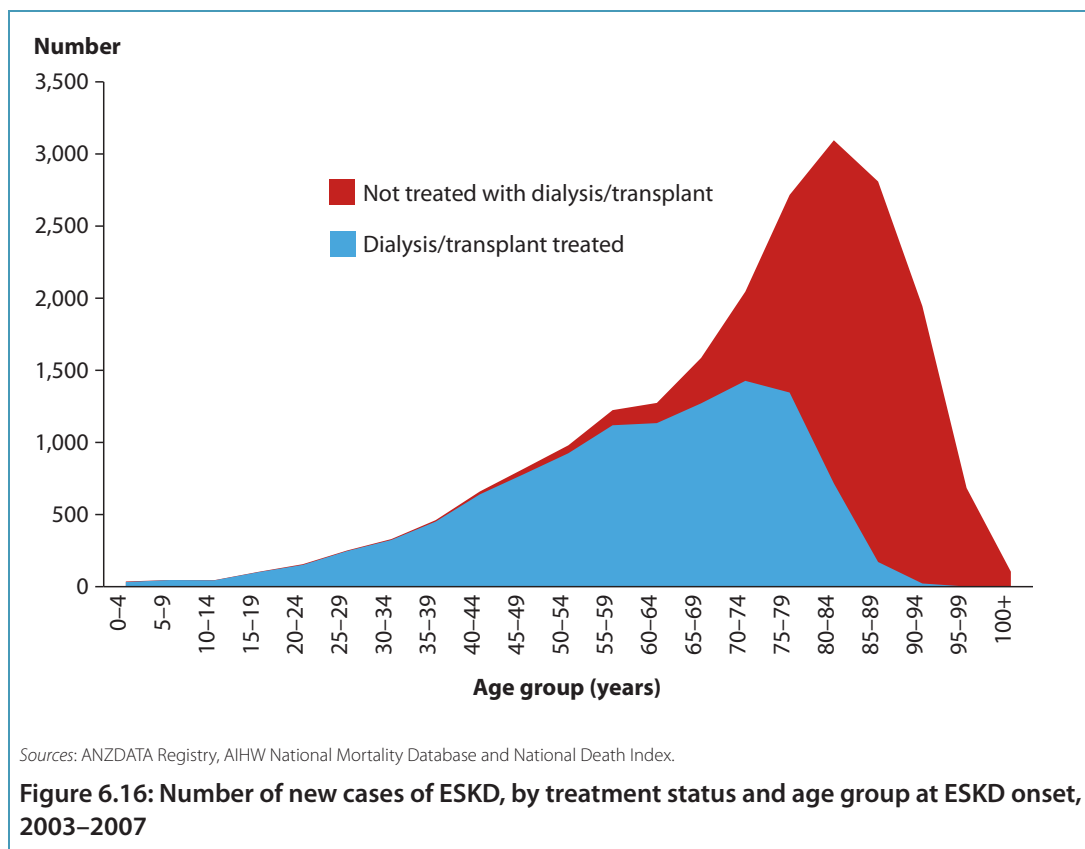
- There were 4,740 new cases of ESKD in 2007, equating to 21 per 100,000 population.
- In 2007, the incidence rate was higher for males than females (26 compared with 17 per 100,000 population).
- The incidence rate for Indigenous Australians in 2004–2007 was six times as high as the non-Indigenous rate.
- The incidence of ESKD in 2005–2007 increased with decreasing socioeconomic status.



Source: Linked ANZDATA Registry, AIHW Mortality Database and National Death Index.

It is estimated that half of all new cases of ESKD do not receive dialysis or transplant treatment (AIHW 2011n) and the overall proportion of those who do varies greatly with age (Figure 6.16). For example, among those aged under 65, about 90% of new cases receive these treatments, but this proportion falls substantially in older age groups, with only about 1 in 10 of those aged 80 or over receiving dialysis or transplant. There is little variation in overall treatment rates by sex or Indigenous status (AIHW 2011n).





Treated end-stage kidney disease

Data in this section refer to cases of ESKD that are treated with dialysis or kidney transplantation. A kidney transplant is generally preferred to dialysis as the treatment for ESKD by both patients and health-care professionals because of better survival rates and quality of life. Donated kidneys come from either a live donor—usually a relative, spouse or even a close friend—or from deceased donors (see ‘Section 7.14 Blood, organ and tissue donation’ for more information on transplants in Australia). However, transplantation is not a cure for ESKD, as recipients live with the possibility of chronic rejection and the loss of the donor kidney (CARI 2007). When ESKD is managed conservatively, that is, without using dialysis or transplants, the approach involves a shift from efforts to prolong life to those that focus on care, quality of life and symptom control (Chandna et al. 2011).

The rate of organ donation from deceased donors in Australia is low compared with those of other developed countries, and the largest transplant waiting list by far is for a kidney (DonateLife 2010). Once a person is on the kidney transplant waiting list, their average waiting time for a deceased donor is about 4 years (Excell et al. 2011). The more time spent on dialysis before transplantation, the greater the subsequent risk of dying and the smaller the survival rate of donor kidneys (CARI 2007).

Incidence

In 2009, just over 2,300 people began dialysis or transplant treatment for ESKD, with males starting at 1.6 times the rate of females (13 compared with 8 per 100,000 population). After adjusting for age, the overall commencement rate increased by 19% between 2000 and 2009, with much of the increase occurring in those aged over 65 (Figure 6.17). The average age of patients beginning treatment has increased over time, from 45 in 1978 to 55 in 1997 and 61 in 2009 (ANZDATA 1979; Disney et al. 1999; McDonald et al. 2011).

The leading cause of new cases of treated ESKD in 2009 was diabetic nephropathy (33%)—a condition where consistently high blood sugar levels damage the capillaries that filter blood in the kidneys. The next most common cause was glomerulonephritis (24%)—inflammation of part of the filtering units of the kidney—followed by high blood pressure (14%). The proportion of new cases of treated ESKD attributed to diabetic nephropathy has been increasing steadily over time, overtaking glomerulonephritis as the leading cause in 2004. This reflects the increasing prevalence of Type 2 diabetes in the population rather than a decline in the number of new cases attributed to other causes.

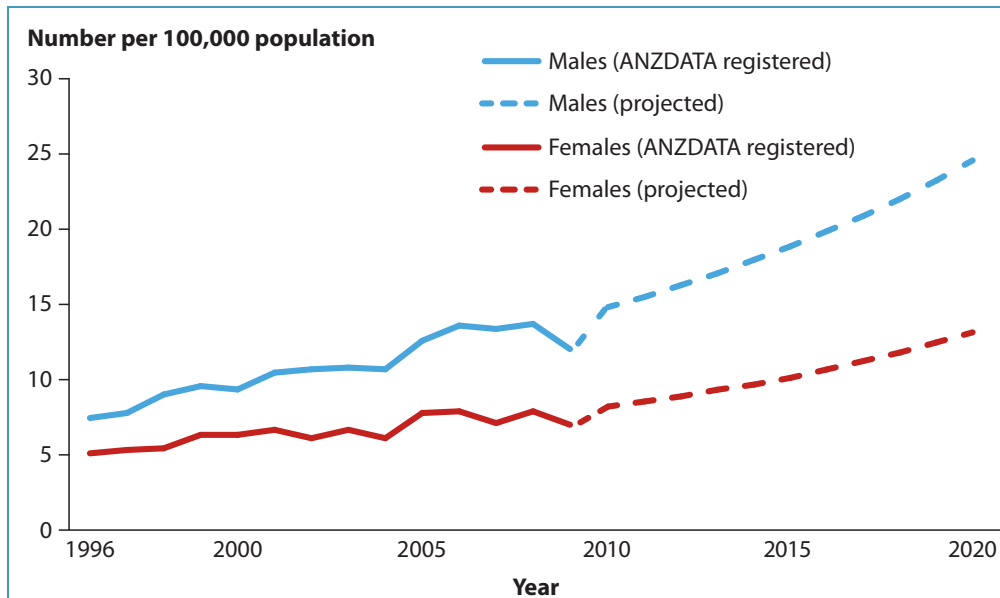
The increases in the number and average age of new cases of treated ESKD reflect an increased likelihood that older ESKD patients will receive dialysis or transplant. However, other factors may also have contributed to the increase, including the increasing prevalence of Type 2 diabetes, the high prevalence of high blood pressure in the past, and a reduction in the number of people dying from cardiovascular disease (McDonald et al. 2005).

Indigenous Australians have higher rates of treated ESKD. During 2007–2008, nearly 10% (476) of Australians who began dialysis or transplant treatment for ESKD identified as Aboriginal and/or Torres Strait Islander, amounting to about 79 cases per 100,000 people (AIHW 2011o). After adjusting for age, Indigenous people started dialysis or kidney transplant at eight times the rate of non-Indigenous people.

Projections of incidence

The rate of new cases of treated ESKD is projected to increase by 80% between 2009 and 2020, from 11 to 19 per 100,000 population, with the majority of the increase among patients aged 70 and over (AIHW 2011p) (Figure 6.17). In addition, the proportion of patients starting treatment who also have diabetes is projected to increase from 45% in 2009 to 64% in 2020 (AIHW 2011p).





Source: AIHW 2011p.

Figure 6.17: Registered and projected incidence of treated ESKD, by sex, Australia, 1996–2020

Prevalence

At the end of 2009, there were more than 10,300 people receiving dialysis and 7,900 had a functioning kidney transplant. Of the patients receiving dialysis, 11% were on the waiting list for a kidney transplant from a deceased donor. Of these, 80% were waiting for their first transplant, while 20% had received a previous transplant. A number of factors can decrease the chance of being considered for kidney transplantation in Australia. These include age, other health conditions beside CKD, obesity, smoking, drug and alcohol abuse, and having a history of not taking appropriate medications while on dialysis (Ibels et al. 2009).

There were 772 kidney transplants performed in 2009, down from 813 in 2008. Of these, 42% were from a living donor, and the median age of recipients was 49. Although the number of deceased donor transplants decreased slightly from 1987 to 2000, there was more than a six-fold increase in the number of live donor transplants in that period (AIHW 2009c).

Indigenous Australians are less likely to have a functioning kidney transplant than non-Indigenous Australians. As at 31 December 2009, 88% of all Indigenous patients with treated ESKD relied on dialysis and only 12% had a functioning kidney transplant. In contrast, 45% of non-Indigenous Australians with treated ESKD had a functioning transplant.

Hospitalisations

People with CKD, particularly those with ESKD, often require hospitalisation. The vast majority of these hospitalisations are for dialysis. Those receiving dialysis in hospital usually attend three times a week, or about 156 times per year, and are almost always admitted and discharged on the same day. This makes dialysis the most common reason for hospitalisation in Australia, accounting for more than 1,125,000 hospitalisations (about 13%) in 2009–10. The number of hospitalisations for dialysis has almost doubled between 2000–01 and 2009–10, while the hospitalisation rate also increased substantially in that period—up 64% from 3,033 to 4,830 per 100,000 people.

People with CKD are also hospitalised for reasons other than dialysis. In 2009–10, there were more than 36,500 hospitalisations where CKD, not dialysis, was recorded as the principal diagnosis, and a further 151,000 hospitalisations where CKD was recorded as an additional diagnosis. In these latter cases, the most common principal diagnoses recorded were cardiovascular disease (21%), endocrine, nutritional and metabolic disorders—excluding diabetic nephropathy—(10%), and respiratory diseases (9%).

In 2009–10, Indigenous Australians were hospitalised for regular dialysis at 11 times the rate of other Australians. Rates for other hospitalisations, where CKD was a principal or additional diagnosis, were five times as high for Indigenous people than they were for other Australians.

Australians living in remote areas were more likely to be hospitalised for regular dialysis and other CKD diagnoses than those in *Major cities*. This is largely because a much greater proportion of the remote area population is comprised of Indigenous Australians, who have higher rates of CKD and ESKD. The rate of hospitalisation for regular dialysis and other CKD diagnoses is highest among the groups with the lowest socioeconomic status (AIHW 2010j).

Mortality

In 2009, CKD was recorded as the underlying cause in more than 3,300 deaths. CKD, however, is much more likely to be recorded as an associated cause of death, that is, another condition that intervened or may have contributed to the death but was not related to the diseases or conditions causing death. In 2007, CKD was recorded as the underlying cause in about 3,000 deaths, and as an associated cause in more than 10,000 more deaths (AIHW 2010b). For those deaths where CKD was an associated cause, the most common underlying cause was disorders of the circulatory system, highlighting the well-established relationship between cardiovascular disease and CKD.

The male mortality rate for CKD as the underlying cause of death was slightly higher than the female rate (15 compared with 12) per 100,000 population.

Over the period 2003 to 2007, Indigenous Australians were four times as likely as non-Indigenous Australians to have CKD recorded as an underlying or associated cause of death (AIHW 2011o).



What is missing from the picture?

The best estimates of diagnosed and undiagnosed CKD in Australia still come from the 1999–2000 AusDiab study. As no new data are anticipated until the results of the 2011–2013 Australian Health Survey are released, there is no reliable method for measuring how the prevalence of CKD may have changed in the intervening decade.

There are currently no national data available in Australia for the total prevalence of ESKD. However, the AIHW has created a new method for estimating the incidence of ESKD that is an international first. This method links ANZDATA and mortality data so that those with ESKD, who do not receive dialysis or transplant treatment, are included in the estimate. It is possible that this method can be used to also estimate the prevalence of ESKD in the future.

Where do I go for more information?

For more information about chronic kidney disease in the Australian population, see the following publications available at <www.aihw.gov.au>:

- *An overview of chronic kidney disease in Australia 2009* (AIHW 2009c)
- *Chronic kidney disease hospitalisations in Australia 2000–01 to 2007–08* (AIHW 2010j)
- *End-stage kidney disease in Australia: total incidence 2003–2007* (AIHW 2011n)
- *Chronic kidney disease in Aboriginal and Torres Strait Islander people 2011* (AIHW 2011o)
- *Projections of the incidence of treated end-stage kidney disease in Australia, 2010–2020* (AIHW 2011p).

6.11 Infectious diseases

At a glance

- The burden of infectious disease has reduced markedly over the past century, from 13% of all deaths in 1907 to 1.3% in 2009.
- The rate of chlamydia infection continues to climb, increasing sixfold since national notification began in 1994.
- Health departments continue to monitor outbreaks of certain infectious diseases, previously unknown (emerging) diseases, and known diseases that have re-emerged, or spread to new locations or populations.



Introduction

The term 'infectious disease' refers to an illness, fever or rash due to harmful organisms (mostly micro-organisms) or their toxic products. From a public health perspective, their distinctive feature is an ability to spread from human to human by air, food, water, objects, insects, or by direct contact with an infected person. Some infectious diseases can occur in outbreaks that affect many people, especially if they can spread rapidly through person-to-person contact.

The effects of infectious diseases on Australia's health have reduced over the past century after improvements in sanitation, the introduction of antibiotics and immunisation programs. Whereas infectious diseases accounted for about 13% of all deaths in 1907, they accounted for only 1.3% in 2009 (Magnus & Sadkowsky 2006; ABS 2011a). Nonetheless, they remain a prominent public health concern in Australia and many parts of the world. Health departments continue to respond to outbreaks and to monitor trends for certain important infections (see Box 6.9 for how these are determined).

This section provides a snapshot of infectious diseases in Australia and features selected infections that are of particular interest because they are relatively common or part of an epidemic, they are new or emerging in Australia, or they are otherwise deserving of extra attention.



Box 6.9: How are infectious diseases selected for monitoring?

There are many infections caused by a variety of different organisms that lead to different kinds of illnesses of varying severity. All state and territory health departments perform surveillance for a number of infections and although the list may vary from one jurisdiction to another, a large number are nominated as nationally notifiable. Infections under surveillance are chosen for one or more of the following reasons (examples in brackets):

- highly infectious (measles)
- dangerous (Ebola, meningococcal disease)
- part of the immunisation schedule (pertussis, invasive pneumococcal disease)
- lifestyle implications (sexually transmitted infections)
- foodborne disease (*Salmonella* outbreaks from food outlets)
- economic consequences (SARS)
- threat of global infection (pandemic) (avian influenza (bird flu))
- breakdown of infrastructure (*Legionella* outbreaks from cooling towers)
- emerging infections (pandemic H1N1 influenza (swine flu), Hendra virus)
- bioterrorism potential (smallpox, anthrax, tularaemia)
- being part of a global surveillance network (malaria)
- performance indicators for hospital care (golden staph)
- transmitted by insects (dengue, Barmah Forest virus)
- brought from overseas with the potential to spread here via our own mosquitoes (chikungunya).

What do we know about infectious diseases in Australia?

Infectious diseases are still relatively common in Australia. Based on data from the National Notifiable Diseases Surveillance System, Table 6.9 shows notifications for a selection of diseases in 2011 and for the average of the previous 5 years (2006–2010).

Compared with the previous 5 years, there were substantially more notifications in 2011 for pertussis, laboratory-confirmed influenza, gonococcal infection, chlamydia infection, Campylobacteriosis and Salmonellosis. There were fewer notifications for mumps, malaria and hepatitis C.

Table 6.9: Selected nationally notifiable diseases

Disease	2011		Average of previous 5 years	
	Notifications	Number per 100,000	Notifications	Number per 100,000
Vaccine-preventable diseases				
Meningococcal disease (invasive)	241	1.1	279	1.3
Pneumococcal disease (invasive)	1,881	8.4	1,547	7.2
Pertussis (whooping cough)	38,573	172.7	18,699	85.6
Mumps	153	0.7	281	1.3
Measles	193	0.9	75	0.4
Influenza (laboratory-confirmed)	27,075	121.2	19,122	87.6
Mosquito-borne diseases				
Barmah Forest virus infection	1,865	8.3	1,773	8.3
Ross River virus infection	5,149	23.0	5,059	23.5
Malaria	411	1.8	552	2.6
Dengue	809	3.6	736	3.4
Sexually transmissible infections				
Syphilis ^(a)	2,491	11.1	2,561	11.9
Gonococcal infection	12,116	54.2	8,383	38.9
Chlamydial infection	80,793	361.7	58,946	273.1
Hepatitis				
Hepatitis B ^(b)	6,853	30.6	6,983	32.4
Hepatitis C ^(b)	10,279	46.4	11,714	54.5
Gastrointestinal diseases				
Campylobacteriosis	17,723	117.4	16,201	75.3
Salmonellosis (nec)	12,280	55.0	9,503	44.1
Tuberculosis	1,219	5.5	1,235	5.7

nec Not elsewhere classified.

(a) Includes all syphilis categories.

(b) Includes incident and unspecified cases.

Source: DoHA 2012.



A considerable proportion of health service use is attributed to infectious disease. In 2010, infections accounted for 1 in 6 problems managed by general practitioners (AIHW: Britt et al. 2010a). Furthermore, in 2009–10, there were nearly 128,000 hospitalisations with infectious and parasitic diseases as the principal diagnosis—the majority (84%) of which occurred in public hospitals (AIHW 2011q).

Infections can also be acquired during a stay in hospital, and these are concerning for both patients and the health-care system. Such infections can prolong a patient's stay, aggregate existing conditions or, in some cases, lead to death. Examples include infection of a surgical wound, bloodstream infections from an intravenous catheter, or hospital-acquired pneumonia. In recent years, some bacteria—known as superbugs—have become resistant to standard antibiotics. The most prominent examples are *Staphylococcus aureus* (golden staph) and *Escherichia coli* (E. coli). See 'Section 7.9 Admitted hospital care' for more information on *Staphylococcus aureus* in Australian public hospitals.

Sexually transmissible infections

STIs are infectious diseases that are spread from person to person through sexual contact. Diagnosis can be difficult as many STIs are asymptomatic or produce only mild symptoms. Examples of STIs include gonorrhoea, syphilis, HIV/AIDS, hepatitis B, chlamydia, HPV, and genital herpes. This section focuses on chlamydia and gonorrhoea—two of the most commonly acquired STIs in Australia.

Chlamydia is a sexually transmissible infection due to the bacterium *Chlamydia trachomatis*. In 2011, there were more than 80,000 chlamydia infections reported in Australia at a rate of 362 new cases per 100,000 population (Table 6.9). This was about 21,800 more cases than the average of the previous 5 years. In 2011, the notification rate for chlamydia was higher for females (422 per 100,000 population) than males (300 per 100,000 population) (DoHA 2012). For both sexes, rates were highest among those aged 15–24.

Gonorrhoea is due to the bacterium *Neisseria gonorrhoeae* (also known as gonococcus). While fewer in number than chlamydia, notifications of gonorrhoea are still substantial. In 2011, there were more than 12,000 cases reported at a rate of 54 new cases per 100,000 population (Table 6.9). This was about 3,700 more cases than had occurred on average in the previous 5 years. In contrast to chlamydia, the notification rate for gonorrhoea was higher for males (73 per 100,000 population) than females (36 per 100,000) in 2011 (DoHA 2012). However, the highest rates were again found in those aged 15–24.

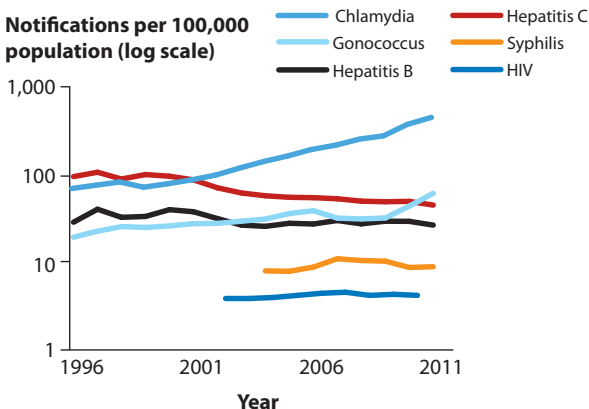
Since national notifications began in 1994, there has been a sixfold increase in the rate of chlamydia and a threefold rise in the rate of gonococcal infection—see the performance indicator 'Incidence of sexually transmissible infections and bloodborne viruses'. While this rise in notifications might intuitively seem worrying, there may be an associated health benefit. In past years, chlamydia infection was often missed because it did not make a person feel sick; hence, the person remained infectious to other sexual partners and at risk of long-term problems (such as pelvic inflammatory disease and infertility). In recent years, there has been increased awareness of these silent infections among health-care workers and those who are sexually active. This has meant that more people are getting tested, diagnosed and treated.

Incidence of sexually transmissible infections and bloodborne viruses. The number of new cases of syphilis, HIV, hepatitis B, hepatitis C, chlamydia and gonococcal infections. Presented as numbers per 100,000 population.



- The rate of chlamydia infection continues to climb, increasing sixfold since national notification began in 1994.
- The rate of HIV infection is stable at about 1,000 new diagnoses each year.
- The rates are declining for both hepatitis B and hepatitis C.

Notifications per 100,000 population (log scale)



Note: Data are presented using a log scale.
Sources: National Notifiable Diseases Surveillance System; Kirby Institute 2011b.

Vaccine-preventable infections

Immunisation has had a dramatic influence on rates of illness and death from a wide variety of infections (see also 'Section 4.3 Infant and childhood vaccination' and 'Section 4.5 Adult vaccination'). This section focuses on pertussis and measles—two prominent vaccine-preventable infections in Australia.

Pertussis, also known as whooping cough, is an infection caused by the bacterium *Bordetella pertussis*. It is best known for its chronic cough and severe coughing fits that can be life-threatening. In 2011, there were more than 38,000 notifications of pertussis, at a rate of 173 new cases per 100,000 population (Table 6.9). This rate is about double the average of the previous 5 years, or about 19,900 more cases. Similar to chlamydia, this reflects a combination of more testing and better diagnostic tests, however, there is likely to also be a genuine increase in the number of cases.

The cough associated with pertussis is particularly dangerous for infants and very young children, and they are more likely to develop complications. In 2011, there were 4,855 notifications of pertussis among children aged 0–4 (332 cases per 100,000 population) (DoHA 2012).

Measles is a contagious viral illness that causes a skin rash and fever, and can lead to serious and sometimes fatal complications, such as pneumonia and encephalitis (brain inflammation). Measles is relatively rare in Australia because of the widespread use of the measles vaccine. However, outbreaks continued to occur in Australia in 2011, with cases being notified from every state and territory except Tasmania (DoHA 2012). There were 193 measles notifications, the highest number since 1999, and slightly more than reported on average in the previous 5 years. While the number of cases is relatively small compared with other infectious diseases, measles outbreaks are resource-intensive exercises for public health authorities.

People who are fully vaccinated against measles in childhood are considered immune to the infection for their lifetime. However, there are still groups susceptible to measles because they were never properly vaccinated, either inadvertently or through personal choice. Thus, when a measles case occurs, these susceptible individuals can be affected.



New infections and threats

Public health authorities remain alert for new diseases, and new threats from old diseases. Indeed, the WHO noted in its 2007 report that more than 40 new infections had appeared in the world since the 1970s (WHO 2007). This figure does not take into account another aspect of emerging infections, namely, those infections established in one part of the world that newly appear in another. For example:

- Tasmanian authorities confirmed in 2011 that, after possum bites, two people had developed skin ulcers due to tularaemia—a bacterial disease passed from animals that was previously found only in the northern hemisphere (Tasmanian Department of Health and Human Services 2011)
- a person from New South Wales was reported in 2011 to have locally-acquired babesiosis—a malaria-like parasitic disease that had not previously been found in humans in Australia (Senanayake et al. 2012)
- a Victorian man was diagnosed in 2010 with the first recognised case (acquired in Australia) of *Clostridium difficile*—a bacterium common in Europe and the United States that causes severe diarrhea and other intestinal disease (Richards et al. 2011).

More broadly, climate change is expected to have a direct impact on infectious diseases in Australia. This could include an increase in cases of foodborne diseases (such as *Salmonella* infections) associated with rising temperatures, and cases of vector-borne diseases (such as Ross River virus infection and dengue fever) associated with changes in the spread and abundance of insect populations. For more information, see 'Section 4.1 Health and the environment'.

What is missing from the picture?

Although the infectious diseases notification system in Australia is mature, providing high quality and up-to-date data for public health authorities, there remain important gaps in the national picture. For example, there are limited data on:

- diseases that are not nationally notifiable (such as genital herpes and HPV)
- the circumstances by which a person acquired an infectious disease, which in turn limits the usefulness of the notification data for targeting preventive activities
- the long-term health effects of having an infectious disease and being treated, or not being treated.

Where do I go for more information?

For more information on nationally notifiable diseases including data from the National Notifiable Diseases Surveillance System, visit the Communicable Diseases Information section of the Department of Health and Ageing website: <www.health.gov.au>.

6.12 Parkinson disease

At a glance

- The exact prevalence of Parkinson disease in Australia is not known and current estimates vary widely, from 38,300 people (181 in every 100,000 Australians) to 64,000 people (283 in every 100,000 Australians).
- At 30 June 2011, 8,100 permanent residents in residential aged care facilities (5%) had a diagnosis of Parkinson disease.
- There is no cure, but recent research is showing promising results. Drug therapy is the main treatment, although a multidisciplinary approach—involving different clinicians and services—is also recommended.



Introduction

Parkinson disease is a degenerative neurological condition that affects the control of body movements. It results from the progressive degeneration of a region of the brain called the substantia nigra, which contains neuronal cells that produce dopamine. Dopamine is a chemical messenger in the brain (neurotransmitter) necessary for smooth, coordinated and regular body movements. Symptoms of this disease include tremors, slowness of movement, muscular rigidity and postural instability (Gelb 1999).

What do we know about Parkinson disease?

Prevalence

The prevalence of Parkinson disease among Australians is difficult to determine because there is no definitive diagnostic test. The most accurate prevalence data are for people living in residential aged care facilities. AIHW analysis of the ACFI shows that 8,100 permanent residents in residential aged care facilities (5%) had a diagnosis of Parkinson disease on 30 June 2011. Estimates for the broader Australian population, including people in residential aged care facilities, range from 38,300 people in 2009 (181 per 100,000 in the population) (AIHW analysis of the ABS Survey of Disability, Ageing and Carers 2009) to 64,000 people in 2011 (283 per 100,000 in the population) (modelling undertaken by Deloitte Access Economics 2011).



Very little accurate information exists about the characteristics of people with Parkinson disease. AIHW analysis of the ABS Survey of Disability, Ageing and Carers 2009 suggests the disease is more common among males (63%), whereas modelling by Deloitte Access Economics (2011) suggests it occurs at similar rates in males (52%) and females (48%). On 30 June 2011, 4% of female and 7% of male permanent residential aged care residents had the disease, suggesting that a higher proportion of male than female permanent residents had the condition (AIHW analysis of the ACFI).

Parkinson disease is age-related: in 2011, more than 80% of all people with Parkinson disease were aged over 65, with the average age at diagnosis between 55 and 65, although some were diagnosed as young as 30 (Deloitte Access Economics 2011). Deloitte Access Economics (2011) modelling suggests 19% were people of working age.

Comorbidities

Parkinson disease is a chronic and disabling illness that is associated with numerous comorbidities (diseases that occur at the same time). In 2009, 71% of people with the condition always or sometimes required help with core activities (communication, mobility or self-care) (AIHW analysis of ABS SDAC 2009). Sleep disorders, including both disturbed nocturnal sleep and excessive daytime sleepiness, are frequent; studies estimate that 60–98% of people with Parkinson disease are affected (Davie 2008). Cognitive impairment is also common with prevalence studies indicating that about one-quarter of people with Parkinson disease also have dementia (Aarsland et al. 2005). Prevalence of dementia increases with severity of Parkinson disease and this is likely to account for the higher comorbidity rate among residential aged care residents (51% also had dementia at 30 June 2011; AIHW analysis of the ACFI). Other neuropsychiatric conditions are also common, with depression estimated to co-occur in up to 50% and psychosis in up to 30% of patients (Davie 2008). At 30 June 2011, 46% of permanent residential aged care residents with Parkinson disease also had a diagnosis of depression (AIHW analysis of the ACFI).

Treatment

Although there is no cure for Parkinson disease, symptoms may be alleviated by drug treatments. Drug treatments are most effective in the early stages of the illness and typically involve addressing the depleted levels of dopamine. Other treatment options include physiotherapy to assist with coordination and movement, occupational therapy and home modifications to maintain independence for as long as possible, and speech therapy to help with communication and swallowing problems. For some, a single-therapy approach is most effective, while for others a multidisciplinary approach is preferred (Davie 2008).

What is missing from the picture?

The exact prevalence of Parkinson disease in Australia is not known and estimates vary widely. It is difficult to compare its prevalence between population groups and across geographic location, and determine how Australia compares on an international scale.

Several strands of research into the causes, diagnosis and treatment of Parkinson disease are seen as promising. For example, a blood test that detects the onset of the disease is being developed (Double et al. 2009). If successful, it will allow the accurate diagnosis of Parkinson disease before the onset of symptoms. Accurate diagnosis will also lead to an improvement in the quality of data available about people with this disease in Australia and their use of health services.

Researchers have identified several genes and genetic mutations that may play a role in Parkinson disease (Schapira 2007). Other research examining the effectiveness of deep brain stimulation (Moro et al. 2006), stem cell therapy (Marchetto et al. 2011) and exercise interventions (Dibble et al. 2009) in the treatment of Parkinson disease are also improving our understanding of the illness and our ability to effectively treat and manage the disease.

Where do I go for more information?

For more information about Parkinson disease, see the report *Disability in Australia: trends in prevalence, education, employment and community living* (AIHW 2008d).



6.13 Oral health

At a glance

- There were improvements in oral health among Australians over the last half of the 20th century. In 2010, 84% of Australians reported having good, very good or excellent oral health.
- Oral health problems generally increase with age; for example, self-rated oral health declines and the number of missing teeth increases.
- Oral health varies between population groups, with people living in regional areas, those on lower incomes and Indigenous Australians experiencing the worst oral health.



Introduction

Having good oral health means being able to eat, speak and socialise without discomfort or embarrassment and without active disease that affects overall wellbeing. Good oral health is an integral part of good general health, and is essential to being able to participate in daily activities without limitation, or without physical or psychological discomfort as a result of poor oral health.

Efforts to improve oral health are guided by the National Oral Health Plan 2003–2012 (AHMC 2004) which ‘aims to help all Australians retain as many of their teeth as possible throughout their lives, have good oral health as part of their general good health, and have access to affordable and quality oral health services’. More recently, the National Health and Hospitals Reform Commission recommended renewed efforts to improve oral health through health promotion and improved access to dental care (National Health and Hospitals Reform Commission 2009).

What do we know about oral health in Australia?

Dental decay is widespread among Australian adults, and is a leading reason for admission to hospital for general anaesthetic among children. Based on a sample of dental examinations in 2004–06, fewer than 10% of adults had never had any dental decay, and virtually all Australians had experienced problems associated with oral disease at some time in their lives (Slade et al. 2007).

Australia had two important achievements in oral health in the 20th century: the first was large gains in child oral health associated with widespread access to fluoride, and the second was the dramatic decline in tooth loss in adults. As a result of changes in patient preferences and dental practice, fewer Australians are experiencing edentulism (complete tooth loss) and it is now almost exclusively a condition of old age. In addition, adults who are not edentulous are keeping more teeth than in the past as fewer decayed teeth are extracted and more are treated with restorations (fillings) (Slade et al. 2007). Challenges remain, however, as the gains in underlying oral disease in children have not yet flowed through to older age groups.

Australians living today experience relatively good oral health compared with Australians in the past, and compared with their overseas counterparts. Based on a national survey in 2010, more than 80% of Australians report having good, very good or excellent oral health (Table 6.10). As noted above, edentulism is experienced by a small minority of the population and is concentrated in older Australians who lost their teeth in the past. However, on average, adults were missing five teeth and oral problems affected at least one-quarter of Australians, including 14% who had recently experienced toothache and 16% who avoided foods because of oral problems. Oral health problems generally increased with age, especially the average number of missing teeth and avoiding food because of oral problems.

Table 6.10: Oral health indicators, by age group, 2010

Age (years)	Self-rated oral health ^{(a)(b)}	Edentulism ^(c)	Missing teeth ^{(a)(c)}	Experienced toothache ^{(a)(d)}	Uncomfortable with appearance ^{(c)(e)}	Avoided food ^(f)
	(per cent)	(per cent)	(average number)	(per cent)	(per cent)	(per cent)
2–4	98.3	..	..	2.6	..	5.1
5–14	93.7	..	..	8.0	..	10.3
15–24	89.5	—	2.2	16.4	18.7	12.2
25–64	80.8	2.7	4.5	15.6	26.9	17.8
65+	78.6	21.1	11.9	10.1	21.4	20.5
Total	84.4	4.5	5.3	13.6	25.0	15.9

.. not applicable.

— nil or rounded to zero.

(a) Relates to dentate persons (those with any of their natural teeth).

(b) The proportion of people who rate their oral health as good, very good, or excellent.

(c) This question asked only for persons aged 18 and over.

(d) The proportion of people who experienced toothache sometimes, often or very often in the past 12 months.

(e) The proportion of people who felt uncomfortable about the appearance of their teeth, mouth or dentures sometimes, often or very often during the past 12 months.

(f) The proportion of people who avoided eating some foods because of problems with their teeth, mouth or dentures sometimes, often or very often during the past 12 months.

Source: National Dental Telephone Interview Survey, 2010.



Life-course patterns of oral health status

Carers of Australian preschool-aged children report that the children have high levels of good oral health overall (Table 6.10). However, even in this age group, there is a small but significant group of children who experience oral health problems, including toothache and avoiding food.

Australian children aged 5–14 report mostly good, very good or excellent oral health. However, experience of toothache (8%) and avoiding certain foods (10%) because of oral problems is relatively common. This is reflected in more than 6% of children reporting either fair or poor oral health.

Almost 90% of adolescents and young adults (aged 15–24) report good, very good or excellent oral health. In this age group, loss of teeth due to dental disease becomes evident (on average 2 missing teeth per person), and almost 1 in 5 experience toothache or feeling uncomfortable about their dental appearance; just over 1 in 10 avoid certain foods.

This level of toothache experience persists into adulthood (25–64 years). Further, on average, there are more missing teeth (4.5), more experience of being uncomfortable about their dental appearance (27%), and more avoidance of certain foods (18%).

The decline in oral health in adults carries into older age. While high levels of edentulism persist, mainly from historical treatment patterns, older adults with any of their own teeth report high levels of both missing teeth (almost 12 on average) and experience of toothache (about 10%) and of being uncomfortable with their dental appearance and avoiding foods (both about 1 in 5).

Inequalities in oral health

Aboriginal and Torres Strait Islander people

Although there have been a number of local studies of the oral health of Aboriginal and Torres Strait Islander people, there are a number of gaps in nationally representative data on their oral health. Methods used to collect data on adult oral health tend to under-represent Indigenous Australians, especially those living in remote locations. However, all comparisons point to poorer oral health among Indigenous Australians than other Australians (Williams et al. 2011).

Specifically, compared with other children, Indigenous children have more teeth affected by decay, and are more likely to have teeth with untreated decay or that have been extracted due to decay. Indigenous children under the age of 5 were 1.8 times as likely to be admitted to hospital for dental care (AIHW DSRU unpublished data). In one study, young Indigenous adults living in the Northern Territory had 1.7 times the amount of decay experience (that is, had teeth which were decayed, missing due to decay or filled due to decay), but eight times the number of teeth with decay requiring dental treatment. They were also almost 10 times as likely to have moderate or severe periodontal disease (Jamieson et al. 2010).

Income

Oral health, like general health, is associated with socioeconomic status. While Australians adults generally report that they have good oral health, there is a gradient in oral health by socioeconomic status. When the adult population is divided into thirds by household income (adjusted for the size of the household), oral health improves incrementally as we move from the lowest income group through to middle and higher incomes (Table 6.11). Adults with the lowest one-third of household incomes are more likely to report that they have lost all their teeth. If they have their own teeth, adults on lower incomes report that they have more missing teeth than adults on high incomes.

These differences translate to affecting everyday activities for which people rely on well-functioning teeth. Adults on lower incomes are more likely to experience toothache, to avoid certain foods and to feel uncomfortable with their appearance than adults on higher incomes.

Location

Australian adults living in regional areas endure more tooth loss than their *Major city* counterparts. They are about 1.7 times as likely to have no natural teeth and those who do have any natural teeth have 25% more missing teeth than people who live in *Major cities* (Table 6.11). However, this increased tooth loss does not translate to higher rates of adverse oral health effects, such as feeling uncomfortable with their appearance, avoiding foods or experiencing toothache, or to worse self-rated oral health.

These variations in oral health can be attributed in part to differences in access to the means to prevent dental disease, and to differences in access to timely treatment for dental disease when it occurs. For Australians living in non-metropolitan areas, both can be a problem.

Access to fluoridated water is a safe and effective means of preventing dental caries. While considerable progress has been made in fluoridating Australia's water supplies (see 'Section 4.1 Health and the environment' for more information), for many rural residents, this has only occurred recently or not at all. However, differences in the experience of decay between city and country dwellers are small compared with differences in need for dental treatment and tooth loss (Slade et al. 2007). This points to the importance of access to dental care as a key factor in achieving good oral health and for minimising inequalities in oral health across population groups.



Table 6.11: Oral health indicators, by household income and by location, 2010

Group	Self-rated oral health ^{(a)(b)} (per cent)	Edentulism ^(c) (per cent)	Missing teeth ^{(a)(c)} (average number)	Experienced toothache ^{(a)(d)} (per cent)	Uncomfortable with appearance ^{(c)(e)} (per cent)	Avoided food ^(f) (per cent)
All Australians	81.8	5.1	5.3	15.0	25.4	17.0
Household equivalised income						
Lowest	73.1	7.4	6.1	19.5	33.1	24.2
Middle	84.0	3.4	4.9	14.3	25.6	16.3
Highest	87.0	1.3	4.8	11.3	20.2	11.0
Location						
Major cities	82.3	4.3	4.9	15.3	25.4	16.2
Other areas	81.4	7.3	6.2	14.4	25.4	17.4

- (a) Relates to dentate persons (those with any of their natural teeth).
- (b) The proportion of people who rate their oral health as good, very good, or excellent.
- (c) This question asked only for persons aged 18 and over.
- (d) The proportion of people who experienced toothache sometimes, often or very often in the past 12 months.
- (e) The proportion of people who felt uncomfortable about the appearance of their teeth, mouth or dentures sometimes, often or very often during the past 12 months.
- (f) The proportion of people who avoided eating some foods because of problems with their teeth, mouth or dentures sometimes, often or very often during the past 12 months.

Note: Data in Table 6.11 are age-standardised to the 2001 Australian population and do not match those shown in Table 6.10.

Source: National Dental Telephone Interview Survey, 2010.

International comparisons

Little recent data are available for making international comparisons of oral health. In 2004, 12 year old Australian children attending school dental services had an average of one tooth that had experienced any decay, compared with the global average decay experience for 12 year olds of 1.6 teeth.

What is missing from the picture?

The National Oral Health Plan calls for a national adult oral health survey and a national children's oral health survey, each to be repeated every 10 years. The first National Child Oral Health Survey is under way in 2011–2013. The National Survey of Adult Oral Health was conducted in 1987–88 and 2004–06. Unlike the National Dental Telephone Interview Survey, these surveys include a dental examination.

As noted above, while a number of local surveys have documented the oral health and dental visiting of groups of Indigenous Australians, there is a lack of nationally representative data for this group.

Where do I go for more information?

For more information on oral health, see the AIHW report *Oral health and dental care in Australia: key facts and figures 2011* (Chrisopoulos et al. 2011). This report and others are available at <www.aihw.gov.au/dental-and-oral-health>.



6.14 Autism spectrum disorders

At a glance

- Prevalence estimates of autism spectrum disorders (ASDs) almost doubled between 2003 and 2009 in Australia.
- Limitations in the prevalence data mean the reason for the changing rates is unclear.
- Nearly 2 in 5 specialist disability services users with autism always require assistance with activities of daily living, while about half always require assistance in activities associated with work, education and community living.



Introduction

ASDs, also termed pervasive developmental disorders, or just autism, are development disorders that influence communication and social interaction and include restricted, repetitive patterns of behaviour, interests, or activities (American Psychiatric Association 2000, 2011).

Autism is conceptualised as a spectrum; that is, a 'continuum of impairments, with autistic disorder representing the most severe presentation of the disorder' (Chlebowski et al. 2010). A number of other disorders have been identified as part of the spectrum, including Rett disorder, childhood disintegrative disorder (CDD), Asperger syndrome (AS) and pervasive developmental disorder—not otherwise specified (PDD-NOS).

What do we know about autism spectrum disorders?

Overall prevalence

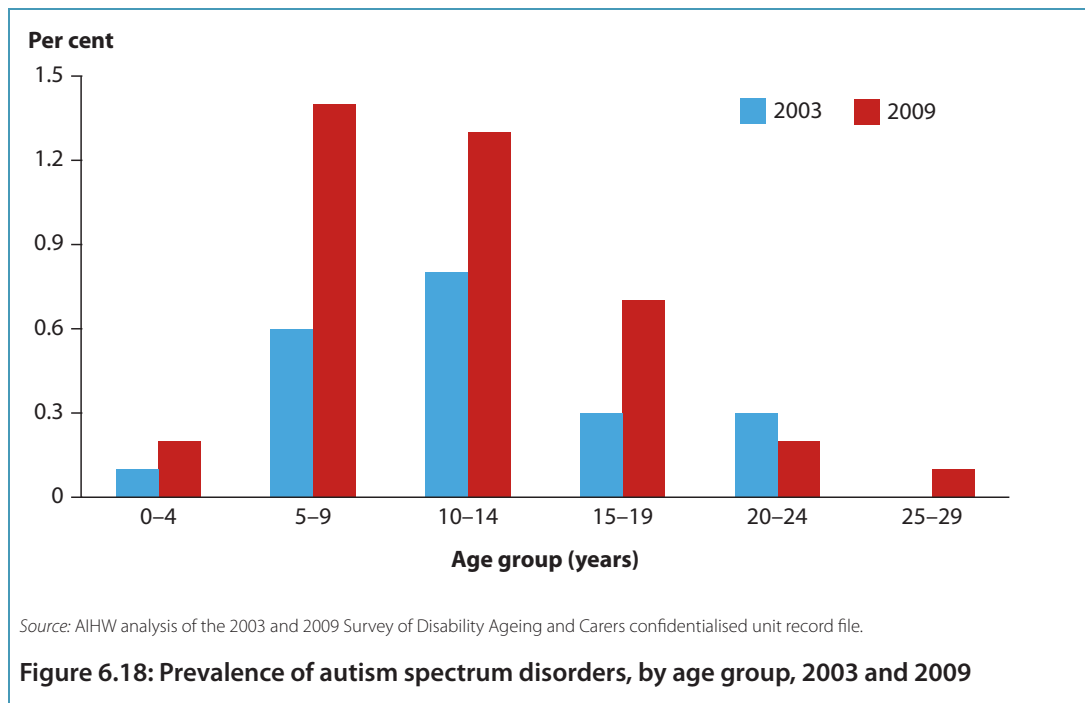
The ABS 2009 Survey of Disability, Ageing and Carers shows that an estimated 64,600 Australians have ASDs—82% are male (ABS 2011b). Overall, the prevalence almost doubled between 2003 and 2009 (an increase of 34,200).

Prevalence by age

The prevalence of ASDs varies according to age, with rates highest for children aged 5–14, before dropping off during the late teens (Figure 6.18).

Children are more likely to be diagnosed younger for ASDs, such as autistic disorder (AD), that have characteristics including significant language and cognitive impairments. On the other hand, diagnosis of PDD-NOS and AS usually occurs later, with greater frequencies (Chakrabarti & Fombonne 2001; Hertz-Picciotto & Delwiche 2009). It is noteworthy that the rates of ASDs were highest in children aged 5–14, and increased between 2003 and 2009.





Reasons for increased prevalence

The reasons for the changing prevalence rates of ASDs are not clear, although the ABS (2011b) has suggested that the reduction in the number of criteria required to be met for a diagnosis may have had some influence. In particular, the ABS (2011b) points to changes in diagnostic criteria over time correlating with age specific rates, as seen in Figure 6.18.

Others, however, have considered broadening of the diagnostic concept (as distinct from criteria), diagnostic substitution, greater awareness, the use of more reliable diagnostic tools, and a true rise in incidence due to an environmental risk factor as possible factors, around which there is some debate (Silove et al. 2008; see also Bishop et. al. 2008).

There has also been some disagreement on inclusion of disorders on the spectrum over the past decade and more (Chlebowski et al. 2010; Lenne & Waldby 2011). One of the main areas of contention is with AS and whether it is equivalent to what is termed 'higher functioning autism', and therefore belonging on the spectrum or a separate disorder (Kamp-Becker et al. 2010). This is highly significant to any discussion of ASDs, statistically, as there are far more people with PDD-NOS and AS than AD, and as noted above, both PDD-NOS and AS are generally diagnosed somewhat later than AD (Chakrabarti & Fombonne 2001; Hertz-Picciotto & Delwiche 2009).

Administrative data for autism

Data are available on services provided to people with autism under the National Disability Agreement. These data show that people with autism often require ongoing support both at home and in the community. Although only 6% of specialist disability service users overall report autism as their primary disability, they represent the second-highest proportion (18%) of service users among 0–14 year olds, next to those with intellectual disability (22%). This may be in part because 49% of those reporting autism as a primary disability also reported other significant disabilities (AIHW 2011r). Of all specialist disability services users with autism, 39% always require help with activities of daily living, compared with 37% of people with intellectual disability (AIHW 2011r). In terms of activities of work, education and community living, the comparison is somewhat different. About 49% of all service users with autism always require support in these activities, compared with 61% of those with intellectual disability.

Many people with autism struggle to find and maintain employment. Those with autism are reported as using both open and supported employment services. In 2009–10, 43% of open employment service users with autism were employed and 57% were unemployed (AIHW 2011r).

What is missing from the picture?

There are limited national data available for research into the reasons for the increased prevalence of ASDs.

The U.S. Centers for Disease Control and Prevention (Rice: CDC 2009) have suggested comparison of the changing prevalence rates for ASDs, attention deficit hyperactivity disorder (ADHD), asthma and allergies to ascertain if changes in the prevalence of ASDs are occurring in isolation.

Where do I go for more information?

Current information on specialist service provision to people with ASDs is in *Australia's welfare 2011* (AIHW 2011s) and *Disability support services 2009–10* (AIHW 2011r).



6.15 Inflammatory bowel disease and irritable bowel syndrome

At a glance

- Inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS) are two conditions characterised by recurring symptoms of abdominal pain, discomfort and alterations in bowel habits.
- It is estimated that about 70,000 people in Australia are living with IBD. The number of people hospitalised for ulcerative colitis and Crohn disease (the two most common forms of IBD) has almost doubled in the past decade.
- Symptoms of IBS are experienced by about 1 in 10 people, but it is probably under-reported.



Introduction

IBD and IBS are two conditions that share some symptoms, although IBD is considered the more serious as it causes damage to the digestive tract. While IBS can be painful and can lower quality of life, it is not associated with structural or biochemical abnormalities.

IBD encompasses a range of diseases that involve inflammation and subsequent damage to the digestive tract. The most common forms of IBD are ulcerative colitis (chronic inflammation to the surface of the colon) and Crohn disease (deeper inflammation in any part of the digestive system from the mouth to anus). In both, the inflammation is thought to be caused by excessive activity from the immune system in response to an unknown trigger in the digestive tract (Xavier & Podolsky 2007).

IBS is a chronically recurring condition of the lower digestive system that will not show up as physical or blood test abnormalities. Symptoms include diarrhoea, constipation or a combination of both. The causes are not fully understood, and are thought to include genetic, biological and environmental factors (Victorian Government 2012).

For both conditions, those affected experience periods of being well and unwell. When unwell, symptoms can lead to reduced quality of life and time absent from school or work, and hospitalisation in the case of severe episodes (ACCA 2009).

What do we know about these conditions?

Inflammatory bowel disease

It is estimated, based on recent incidence surveys, that there are about 70,000 people in Australia living with IBD (Wilson et al. 2010). In 2009–10, there were about 27,000 hospitalisations where Crohn disease or ulcerative colitis was recorded as the principal diagnosis (Table 6.12). There were slightly more females than males hospitalised for Crohn disease, while the reverse was true for ulcerative colitis.

Even though most patients hospitalised were discharged on the same day, two-thirds of all time spent in hospital for these conditions was for patients who were hospitalised for one night or more; the average length of stay was 6.2 days for Crohn disease and 7.4 days for ulcerative colitis.

Table 6.12: Hospitalisations for IBD and IBS^(a), 2009–10

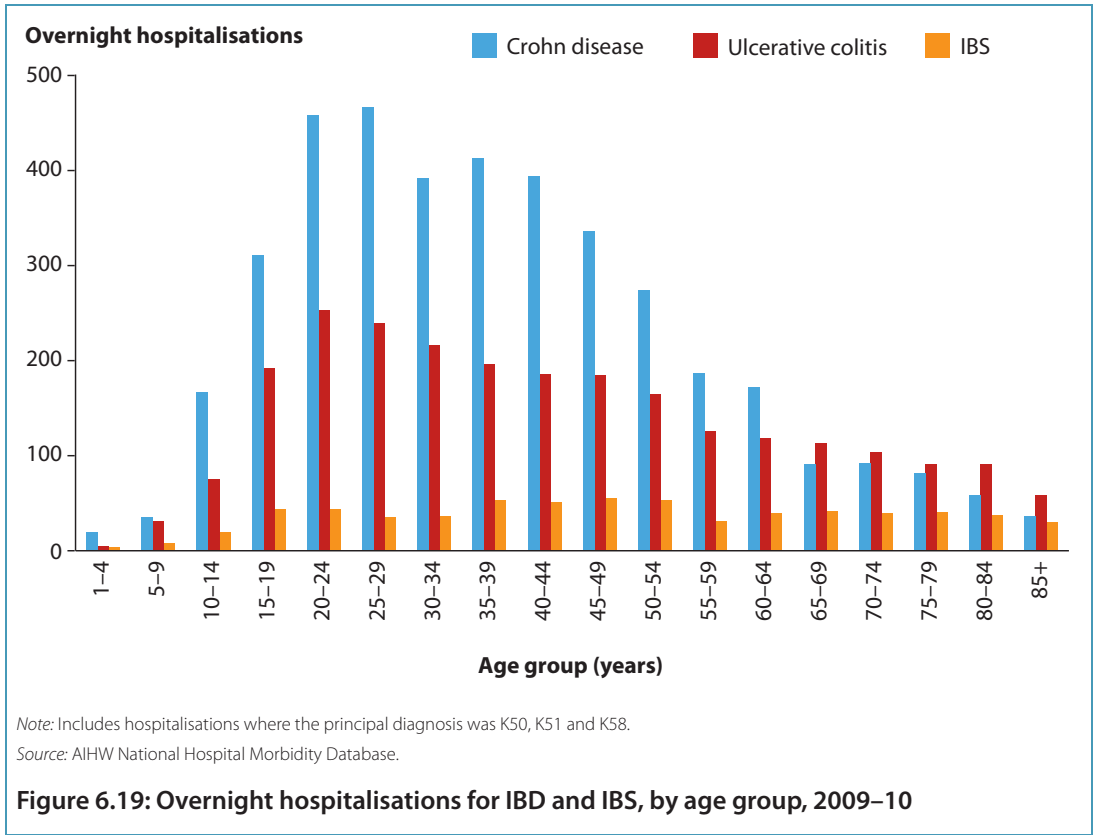
Measure	Inflammatory bowel disease					
	Crohn disease		Ulcerative colitis		Irritable bowel syndrome	
	Number	Per cent	Number	Per cent	Number	Per cent
Hospitalisations						
Overnight	4,040	24	2,480	23	670	8
Same-day	12,720	76	8,080	77	7,860	92
<i>Total</i>	<i>16,760</i>	<i>100</i>	<i>10,560</i>	<i>100</i>	<i>8,530</i>	<i>100</i>
Average length of stay for overnight hospitalisations (days)						
	6.2		7.4		4.0	

(a) Includes hospitalisations where the principal diagnosis was K50, K51 and K58.

Source: AIHW National Hospital Morbidity Database.

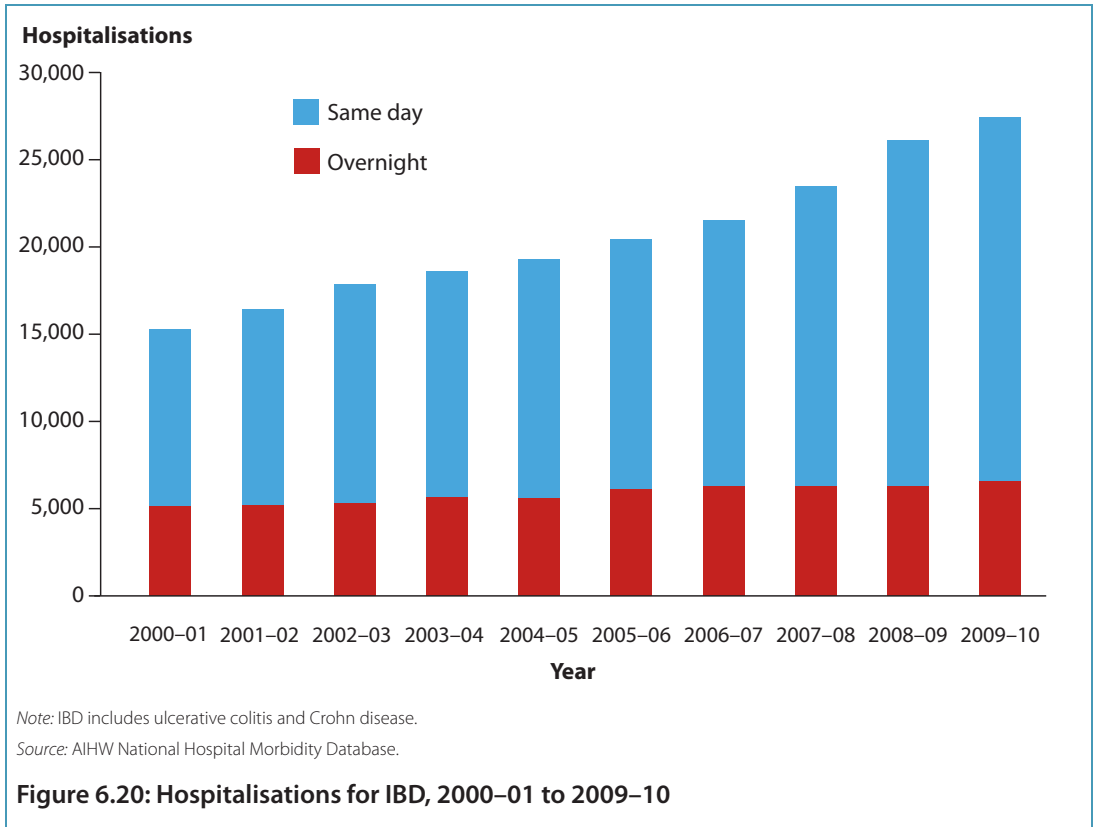


While IBD may occur at any age, its onset is usually between 15 and 40 (Hanauer 2006). Hospitalisation is more common in people of working age (15–54) (Figure 6.19). This may have important implications for productivity at school and work (ACCA 2009).



There has been a steady increase in hospitalisations for ulcerative colitis and Crohn disease (the two most common forms of IBD), with the number almost doubling in the past 10 years (Figure 6.20). This trend has been mainly associated with an increase in same-day hospitalisations.





As IBD affects the digestive system, it commonly causes difficulties in absorbing nutrients from the diet. This can lead to weight loss, nutrient deficiencies, and impaired growth in children and adolescents (Escott-Stump 2008). While IBD can increase the risk of bowel cancer, there are relatively few deaths from this condition (Access Economics & ACCA 2007). Between 1998-2007, IBD was recorded as the underlying cause of death for 448 people in Australia (AIHW analysis of the AIHW National Mortality Database).

Treatment for IBD can involve anti-inflammatory and immunosuppressant medications and alterations to a patient's diet (Escott-Stump 2008). Surgery to remove permanently damaged or blocked sections of digestive tract may be undertaken, and this occurs in up to one-third of ulcerative colitis and three-quarters of Crohn disease cases (Access Economics & ACCA 2007). Surgery may cure some forms of IBD but ongoing quality of life will still be affected.



Irritable bowel syndrome

Based on surveys using IBS-specific diagnostic criteria, an estimated 1 in 10 Australians experience symptoms associated with IBS at some time (Boyce et al. 2000, Boyce et al. 2006); however, not all seek medical care (Talley et al. 1997). IBS affects twice as many females as males, with symptoms generally first appearing in early adulthood (Drossman et al. 2002; Charles & Harrison 2006).

While IBS can lead to hospitalisation, it is less likely than IBD to require an overnight stay (Table 6.12). In 2009–10, there were about 9,000 hospital admissions where IBS was recorded as the principal diagnosis. However, only 8% of these were overnight stays, compared with more than 20% for the two forms of IBD. Further, the average length of an overnight stay for IBS was much shorter. Females were much more likely than males to be hospitalised with IBS—71% of hospitalisations in 2009–10 were for females. The overall number of hospitalisations for IBS has remained relatively stable in the past 10 years.

Treatment for IBS often involves reassurance it will not lower life expectancy and treating specific symptoms through medication, dietary and lifestyle adjustments, and investigating and then avoiding triggers (Johannesson et al. 2011; Staudacher et al. 2011).

What is missing from the picture?

There are limited Australian data on the current incidence and prevalence of IBD and IBS. As with many other conditions, respondents in population health surveys may not be aware that they have IBS or IBD at the time of the survey, they may not know its medical term, or they may be unwilling to report it. Reliable estimates cannot be made if there are not enough cases reported.

Further, the most recent published estimates of the burden caused by these conditions include IBD as a combined group, not separate diseases, and do not include IBS (Begg et al. 2007).

Where do I go for more information?

More detail on hospitalisations for IBD and IBS can be viewed on the interactive hospital data cubes on the AIHW website—see <www.aihw.gov.au/hospitals-data/>.



6.16 Multiple chronic conditions

At a glance

- Living with multiple chronic conditions takes its toll on more than a person's health—it also affects their quality of life and leads to increased health costs.
- Overall, 2% of people reported four or more concurrent health conditions in 2007–08; this figure was higher among those aged 65 or older (8%).
- Arthritis and high blood pressure was the most common comorbidity, and these conditions also featured in other comorbidities.



Introduction

Studies have shown that having multiple chronic conditions is associated with worse health outcomes, complex clinical management and increased health costs (Valderas et al. 2009) in addition to a poorer quality of life (Walker 2007). Different combinations of chronic conditions affect people in different ways, and this influences how the conditions are managed.

The likelihood of having one or more chronic conditions increases with age. Hence, with the general ageing of the population the associated burden on individuals and communities is expected to increase. Understanding patterns of multiple chronic conditions can help with planning prevention programs and improving health services.

The term comorbidity is defined in this section as more than one illness, health condition or disorder experienced by an individual at the same time.

This section describes the number of chronic conditions people have and the common combinations in which they occur. Other sections in this report provide information on individual chronic conditions (such as, diabetes, cardiovascular disease or cancer).

In this section, data on multiple chronic conditions were sourced from the ABS 2007–08 National Health Survey, and are 'as reported' by the survey respondents. Therefore, the data may not be as accurate as information obtained through health services, or from clinicians.

Nine chronic conditions were selected for analysis: asthma, Type 2 diabetes, coronary heart disease, cerebrovascular disease (mainly stroke), arthritis, osteoporosis, COPD, depression and high blood pressure.



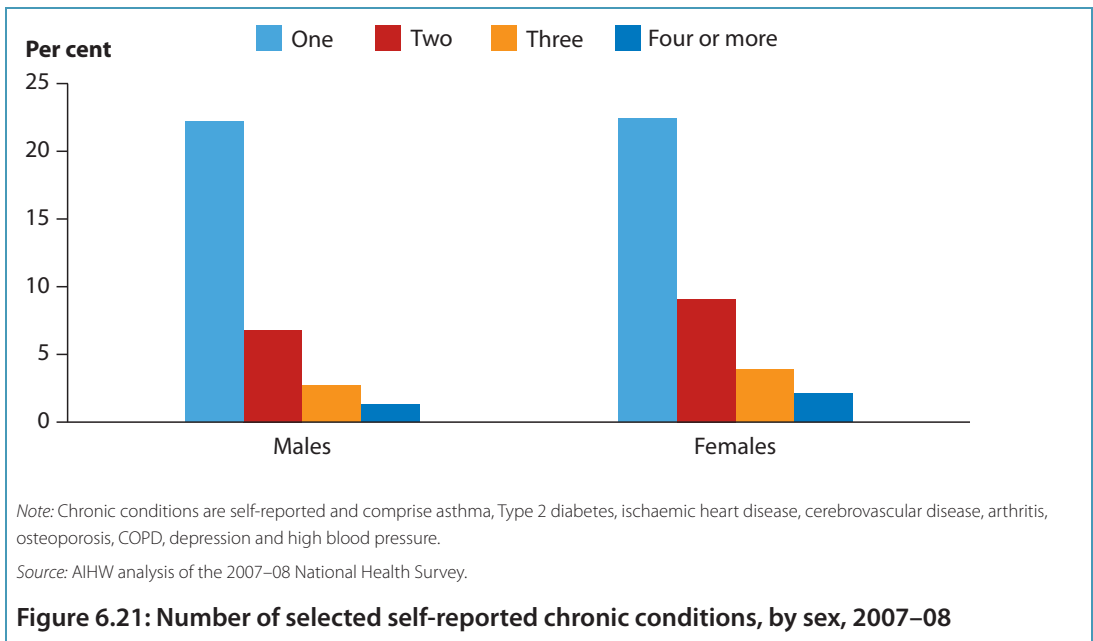
These conditions were selected because:

- they are largely preventable—mainly through the reduction of health risk factors (see ‘Section 1.3 Determinants of health’)
- outcomes of management and medical treatment are better if these conditions are detected and treated in their early stages (NPHP 2001)
- suitable data were available from the 2007–08 National Health Survey.

Other chronic conditions can also affect Australians and contribute to the national burden of disease and health costs. For example, chronic kidney disease and individual cancers affect a substantial number of Australians; however, 2007–08 National Health Survey data do not support detailed analysis for these conditions.

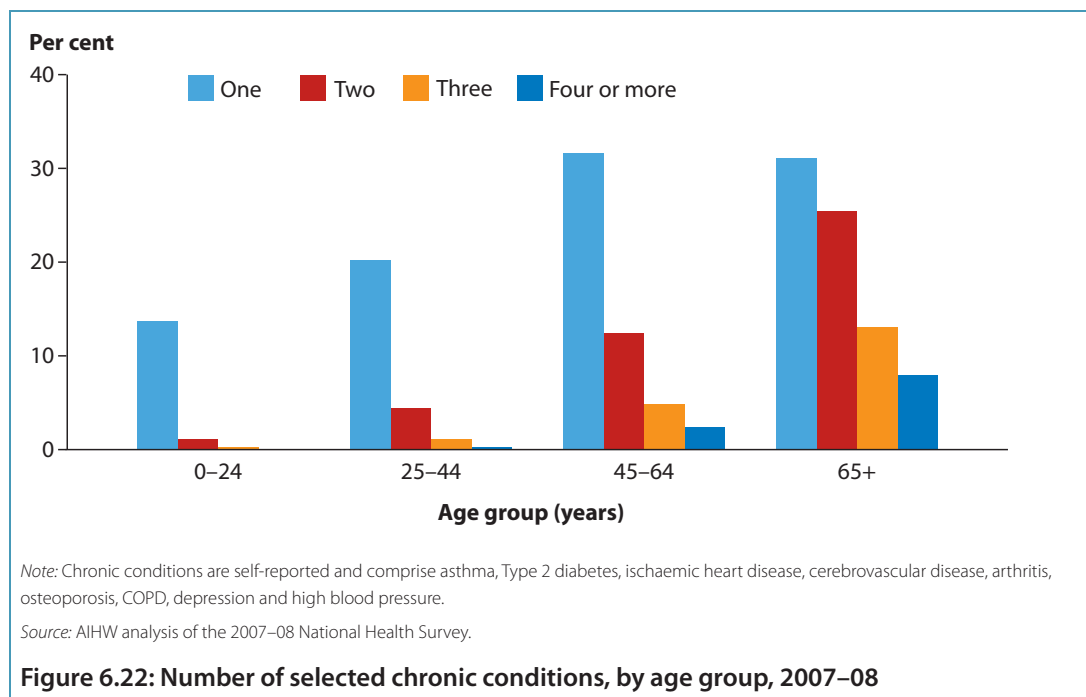
What do we know about the number of chronic diseases?

In 2007–08, 35% of the population had at least one of the chronic diseases listed above; this equates to more than 7 million Australians. An estimated 2% of the population reported four or more concurrent conditions (Figure 6.21).



As the likelihood of having a chronic condition increases with age, so does the number of concurrent conditions. Almost 15% of people in the 0–24 age group reported having at least one of the chronic conditions, compared with 78% of people aged 65 or over (Figure 6.22). Higher numbers of chronic conditions (four or more) were prominent in the 45 or over age groups, with 8% of the population aged 65 and over reporting four or more conditions.





What do we know about the combinations of chronic diseases?

For males and females, arthritis and high blood pressure was the most common comorbidity, and the conditions also featured in other comorbidities (Table 6.13). In the younger age groups, asthma and depression was the most common comorbidity, affecting 91,300 Australians under the age of 45. Similar to the overall population, the most common comorbidity among those aged 45 or older was high blood pressure and arthritis.

Table 6.13: Top three combinations of selected chronic conditions reported, 2007–08

Chronic conditions	Males		Females	
	('000)	Per cent	Chronic conditions	('000) Per cent
High blood pressure and arthritis	125.4	1.2	High blood pressure and arthritis	237.4 2.3
High blood pressure and Type 2 diabetes	59.8	0.6	Osteoporosis and arthritis	120.3 1.2
Depression and arthritis	55.8	0.5	Depression and arthritis	101.8 1.0

Note: Chronic conditions are self-reported and include asthma, Type 2 diabetes, ischaemic heart disease, cerebrovascular disease, arthritis, osteoporosis, COPD, depression and high blood pressure.

Source: AIHW analysis of the 2007–08 National Health Survey.



What is missing from the picture?

The inability to report on all chronic conditions is a limitation of this analysis. As noted previously, some conditions, such as chronic kidney disease, are not identifiable from the National Health Survey data used for this analysis. Further, their prevalence in the community is low, making it difficult to collect information about all chronic conditions through a population survey, and report on with any reliability.

Other conditions that are not included in the National Health Survey, such as dementia, are more prevalent in residents of non-private dwellings, such as nursing homes. Health surveys usually collect information from residents of private dwellings, therefore excluding people in residential care (with dementia) from survey estimates.

Additional data could help fill the picture on comorbidity and how this affects people in Australia, for example, data on the type and frequency of health services used, medications taken and people's ability to carry out their daily lives. Other data sources currently available may also be helpful; for example, hospital data can be used to show the conditions that have an impact on the care received by admitted patients.

More detailed information will support planning for future health services, requirements for medications and medical aids, and targeted interventions.

Where do I go for more information?

In 2012, the AIHW published the report *Risk factors contributing to chronic disease* (AIHW 2012d), which provides detailed information on combinations of health risk factors. This analysis is summarised in 'Section 5.12 Multiple risks factors' of this report.

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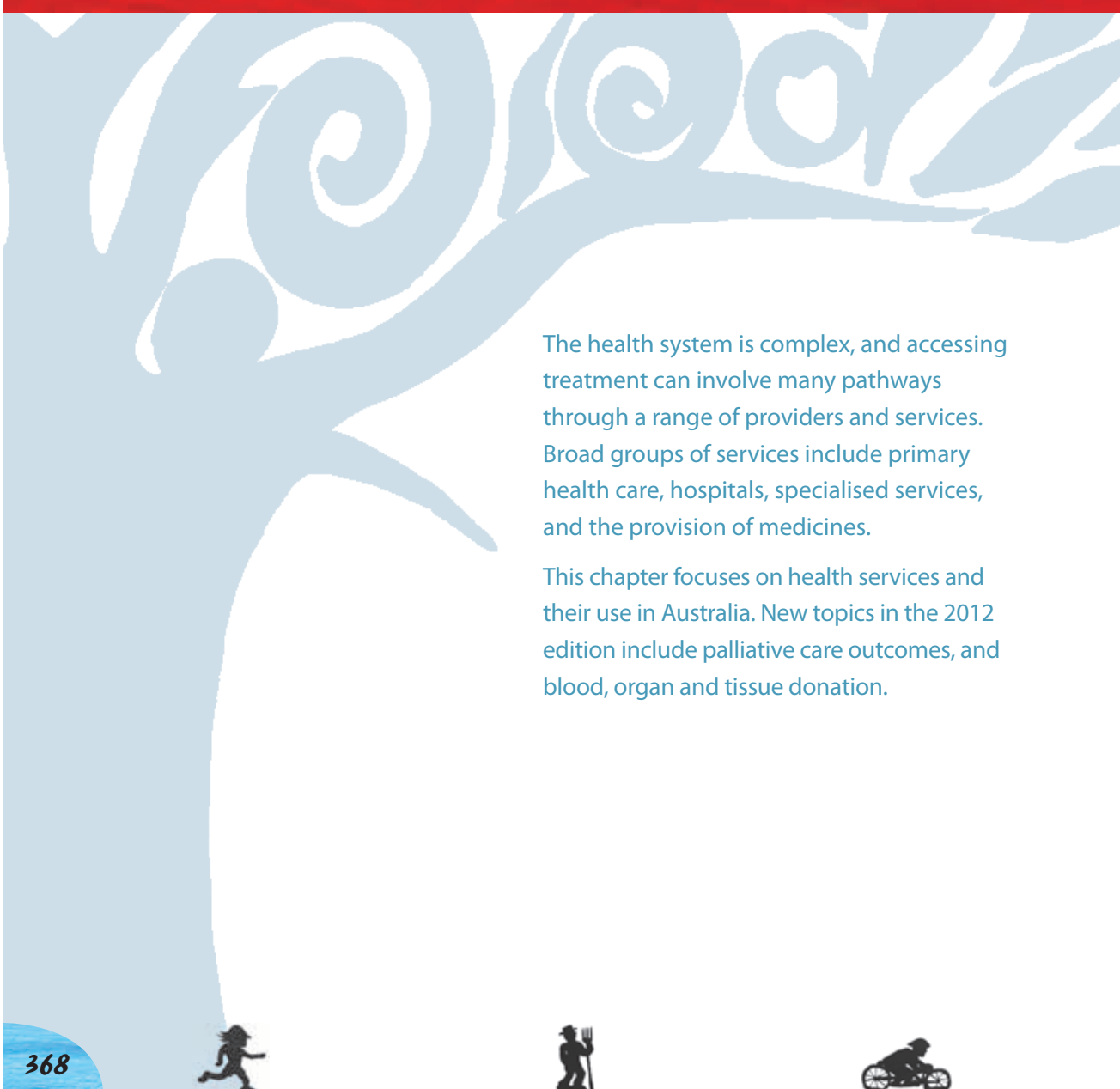
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The health system is complex, and accessing treatment can involve many pathways through a range of providers and services. Broad groups of services include primary health care, hospitals, specialised services, and the provision of medicines.

This chapter focuses on health services and their use in Australia. New topics in the 2012 edition include palliative care outcomes, and blood, organ and tissue donation.

CHAPTER 7

TREATING ILL HEALTH



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7.1 Navigating the health system

At a glance

- The health system is complex, involving many possible pathways and outcomes.
- For many health issues, people's first contact with the system is through a GP.

Introduction

Given the complexity of the health system described in 'Section 1.4 Australia's health system—an overview' and elsewhere in this report, it is not surprising that people with limited experience of it have difficulty navigating the various pathways among providers, funders and other resources. Navigating this path is even more challenging when ill health or disability impose barriers to access, or a person has lower health literacy (see 'Section 5.1 Health literacy') or lower proficiency in English.

What do we know about moving through the health system?

There are many possible pathways through the health system, as depicted in Figure 7.1. Some people start managing a health issue themselves, which might include seeking information from the internet, books, magazines and so forth, or by talking with friends and family.

Another initial action may be to seek help from a telephone-based health advice service, such as *healthdirect Australia*. Most state and territory governments, with support from the Australian Government, have in recent years established this free 24-hour health triage, information and advice service. It is staffed by health professionals who answer queries from callers about health problems, assisted by specialised reference software. The aim is for the service to become nationwide, and at the end of 2011 it covered the Australian Capital Territory, Northern Territory, New South Wales, South Australia, Western Australia and Tasmania.

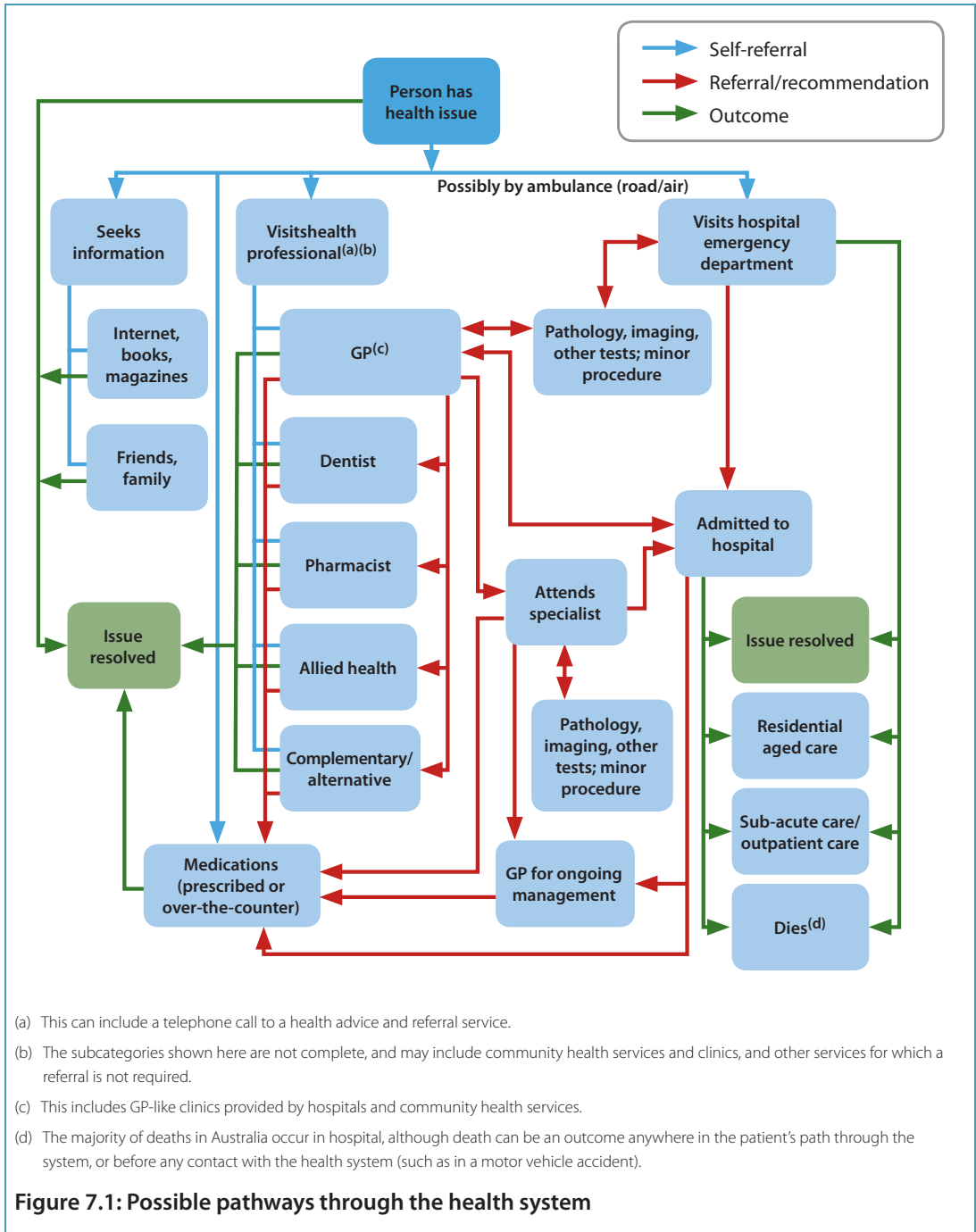
Australians also visit dentists and other private sector health professionals, such as physiotherapists, chiropractors and natural therapists. Costs are usually met by the patients, or with the support of private health insurance. Medicare also subsidises dental health services for specific population groups, such as teenagers and those living with chronic conditions and complex care needs (DoHA 2011a).

Someone seeking help may also choose to visit a community-based health professional (for example, a pharmacist or community nurse), who may in some cases provide advice or other health services for free.

For many issues though, people's first contact with the health system is through a GP. Patients can choose their own GP and are reimbursed for all or part of the fee by Medicare (see Box 7.2 in 'Section 7.3 General practitioners').

For specialised care, patients can be referred by GPs to specialist medical practitioners, other health professionals, and hospitals or community-based health-care organisations. Community-based services—some of which can also be accessed directly by patients—provide care and treatment for such health concerns as mental health, alcohol and other drug use, family planning and sexual health services.





- (a) This can include a telephone call to a health advice and referral service.
- (b) The subcategories shown here are not complete, and may include community health services and clinics, and other services for which a referral is not required.
- (c) This includes GP-like clinics provided by hospitals and community health services.
- (d) The majority of deaths in Australia occur in hospital, although death can be an outcome anywhere in the patient's path through the system, or before any contact with the health system (such as in a motor vehicle accident).

Figure 7.1: Possible pathways through the health system



Patients can access public hospitals through emergency departments, where they may present on their own initiative, through ambulance services, or after referral from a GP. Public hospital emergency and outpatient services are free under Medicare arrangements, as is inpatient treatment for public patients.

People can also choose to be treated as private patients when they are in hospital, whether the hospital is a public or a private hospital. Private patients can select their treating specialist, but charges then apply for all of the hospital's services (such as accommodation and surgical supplies). Medicare subsidises the fees charged by doctors, and private health insurance contributes towards medical fees and hospital costs.

An emerging capability of the health system is telehealth, also termed telemedicine, which uses computing and communications technologies to provide health-care services 'at a distance'—an example would be a rural GP and their patient having a video conference with a specialist in a major city. Other aspects of telehealth are described in Box 7.1.

Box 7.1: Telehealth

Telehealth is the use of telecommunications technologies to deliver health-related services and information that support patient care, administrative activities and health education. It has the potential to improve access to care while reducing transport costs and increasing convenience to patients in obtaining care. Modes of telehealth include:

Tele-consultation Real-time consultations between medical professionals and patients, or among teams of medical professionals with or without patients.

Store and forward The transmission of medical data (such as X-rays, photographs of skin lesions, blood tests) for remote diagnosis, including a discussion between, say, the referring provider and a specialist. Another application of this form of telehealth is access to such data by practitioners after hours, or while they are visiting a patient.

Tele-homecare, or remote monitoring The transmission of medical data for disease and injury management and prevention. Examples include monitoring of patients undergoing dialysis, or providing support and care to elderly people with chronic conditions living at home. Data, such as weight, blood pressure, or glucose level, are captured via medical devices in the patient's home and then transmitted to a provider system by the internet. Nurses and doctors can use the data to suggest changes in a patient's treatment, advise patients to seek care, or alert providers of potential complications.

Tele-education The transmission of medical information, either for the training of health professionals or to assist members of the public to self-manage their health.

Sources: Dixon et al. 2008; NICTA 2010.

Despite the advent of telehealth to supplement the services provided in traditional settings, some people are not able to make full use of the range of health services available. This could be for reasons such as cost, distance to services (or lack of transport options even if the service is relatively local), or availability of services at a suitable time. Some people also choose not to access services for various reasons.



In some cases, the care traditionally provided by a particular type of practitioner may be substituted by a different practitioner. For example, an oral health therapist may be able to provide a range of services that a dentist would provide in another situation. And in remote Australia, for example, some primary care services may be provided by a nurse or Aboriginal health worker rather than a GP.

At the time of writing, the Australian Government was undertaking major reforms to hospitals and the health-care system, including the establishment of Medicare Locals and Local Hospital Networks. Medicare Locals aim to improve access to, and coordination of, health services for consumers by:

- linking local GPs, nursing and other health professionals, hospitals and aged care, and Aboriginal and Torres Strait Islander health organisations
- maintaining up-to-date local service directories
- working closely with Local Hospital Networks to ensure that primary health-care services and hospitals work well together for their patients
- identifying where local communities are missing out on services they might need and coordinating services to address those gaps (including after-hours care)
- being accountable to local communities to ensure services are effective and high quality (DoHA 2011b).

What is missing from the picture?

Other parts of this report provide detailed information on the activity that happens in each of the services depicted in Figure 7.1. However, there is scant information on the pathways through the system, and the relative advantage of one path over another.

Another aspect implied in the diagram is the time taken to move from one part of the system to another. Although there is information available on waiting times for elective surgery, and waiting times in emergency departments (see 'Section 7.9 Admitted hospital care' and 'Section 7.10 Non-admitted hospital care'), there are many time intervals and 'lags' for which there is no information. (Note that in some cases time lags are by choice, for example, an individual delaying seeking help for a health issue.)

As the capacity to link data collections improves (with appropriate privacy protections), it will be possible to conduct these type of patient movement analyses, with the aim of understanding how certain pathways and patterns of care produce better health outcomes.

Where do I go for more information?

The rest of this chapter includes detailed statistics on many of the health services outlined in this section. Chapter 8 provides information on the financing of the health system and Chapter 9 details the health workforce.

For more information on Medicare Locals and the broader health reforms, see the Australian Government health reform website: <www.yourhealth.gov.au>.



7.2 Primary health care in Australia

At a glance

- The majority of health-care services are provided through the primary health-care system, including 130 million services subsidised by the MBS and about 200 million prescriptions subsidised by the PBS and RPBS in 2010–11.
- In 2010–11, 39% of hospital emergency department presentations were for GP-type consultations.
- There is no nationally coordinated approach to primary health-care data collection, which means there is little information available to answer fundamental questions such as ‘Why do people consult a health professional?’ and ‘What was the outcome from the consultation?’



Introduction

The primary health-care system is often referred to as the ‘entry level’ or ‘gateway’ to the broader health system. Primary health care is typically the first health service visited by patients with a health concern. It includes most services not provided by hospitals and involves a wide range of professions, such as GPs, pharmacists, ambulances, community health workers, Aboriginal health workers, practice nurses and dentists.

This section provides an overview of primary health-care arrangements in Australia, including financing, reforms, and performance indicators.

What do we know about primary health care?

The primary health-care sector provides the vast majority of health care in Australia. Improved monitoring of its inputs, activities, outputs and outcomes will be critical to understanding Australia’s health system and health.

The key national administrative data collections for primary health care include data collected as part of the MBS and PBS. These sources focus on general practice and pharmacy and do not cover the whole sector. Their main limitation is that it is generally not possible to link actions or medications with the problem or condition being treated. Other than some survey-based information, in most cases we have little information, if any, about why someone went to the health professional, what happened while they were there, or what the outcomes were.

Also, the service delivery, funding and governance arrangements for primary health care continue to be complex. As noted in the DoHA’s 2009 report on primary health-care reform in Australia, the service delivery system has been complex, fragmented and often uncoordinated and this has had implications for the services people receive and how they are paid for (DoHA 2009a).

Funding for primary health-care services in Australia is provided from a variety of sources, including:

- Australian Government programs such as:
 - MBS funding for GP and some primary health-care services
 - PBS funding for medicines and services provided by pharmacists
 - a range of other programs covering:
 - o preventive health (including immunisation) and health promotion activities
 - o support for general practices to provide quality health care and improve access and health outcomes for patients
 - o improved health access for Aboriginal and Torres Strait Islander people to improve life expectancy, and reduce child mortality
- state and territory government-based programs from different agencies and portfolios, including health, community services and justice programs
- local government programs, such as immunisation programs
- fees charged directly to patients and clients
- private health insurers and worker's compensation insurers
- non-government organisations and private charities targeted at specific issues.

A strong primary health-care system has been shown to be associated with improved population health, decreased health costs, appropriate care and positive health outcomes (Starfield et al. 2005).

For these reasons, the primary health-care sector plays a key role in reducing the overall health burden, including the burden on the hospital system and health expenditure (DoHA 2010a).

For example, in 2009–10 there were about 8.6 million hospitalisations and 7.4 million presentations to emergency departments in Australia. In comparison:

- 125 million claims totalling \$5.3 billion were made through the MBS for general practice activity in 2010–11
- in 2010–11, 201 million medicines were subsidised by the PBS, including RPBS, totalling \$8.3 billion in payments (Medicare Australia 2011a).

In the same year, private health insurers offered rebates for a range of allied health services, including:

- 8.6 million physiotherapy services totalling \$242 million
- 8.8 million chiropractic services totalling \$214 million
- 8.0 million optical services totalling \$524 million
- 28.4 million dental services totalling \$1.6 billion (PHIAC 2011).

What changes are occurring in primary health care?

As Australia's population ages, there are increasing concerns that the health system will be ill-equipped to cope with the demand for health services (AIHW 2000). In the future, it appears likely that an increasing proportion of the population will suffer from multiple chronic conditions and have complex health-care needs.



Overall use of health services and prescribing of medicines are increasing faster than population growth in Australia.

Total MBS services have increased from 214 million services (11.1 per person) in 2000–01 to 319 million services (14.2 per person) in 2010–11. This is an increase of 28% per person (Medicare Australia 2011b).

Over the same period, claiming of PBS benefits (including RPBS) by pharmacists has increased from 160 million services (8.3 per person) in 2000–01 to 201 million (8.9 per person) in 2010–11, or an increase of 7% per person (Medicare Australia 2011a).

In light of these concerns and other gaps in the health-care sector, the National Health and Hospitals Reform Commission was established in 2008. The Commission's final report, released in June 2009, highlighted the likely strain on, and critical role of, the primary health-care sector in managing the future demands on the health system (National Health and Hospitals Reform Commission 2009).

In 2010, the Australian Government released *Building a 21st century primary health care system: Australia's first national primary health care strategy* (DoHA 2010a). This report further highlighted the need to address the growing burden on the health system and the important role that primary health care would play. In addition to the ageing population, this work highlighted changes in service delivery, including a trend toward shorter hospital stays, as creating additional pressures on the primary health-care system (DoHA 2009a).

Over the course of 2010 and 2011, the Australian Government announced a range of national health reforms, including those outlined in *A national health and hospitals network for Australia's future* (Australian Government 2010). These reforms include support for 64 GP Super Clinics and about 425 infrastructure grants to general practices, primary health care and community health services, and Aboriginal Medical Services, improved after-hours services, new incentives to support practice nurses as well as changes in mental health (DoHA 2011c).

On 2 August 2011, the Australian Government and all Australian state and territories became signatories to the National Health Reform Agreement (COAG 2011a). These reforms will establish a range of new bodies.

Medicare Locals

For many years, Divisions of General Practice have provided services and support to general practices at the local level.

Under the national health reforms, primary health-care organisations called Medicare Locals will replace the existing Division of General Practice in some areas. The charter of Medicare Locals is broader than that of the Divisions of General Practice in that they will be responsible for establishing and coordinating primary health-care delivery for general practice and non-general practice health-care providers (see 'Section 7.1 Navigating the health system'). By 1 July 2012, it is expected that 57 of the 62 Medicare Locals across Australia will be operating.

Primary health-care indicators

Indicators commonly used in Australia to consider the potential quality or effectiveness of primary health care are 'Potentially avoidable GP-type presentations to emergency departments' (AIHW 2011a) and 'Potentially preventable hospitalisations' (AIHW 2011b).

'Potentially avoidable GP-type presentations to emergency departments' estimates the number of attendances at public hospital emergency departments that could have potentially been avoided through the provision of appropriate non-hospital services in the community.

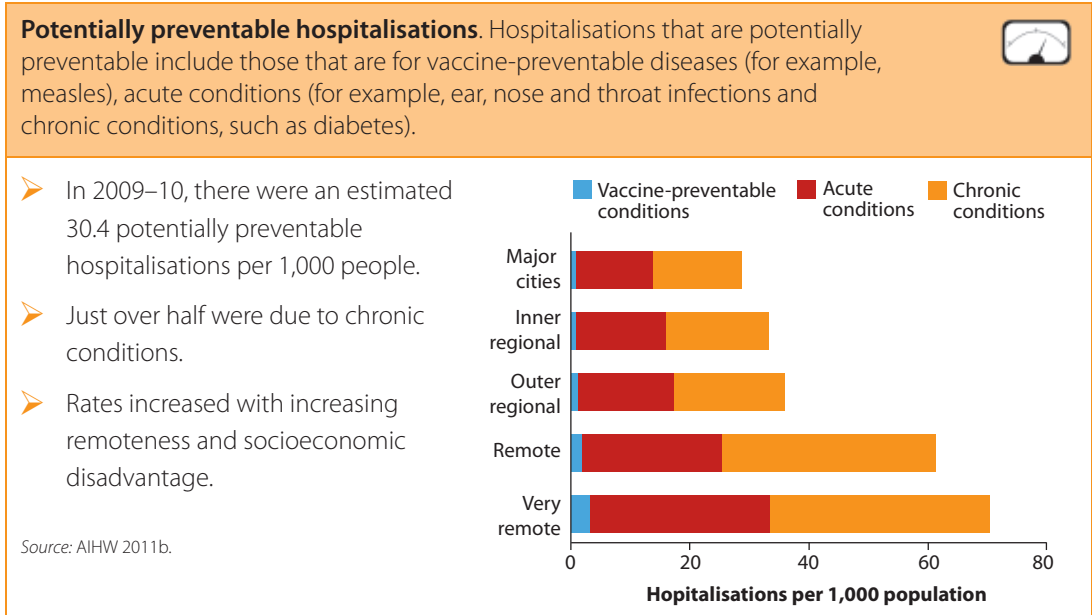
As currently reported, this indicator is only an approximation of the people who could be receiving service in the primary health-care sector. The current definition does not include information on the patient's condition, treatment received, or whether they were referred to the emergency department by a GP as this information is not nationally available.

'Potentially preventable hospitalisations' are defined as hospitalisations that could have potentially been prevented by providing appropriate non-hospital health services, particularly primary health care.

A third indicator, 'Bulk-billing for non-referred (GP) attendances', provides an insight into the accessibility of primary care services, to the extent that cost might be a barrier to access. Under the MBS bulk-billing process, the patient assigns his/her right to a Medicare benefit to the practitioner as full payment for the medical service. No additional charge can be made for the service. Effectively, the full cost of the service is paid by the MBS with no out-of-pocket expense to the patient.

Bulk-billing rates for non-referred GP attendances have fluctuated over the past 2 decades, reaching a relative low of 67.6% in 2003–04 and peaking at 79.1% in 2009–10 (AIHW 2011a).

These indicators should be interpreted together with other factors that affect the use of primary health care, such as physical accessibility and availability (for example, existence of the required service, ability to attract and maintain staff, and opening hours), in addition to the health status of the community.



Potentially avoidable GP-type presentations to emergency departments.

The number of presentations to the emergency department, where the presentation was allocated a triage category of *semi-urgent* or *non-urgent* and the person did not arrive by ambulance, police or correctional vehicle, was not admitted to the hospital, or referred to another hospital, and did not die.



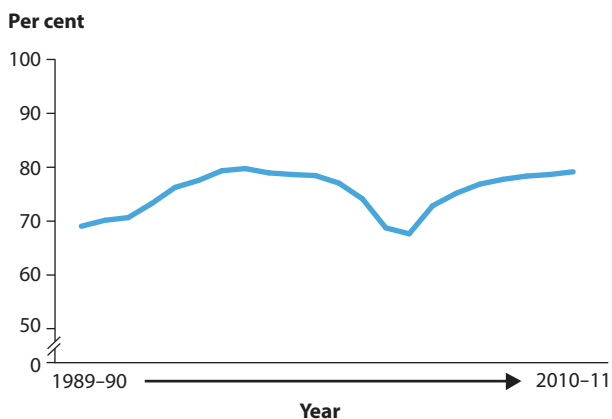
- In 2010–11, it was estimated that there were more than 2 million GP-type presentations in emergency departments.
- These accounted for an estimated 39% of recorded emergency department presentations.
- This figure is based on larger hospitals only, so does not include GP-type presentations to smaller hospital emergency departments.

Source: AIHW 2011a.

Bulk-billing for non-referred (GP) attendances. Percentage of non-referred attendances that were bulk-billed. Presented as a percentage of total annual GP attendances per financial year.



- More than 79% of non-referred GP attendances were bulk-billed in 2010–11.
- Rates varied across states and territories, from 44% in ACT to 84% in NSW.
- Bulk-billing rates have fluctuated over time, although they have increased for each of the last 6 financial years.



Source: DoHA 2011d.



What is missing from the picture?

Despite its critical importance, the Australian primary health-care setting has not experienced the same national focus on data capture, collation and reporting as other parts of the health system. As a result, there are:

- little data or only poor quality data collected about a particular service type at any level of government
- many 'bits' of data collected at a variety of different levels of government that are often overlapping, non-standardised and not centrally collated
- substantial volumes of data collected and stored within the private sector—by individual GP practices or private health insurers—that have historically not been accessed at a national level.

Primary health-care service providers, governance and funding mechanisms are varied, as are reporting systems and requirements. Unlike hospitals, where a set of data is agreed and provided by each jurisdiction to gain a national picture, there is no nationally coordinated approach to primary health-care data collection. This has meant that, in most cases, we have little information about:

- why someone went to a health professional
- what occurred during their consultation
- what interventions or management actions were recommended
- what outcomes were experienced
- what the full costs were.

Where do I go for more information?

Other sections in this report deal with specific elements of the primary health-care sector, including 'Section 7.3 General practitioners', 'Section 7.4 Other primary health-care providers' and 'Section 7.7 Use of medicines'.

For more information on GP data sources, see *Review and evaluation of Australian information about primary health care—a focus on general practice* (AIHW 2008) and the soon-to-be-released report *Primary health care in Australia* (AIHW forthcoming).



7.3 General practitioners

At a glance

- In 2010–11, 125 million GP services totalling \$5.3 billion were subsidised through the Medicare Benefits Scheme.
- The number of services has increased by an average 2.5% per year over the decade from 2001–02 to 2010–11, and total benefits paid has increased by 7.5% per year.
- In 2010–11, respiratory problems were the most common problems managed by GPs, at a rate of 20.4 per 100 encounters.

Introduction

General practice plays an integral role in the provision of primary health care in Australia. GPs diagnose, treat and manage health complaints, provide preventive advice and care, prescribe medicines, and refer patients to other primary, secondary and tertiary care where required, including specialists, hospitals and aged care.

GPs often operate out of a dedicated location, known as a general practice. There can be one or more GPs operating out of a single general practice. Some general practices include many GPs, and general practices can be co-located with other health facilities, such as pharmacies, dental surgeries and physiotherapists. Many GPs work closely with other professionals within a general practice, such as practice nurses, to provide services.

Government funding for GP services is predominantly provided by DoHA and administered by the Department of Human Services (previously Medicare Australia) through the MBS (Box 7.2). According to the 2010–11 BEACH survey, GPs claim payment from either the MBS or the Department of Veterans' Affairs (DVA) for about 95% of encounters. GPs also receive payment from individual patient contributions above the MBS schedule rebate amount.

What do we know about general practice?

In 2010–11, benefits were paid for 125 million GP services, totalling \$5.3 billion. This funding covers some GP services provided by other health professionals, such as practice nurses. See Box 7.3 for information on MBS statistics.

Box 7.2: Medicare Benefits Scheme

The MBS came into operation on 1 February 1984 as part of Australia's universal health insurance scheme, Medicare. Administered by the Department of Human Services, the MBS provides free or subsidised services by a range of practitioners, including certain diagnostic and therapeutic procedures.

All Australian residents are eligible for Medicare. Short-term visitors are not eligible unless they are covered by a reciprocal health-care agreement and the services are of immediate medical necessity.

The MBS establishes a schedule of fees for medical services, which dictates the payments or 'benefits' that the MBS contributes for those services. Practitioners are not obliged to adhere to the schedule fees, except in the case of participating optometrists and when practitioners bill Medicare directly, known as bulk-billing.

For non-hospital services, Medicare pays up to 100% of the schedule fee for GP consultations and up to 85% for services provided by medical specialists. The patient is responsible for the gap between the benefit paid and the schedule fee and any additional amounts charged above the schedule fee.

Further MBS measures provide a safety net: where the benefit for out-of-hospital costs does not cover the schedule fee, these gap amounts are tallied throughout the year. Once a family group or an individual has paid more than \$413.50 (from 1 January 2012 but indexed annually) the patients are reimbursed 100% of the fee up to the amount listed in the schedule. Further, where the actual fee paid by the patient exceeds the schedule fee, these additional out-of-pocket payments are also tallied. Once an annual threshold is reached, the MBS will meet 80% of any further out-of-pocket costs. This threshold is \$598.80 for families in receipt of Family Tax Benefit Part A and for concession cardholders, and \$1,198.00 for all other individuals and families. A 20% rebate on net medical expenses over \$2,060 can also be claimed through the income tax system.

Box 7.3: MBS statistics

MBS data provide information on the use of private medical services, which include services provided outside hospitals as well as medical services for private patients in public and private hospitals. The scheme covers a range of different services, from a single doctor consultation to multiple pathology tests for a single patient episode, each of which is counted as a separate item. MBS data do not contain the reason for a patient's encounter; consequently, it is not possible to directly compare different types of services based on MBS items. Also, for this reason, the terms 'items' or 'items of service' are generally used when referring to MBS services.

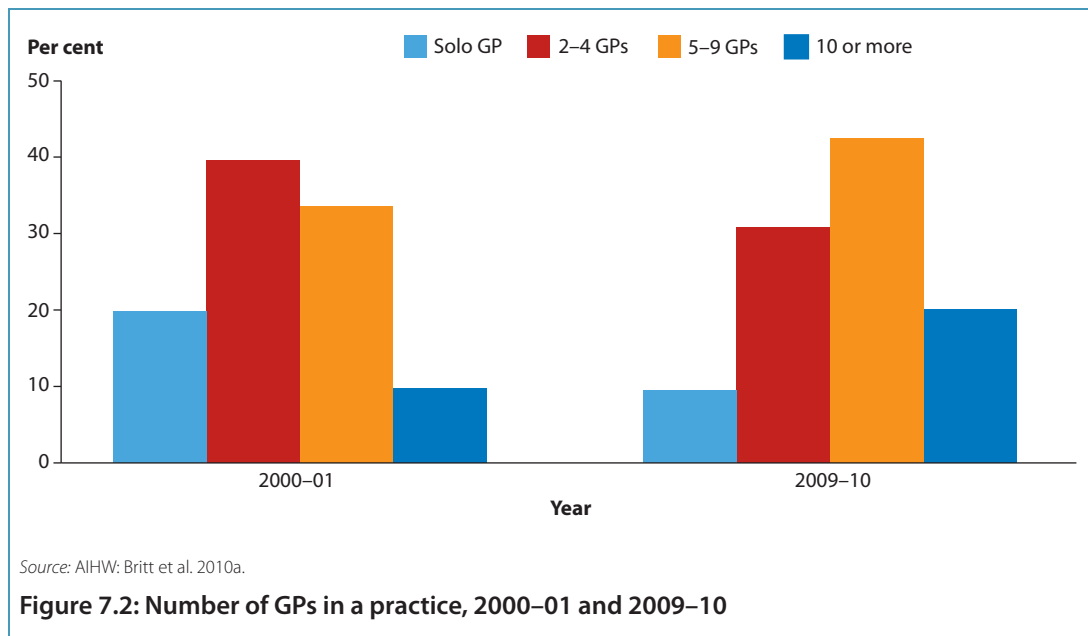
The count of items is subject to changes in bundling and unbundling of services, so the count is not completely comparable between years. Further, the scope of coverage has changed over time; in particular, new items have been introduced in the past few years to cover things such as practice nurse services, mental health services and allied health practitioner services.



Over the decade from 2001–02 to 2010–11, the number of services has increased by an average of 2.5% per year (equating to an average increase in services per person of 1.4% per year), with the total benefits paid increasing by an average of 7.5% per year.

As outlined in 'Section 7.2 Primary health care in Australia', the primary health-care system is facing many pressures, including an ageing population. The general practice landscape is also evolving. Government initiatives, including the delivery of 64 Super Clinics and the establishment of 62 Medicare Locals, are altering how general practice operates and delivers services.

There are a number of established trends that are influencing how GP services are being delivered, including changes in the way general practices are structured. The proportion of solo general practices decreased from 19% in 2000–01 to 9% in 2009–10 (Figure 7.2). The proportion of GPs working in practices with 10 or more GPs increased from 10% in 2000–01 to 20% in 2009–10.



Based on estimates from the Divisions of General Practice from 2000–2001 to 2008–09, there has been a gradual decrease in the number of general practices (physical locations in which GPs operate) in Australia from about 8,300 to 7,100 (PHC RIS 2011a), partly due to the practice consolidations described above. In contrast, the number of GPs in Australia has slowly increased from about 21,600 to 23,500 over the same period. These figures suggest a trend toward larger general practices with more GPs (PHC RIS 2011b).

One change associated with these trends is that practices may employ other types of health practitioners, such as practice nurses and allied health professionals (see 'Section 7.4 Other primary health-care providers').

The age and sex distribution of GPs has changed. Workforce statistics from DoHA suggest the proportion of GPs aged under 45 has decreased. Specifically, the under 35 and the 35–44 age groups have reduced by 5 and 8 percentage points respectively. In contrast, the proportion of GPs aged 45–54 increased by 2 percentage points and the 55–64 age group increased by 9 (Table 7.1). The proportion of female GPs has also increased, from 32% in 2000–01 to 44% in 2009–10 (DoHA 2011e).

Table 7.1: Age profile of practising GPs, 2000–01 and 2009–10 (per cent of GPs)

Age group	2000–01	2009–10
<35	14.6	10.0
35–44	30.7	23.0
45–54	29.2	31.2
55–64	15.1	23.8
65–74	7.3	9.2
75+	3.0	2.8

Source: DoHA 2011e.

The age of GP patients has also increased over the past decade. According to the BEACH survey, between 2001–02 and 2009–10 the proportion of encounters with patients aged under 45 decreased while the proportion with patients aged 45 and over increased. The biggest increase occurred in encounters with patients aged 75 and over (13% to 15%). The biggest decrease was in encounters with patients aged 25–44 (26% to 23%).

Primary Health Care Research and Information Service (PHC RIS) estimates from the Divisions of General Practice suggests an increase of practice nurse numbers from 3,300 in 2003–04 to 10,100 in 2009–10 (PHC RIS 2011c). The increase in the number of GPs per general practice, in conjunction with government initiatives, including the implementation of MBS item numbers for practice nurse services, are likely to have contributed to this increase.

Why do people see a GP?

Based on the BEACH survey (Box 7.4), for every 100 GP–patient encounters, patients presented with an average of 156 reasons for their encounters (RFEs). The RFEs are the patients’ reasons for seeing the doctor, as stated or implied by the patient to the GP.



Box 7.4: The BEACH survey of general practice activity

The BEACH survey data used in this report were collected by the Family Medicine Research Centre, University of Sydney (in collaboration with the AIHW until June 2011). Each year about 1,000 GPs from a random sample participate, each providing details of 100 consecutive encounters tallying to 100,000 GP–patient encounters. No information identifying patients is collected. GPs provide information on structured paper encounter forms, also providing information about themselves and their practice.

GPs who claimed at least 375 general practice Medicare items of service in the previous three months are eligible to be respondents. This equates to 1,500 Medicare claims a year and ensures inclusion of the majority of part-time GPs while excluding those who only claim a few consultations a year.

From April 2010 to March 2011 inclusive, 958 GPs provided details for 95,800 encounters. The BEACH GP respondents were broadly representative of the GP population in all age and sex categories. There is considerable variation among GPs in the number of services each provides in a given year, so encounters were assigned a weight that was directly proportional to the activity level of the recording GP. After these adjustments, there were 95,830 encounters on which the results in this section are based.

In the BEACH study, GPs record their diagnosis or description of the problem managed and also the reasons given by the patient for the visit. For each BEACH year of reporting, data are based on the 12-month period April to March.

Requests for a check-up, prescriptions or test results were the most frequent general RFEs (Table 7.2). RFEs relating to the respiratory, musculoskeletal system and skin were also commonly given.

Table 7.2: GP consultations: top 10 patient reasons for encounter, 2010–11

Patient reason for encounter	Per cent of total RFEs	Rate per 100 encounters
Check-up—all*	8.8	13.7
Prescription—all*	7.7	12.0
Test results*	5.2	8.0
Cough	4.3	6.7
Immunisation/vaccination—all*	3.1	4.8
Back complaint*	2.0	3.1
Throat symptom/complaint	2.0	3.1
Rash*	1.7	2.7
Administrative procedure—all*	1.7	2.6
Blood test—all*	1.7	2.6

* Includes multiple ICPC-2 or ICPC-2 PLUS codes.

Source: FMRC, University of Sydney: Britt et al. 2011.

What problems do GPs manage?

According to the 2010–11 BEACH survey, GPs managed an average 1.5 problems at each patient encounter. More problems were managed at encounters with female patients (155 per 100 encounters) than with male patients (149). In 2010–11, the difference was particularly evident in the 15–24 age group. The number of problems managed per encounter increased with the age of patient.

The most common problems managed in terms of condition groups were respiratory (20.4 per 100 encounters), general/unspecified (19.2), skin (16.8), cardiovascular (16.7) and musculoskeletal (16.6). Individually, the most frequently managed problems were hypertension (high blood pressure), check-ups, immunisation/vaccination, upper respiratory tract infection (URTI), and depression (Table 7.3).

Table 7.3: GP consultations: top 10 problems managed, 2010–11

Problem managed	Per cent of total problems	Rate per 100 encounters
Hypertension*	5.7	8.7
Check-up—all*	4.2	6.4
Immunisation/vaccination—all*	3.6	5.5
Upper respiratory tract infection	3.6	5.4
Depression*	2.8	4.2
Diabetes—all*	2.6	4.0
Arthritis—all*	2.4	3.6
Lipid disorders	2.0	3.1
Back complaint*	1.8	2.7
Acute bronchitis/bronchiolitis	1.7	2.5

* Includes multiple ICPC-2 or ICPC-2 PLUS codes.

Source: FMRC, University of Sydney: Britt et al. 2011.

Between 2001–02 and 2010–11, the top 20 problems managed have remained relatively stable. Hypertension was the most common problem managed by GPs in both time periods. Asthma and contact dermatitis dropped four places, suggesting that these problems are being managed proportionately less frequently. Test results elevated four places, suggesting increased testing of patients by GPs.

For each problem managed, participating GPs are asked to indicate whether the problem under management is a new problem for the patient. The problem is considered new if it is an entirely new problem or a new episode of a recurrent problem and the patient has not been treated for that problem or episode by a medical practitioner before.

Overall, 38% of all problems were specified as being new. The most common new problems managed included URITs, immunisations, check-ups, acute bronchitis and gastroenteritis.

More than one-third (35%) of the problems managed in general practice were chronic. At least one chronic problem was managed in 41% of encounters, and chronic problems were managed at an average rate of 53.1 per 100 encounters. The most frequently managed chronic problems were hypertension, depressive disorder, diabetes, chronic arthritis, blood cholesterol disorders, and oesophageal disease.



How do GPs manage problems?

GPs have a range of management techniques available, including medicines, providing advice and counselling, undertaking procedures, referring to other services, and conducting or ordering investigations.

Of the 95,830 encounters recorded in the 2010–11 BEACH survey, GPs undertook 217,958 management activities in total—227 per 100 encounters, or 2.3 management activities in every encounter, and 149 per 100 problems managed. For 86% of problems managed, at least one management action was recorded.

The most common management activity was medication. For an 'average' 100 GP–patient encounters, GPs provided 85 prescriptions and 36 clinical treatments, undertook 17 procedures, made 9 referrals to specialists and 4 to allied health services, and placed 45 pathology test orders and 10 imaging test orders (Table 7.4).

Table 7.4: GP consultations: management activities, 2010–11

Management activity	Rate per 100 encounters	Rate per 100 problems
Medicines	105.2	69.0
Prescribed	85.1	55.8
GP-supplied	10.3	6.8
Advised, over the counter	9.8	6.4
Other treatments	52.4	34.4
Clinical (advice/counsel)	35.5	23.3
Procedures	16.9	11.1
Referrals	14.1	9.3
Specialist	8.6	5.6
Allied health	4.2	2.8
Hospital	0.4	0.3
Emergency department	0.3	0.2
Other referral	0.6	0.4
Pathology	45.2	29.6
Imaging	9.8	6.4
Other investigations	0.7	0.5
Total management activities	227.4	149.2

Source: FMRC, University of Sydney: Britt et al. 2011.

Over the decade, the rate of GPs prescribing medicines decreased significantly, from 61 per 100 problems managed in 2001–02 to 56 per 100 problems managed in 2010–11. More detail about the specific medicines that are commonly prescribed is in 'Section 7.7 Use of medicines'.

GPs appear to be undertaking more procedures, such as local injections and the application or removal of sutures/casts/prosthetic devices, with the rate increasing from 14 per 100 encounters in 2001–02 to 17 in 2010–11. They are also referring their patients more often—from 11 per 100 encounters in 2001–02 to 14 in 2010–11. This includes significant increases in referrals to specialists (from 7 to 9 per 100 encounters), and to allied health professionals (from 2 to 4 per 100 encounters).

The rate of pathology test ordering increased by almost 50%, from 31 test orders per 100 encounters in 2001–02 to 45 in 2010–11. There was also a smaller but significant increase in the rate of imaging tests ordered, from 8 per 100 encounters in 2001–02 to 10 per 100 encounters in 2010–11.

Referrals to other health services in 2010–11 occurred 14 times in every 100 encounters, and for 9% of all problems managed. Referrals to medical specialists and allied health professionals occurred most frequently. The most common specialist referrals were to surgeons (10% of specialist referrals), orthopaedic surgeons (8%), dermatologists (8%) and ophthalmologists (7%).

Just over one-quarter (27%) of referrals to allied health services were to physiotherapists, one-fifth (21%) were to psychologists, one-tenth (10%) to podiatrists or chiropodists, and 9% to dentists.

How long are people waiting to see a GP?

From both the patient and provider perspective, the time between a patient making an appointment and being seen by a GP is important. Patients value the opportunity to be seen by a GP in a reasonable amount of time and policy makers and planners may use information about waiting times, in conjunction with other information, to inform decisions on matters such as GP labour force, location of primary care services and service delivery models. In Australia, the measure 'GP waiting times' has been agreed as an indicator of health system performance at the national and Medicare Local level.

GP waiting times are particularly relevant for more urgent medical matters, such as an acute asthma episode, and general practices generally reserve some appointment times for patients with urgent needs each day.

According to self-reports in the 2009 ABS Patient Experience Survey, of those Australians aged 15 and over who saw a GP in the previous 12 months, an estimated 18% (about 2.5 million people) made an appointment for a matter they felt required urgent medical care (ABS 2010). Just over half of these patients (60%) were seen within 4 hours of making their appointment. The rest had seen the GP on the same day but after 4 hours (15%), on the next day (13%) or 2 or more days after making an appointment (12%) (ABS 2010).

The time people waited to see a GP for an urgent appointment did not vary significantly with remoteness or socioeconomic status; however, these findings may be limited by the survey sample size (COAG Reform Council 2011).



What is missing from the picture?

There are little data on the links between general practice and other health providers or between primary health care and other sectors. It is currently very difficult to 'follow' a patient through the health system as they go from service to service.

Other gaps in primary care information are described in 'Section 7.2 Primary health care in Australia'.

Where do I go for more information?

Other sections in this report deal with specific elements of the primary health-care sector, including, 'Section 7.2 Primary health care in Australia', 'Section 7.4 Other primary health care providers', 'Section 7.7 Use of medicines' and 'Section 9.2 Key health professions'.

More information on the data sources available for GP data is in the AIHW report *Review and evaluation of Australian information about primary health care* (AIHW 2008).

More information on GP activity is in the following BEACH survey reports: *General practice activity in Australia 2010–11* (FMRC, University of Sydney: Britt et al. 2011).

More information on GP waiting times is in *Health services: patient experiences in Australia, 2009* (ABS 2010) and *National Healthcare Agreement: performance report for 2009–10* (COAG Reform Council 2011).

7.4 Other primary health-care providers

At a glance

- Commonwealth and state and territory governments fund large portions of non-GP primary health-care services, with substantial funding also provided privately. For example, private health insurers provided about \$2.5 billion in rebates for non-GP primary health-care services in 2010–11.
- In 2007–08, 46% of people consulted at least one non-GP health professional in the previous 12 months.



Introduction

In addition to primary health-care services provided by GPs (see 'Section 7.3 General practitioners'), Australians have access to a range of other primary health-care services and service providers.

Non-GP primary health care includes many different service providers and disciplines, such as ambulances, dentists, dietitians, midwives, occupational therapists, optometrists, pharmacists, physiotherapists, psychologists, nurses, nutritionists and speech pathologists.

These service providers operate through a diverse range of service models and settings, including:

- small private practices with one or two practitioners specialising in a particular discipline
- large multidisciplinary centres with many service providers operating out of a single facility
- outreach services where the practitioners work in the community with targeted individuals or groups
- research environments at universities and other research facilities.

An individual practitioner may rotate between these different service settings on a routine basis and may work both in the hospital and primary health-care settings. For example, one physiotherapist may break up their week between seeing some clients at their practice, outreach work with sporting teams or aged care facilities, hospital-based clinics, and research projects. In contrast, another physiotherapist may work entirely out of the same private practice.

Partly as a result of this diversity, the primary health-care service delivery system is complex, fragmented and often uncoordinated (DoHA 2009a). In many cases, service providers operate in relative isolation from the rest of the health system, but they can also work with GPs in multidisciplinary teams to provide more comprehensive health care.

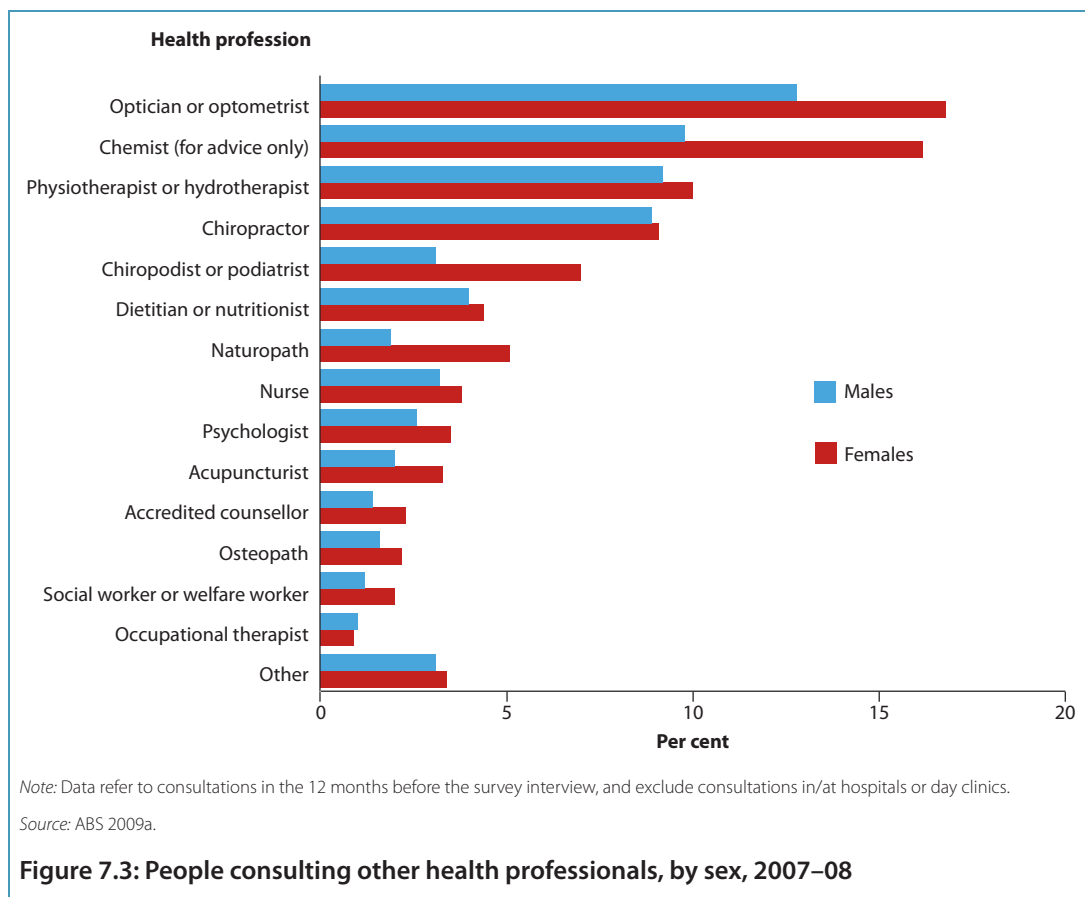


What do we know about non-GP primary health care?

As noted in 'Section 7.2 Primary health care in Australia', national-level data on primary health-care services are not well developed. Thus, it is difficult to obtain a clear understanding of the use of primary health-care services nationally.

One national data source that provides some information on the use of primary health-care services is the 2007–08 National Health Survey conducted by the ABS. In the survey, respondents were asked to nominate from a list of health services which ones they had consulted in the 12 months before the survey interview.

Of these services, which included many primary health-care services, people most commonly reported consulting optometrists or opticians, chemists/pharmacists (for advice only as these data did not relate to medicines being dispensed) and physiotherapists or hydrotherapists (Figure 7.3). The National Health Survey data suggest that females consult these health professions more often than males across all professions except occupational therapists.



Information relating to some specific elements of the primary health-care sector is highlighted below. The services described in this section may overlap with services described elsewhere in this report because primary health-care professionals work in a range of settings, such as hospitals and community health centres, general practice and private practice, education centres, as well as disability services.

Community health-care services and providers

Government-funded community health-care provides a broad range of services, including aged care and health promotion. Services may be provided directly by governments (including local governments) or through local health services or community organisations. State and territory governments are responsible for funding most community health services, including:

- maternal and child health services, which include antenatal and postnatal parenting support services, early childhood nursing programs, disease prevention programs, and treatment programs relating to child development and health
- community nursing, where nurses work with people in the community to help prevent and treat health conditions
- women's health services that provide services and health promotion programs for females across a range of health-related areas
- men's health programs
- immunisation services
- community rehabilitation programs, including case management, prosthetics services and equipment schemes, and home modification
- health education and promotional activities.

The community health-care sector is a large component of the overall health workforce in Australia; however, statistical information available at the national level on workforce and services provided is not as highly developed as for other services (such as hospitals).

There is no nationally agreed basis for describing the number or nature of services provided, nor the health outcomes. Hence a comprehensive national picture regarding the workforce, services provided, service availability and expenditure is not currently available.

Practice nurses

Practice nurses are registered or enrolled nurses who are employed by, or whose services are provided in, a general practice. They help GPs manage the increased demand on health services by providing key services, including immunisation and wound care, within the general practice setting.

Practice nurses can include nurse practitioners, who are registered nurses who have undertaken a master's level degree and are authorised by the relevant regulatory body to undertake extended clinical roles.

Increasingly, practice nurses are becoming involved in GP-patient consultations. In 2009–10, it is estimated that 10,100 practice nurses were operating in Australia. This is an increase of 6,800 on the estimated 3,300 operating in 2003–04 (PHC RIS 2011c).

Since February 2004, a range of MBS item numbers have been introduced to allow GPs to claim for specified tasks undertaken by practice nurses under the direction of a GP.



However, with the start of the Practice Nurse Incentive Program (PNIP) on 1 January 2012, six practice nurse MBS items relating to immunisation, wound management and Pap smears are no longer available. The funding for these has been included in the PNIP, which provides incentive payments to general practices and Aboriginal Community Controlled Health Services to support practice nurses.

Practice nurse services claimed under the MBS in 2010–11 totalled 6,000,000. This included activities such as immunisations (61%), wound management (31%), services to people with chronic conditions (6%) and cervical (Pap) smears (2%).

Dental services

Dental care in Australia is provided primarily by general dental practitioners in private practice. Most states and territories also provide a subsidised dental service for children, as well as a program of public dental services for adults who satisfy a means test.

The public dental sector employs about 16% of all practising dentists and accounted for 8.5% of expenditure in 2009–10 (AIHW 2011c). The work of dentists is supported by:

- dental therapists, who mainly work in the public sector
- dental hygienists and dental prosthetists, who mainly work in the private sector
- oral health therapists, who are employed across both public and private sectors (Chrisopolous & Nguyen 2012).

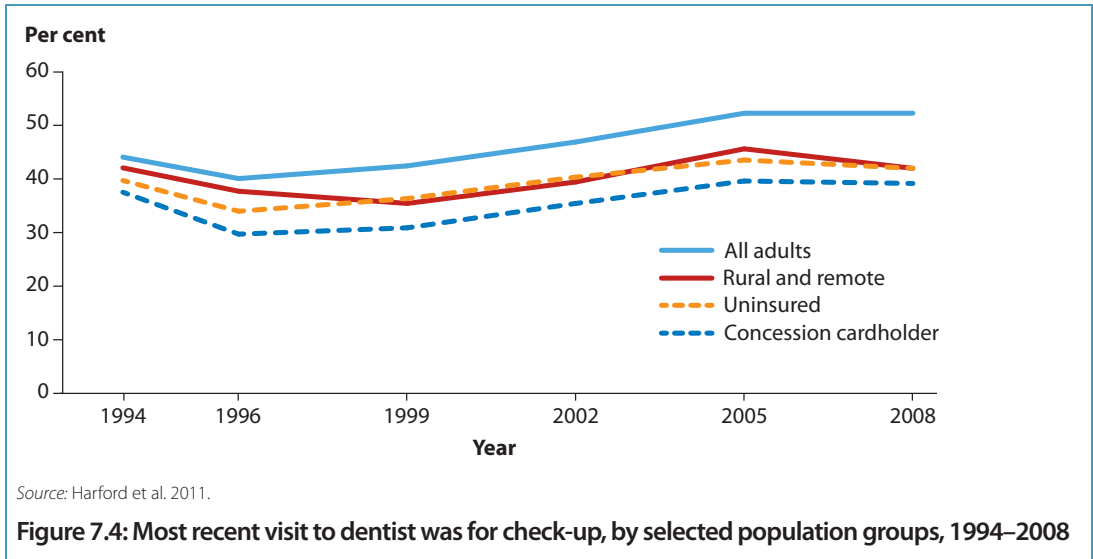
In 2009–10, Australians spent \$7.7 billion on dental care, of which 61% was funded directly by patients and 25% came from government sources (AIHW 2011c).

Based on a national survey in 2010, 78% of Australian children and 62% of Australian adults made a dental visit in the previous 12 months. Among children, 84% visited for a check-up while 61% of adults did so (Chrisopolous et al. 2011). The most commonly reported dental treatment received was preventive care (0.94 services per visit), followed by fillings (0.69) and extractions (0.25).

Patterns of dental attendance have consequences for the oral health of Australians. Based on a national survey (including oral examination) in 2004–06, although no difference exists in underlying decay experience according to visiting patterns, adults who usually make a dental visit once a year, usually visit for a check-up and have a regular source of dental care, are more likely than those who do not to have their dental treatment needs met with restorations (fillings), less likely to have teeth extracted, and less likely to have moderate or severe periodontal disease (Ellershaw & Spencer 2011).

Patterns of dental visiting among adults have changed over the recent past. While about the same proportion of adults made a dental visit in 1994 as in 2008, visiting for a check-up (as opposed to visiting for a dental problem) was more common in 2008 (56%) than in 1994 (48%). Adults who visit the dentist every year for a check-up are more likely to receive dental care focused on prevention, and benefit from early diagnosis and prompt treatment of dental disease (Thomson et al. 2010).

However, these improvements in dental visiting were not experienced equally: holders of Australian Government concession cards, people living in rural and remote areas and adults who do not hold private dental insurance missed out. This has resulted in some widening inequalities in dental visiting over this period (Figure 7.4). The emerging trends in dental visiting among adults have the potential to widen inequalities in oral health status.



Smaller variations were seen among children over the same period and both rates of visiting and rates of visiting for a check-up remained higher than those for adults (Ellershaw & Spencer 2009).

Pharmacist services

Pharmacists dispense medicines and provide professional expertise and advice on general health care. They can work in a community pharmacy as well as a hospital.

Community pharmacies are private businesses that dispense subsidised medicines as well as offer other retail goods and services. They are generally situated in convenient locations allowing easy access for customers.

To be able to dispense government-subsidised medicines a pharmacy must get approval from the Department of Human Services. Approval is subject to a range of conditions, including restrictions outlined in Section 90 of the *National Health Act 1953*.

Hospital pharmacies stock a large range of medicines that are typically provided to hospital patients only. Hospital pharmacies can provide up to 1 month's supply of PBS and RPBS medicine to non-admitted patients and patients on discharge. Medicines for admitted patients are mainly funded by hospitals under the National Healthcare Agreement between the states, territories and the Australian Government.

The main funding sources for pharmacies are the PBS and RPBS. More information on the PBS and RPBS and the medicines that are mostly commonly prescribed is in 'Section 7.7 Use of medicines'.

During 2010–11, about 201 million PBS or RPBS prescriptions were claimed by pharmacies. About 68 million prescriptions did not attract a subsidy under the PBS or the RPBS (Medicare Australia 2011a).

Medication management

In addition to dispensing medicines, accredited pharmacists can claim a benefit for providing medication management reviews for eligible Australians in either an aged care facility (Residential Medications Management Review (RMMR)) or a person's home (Home Medicines Review (HMR)). The medication management review is designed to assess the effectiveness of a patient's existing medication, to ensure there are no adverse effects with using multiple medicines at the same time, and to update their medicines if required.



RMMR services must be conducted by a pharmacist in collaboration with a GP. From 1 October 2011, approved RMMR service providers receive a benefit of \$100.00 for each eligible RMMR service. RMMR Service Fees are indexed annually (Medicare Australia 2011c).

HMR service providers receive \$197.76 for each approved service. This amount is also indexed annually (Medicare Australia 2011d).

Ambulance services

Ambulance services in Australia are provided directly by state and territory governments, with the exception of Western Australia and the Northern Territory, where they are provided by St John Ambulance Western Australia and St John Ambulance Australia, respectively.

Ambulance services provide emergency pre-hospital patient care, offer transportation in response to sudden illness or injury, transport patients between hospitals, conduct road accident rescues, and coordinate patient services in multi-casualty events.

Some government ambulance services also provide first-aid training courses, as do non-government providers such as St John Ambulance and the Red Cross.

In 2009–10, ambulance service organisations responded to 2.8 million patients nationally, of which about 2.5 million were transported, with the remaining 318,000 patients treated but not transported (Table 7.5).

Most patient transports were by road (2.5 million) with 1.6 million of those for emergency or urgent reasons.

Table 7.5: Ambulance responses and transport outcomes, 2009–10

Response/outcome	Number	Per cent
<i>Patients transported</i>	2,499,900	88.7
Patients transported road	2,480,000	88.0
Emergency transports road	979,600	34.8
Urgent transports road	582,300	20.7
Non-emergency transports road	918,200	32.6
Patient transported fixed wing	11,300	0.4
Patient transported helicopter	8,600	0.3
<i>Patients treated not transported</i>	318,000	11.3
Emergency patients treated not transported	197,700	7.0
Urgent patients treated not transported	104,700	3.7
Non-urgent patients treated not transported	15,700	0.6
Patients—total	2,817,900	100.0

Note: Percentages are calculated on the number of transportations against the total number of patients.

Source: Council of Ambulance Authorities (unpublished).

Aero-medical health services

Aero-medical health services in Australia are provided by many different organisations funded through multiple channels, including government funding, donations, and corporate support.

One particular prominent not-for-profit organisation that relies on charitable donations as well as substantial government funding, the Royal Flying Doctor Service (RFDS), uses aircraft and other transport, as well as communication technology, to improve the health and wellbeing of Australians in regional and remote areas.

The RFDS provides primary and community health-care clinics at remote sites (for example, routine health checks and advice, immunisation, child health care, and dental, eye and ear clinics), telehealth consultations via radio, telephone or video conferences, medicine supplies at remote sites, and emergency air transport services (both to and between hospitals).

Over the past decade there has been a steady increase in the services that the RFDS provides, particularly for technological services provided through telehealth (Table 7.6).

Table 7.6: Services provided by the Royal Flying Doctor Service, 2000–01 to 2009–10

Year	Patient contacts	Aerial medical evacuations	Immunisations	Telehealth services	Number of aircraft	Distance flown (million km)
2000–01	190,000	23,300	5,500	54,300	42	16
2001–02	197,000	24,200	5,300	57,100	40	17
2002–03	212,300	27,900	5,700	58,700	36	14
2003–04	210,400	31,400	4,900	57,800	45	20
2004–05	234,500	32,100	5,500	73,700	47	20
2005–06	237,100	33,300	6,800	77,100	50	20
2006–07	242,500	34,300	4,900	75,400	47	22
2007–08	261,800	38,300	6,400	87,000	51	23
2008–09	274,200	36,800	6,200	85,300	53	24
2009–10	276,500	38,900	7,300	91,600	60	26

Source: RFDS Annual reports.

In 2009–10, there were 276,500 patient contacts with the RFDS, including 91,600 telehealth services, 7,300 immunisations and 38,900 evacuations/transportations. In the same year the RFDS flew about 26 million kilometres.



Funding of non-GP primary health-care services

Funding of primary health care is also diverse and multi-streamed. Funding is provided by many sources, including the Australian Government, state and territory governments, and through the non-government sector, including private and public organisations and individuals' out-of-pocket expenses.

State, territory, and local governments fund a variety of non-GP primary health-care services, including, but not limited to, dental health, Indigenous health, maternal and child health, immunisation and public health initiatives.

Expenditure data for non-GP primary health care is not readily available. The AIHW expenditure database captures some funding data for community health and other recurrent health services. Expenditure in this sector was estimated at \$5.9 billion in 2009–10, up by \$0.4 billion from 2008–09. State, territory and local governments provided \$4.7 billion (81%) of the total, the Australian Government \$858 million (15%), and individuals \$121 million (2%) (AIHW 2011c).

Private organisations are also major contributors to primary health-care funding in Australia. In 2010–11, private health insurers paid rebates for a range of non-GP primary health services (see 'Section 7.2 Primary health care in Australia' and 'Section 8.4 Private health insurance').

What is missing from the picture?

Service delivery for primary health care involves many different service types, providers, clients and programs. Primary health-care providers often receive funding from a variety of sources. Each funding model may have a unique set of reporting requirements. Historically, there has been little coordination of these reporting requirements and little standardisation of the data elements they contain.

The result is that, in some cases, there are little data or only poor quality data collected about a particular service type. In some cases there are many data items collected at a variety of different levels of government and in practices that are often overlapping, non-standardised and not centrally collated. A coordinated approach to reporting requirements, standards and data collection would help fill the picture of primary health care in Australia for research and health decision-making purposes.

Where do I go for more information?

Other sections in this report examine specific elements of the primary health-care sector, including 'Section 7.2 Primary health care in Australia', 'Section 7.3 General practitioners', and 'Section 7.7 Use of medicines'.



7.5 Primary health-care services for Indigenous Australians

At a glance

- In 2009–10, Aboriginal and Torres Strait Islander primary health-care services funded by the Office for Aboriginal and Torres Strait Islander Health provided 2.4 million episodes of health care to about 456,000 people.
- Compared with 2008–09, there was a 22% increase in the number of Indigenous clients and a 14% increase in the number of episodes of care provided.
- About three-quarters of services had shared-care arrangements with hospitals or relevant specialists for people with chronic conditions and for women accessing antenatal care, and nearly half of services (49%) provided access to dental care.



Introduction

Aboriginal and Torres Strait Islander people have worse health outcomes than other Australians across a range of measures. For instance, in 2005–2007 the average life expectancy at birth was estimated to be about 10–12 years lower for Indigenous people than other Australians (ABS 2009b).

Closing the gap in Indigenous health is a priority for COAG, which in 2008 agreed to a \$1.6 billion National Partnership Agreement to address this health disadvantage through a range of initiatives. While there are many determinants that affect health outcomes, access to primary health care is recognised as a key factor.

As three-quarters of the Indigenous population live in *Major cities* and regional areas where mainstream services are typically located, mainstream health services are a significant source of health care for Indigenous Australians. However, these services are not always accessible to Indigenous Australians, due to geographic, social and cultural reasons. According to the 2008 National Aboriginal and Torres Strait Islander Social Survey, almost 30% of Indigenous people aged 15 and over experienced problems accessing services and almost 10% experienced problems accessing a doctor. Overall, 1.3% reported barriers to accessing services due to discrimination, and 2.3% reported barriers due to services not being culturally appropriate (ABS 2009c; AIHW 2011d).

Indigenous-specific health services are therefore important providers of comprehensive primary health services for Indigenous Australians. Funding is provided by the Australian Government, state and territory governments, or both. The state and territory governments provide funding primarily through hospitals, community clinics and Aboriginal Community Controlled Health Services. The Australian Government, through the Office for Aboriginal and Torres Strait Islander Health (OATSIH), provides funding for a range of Indigenous-specific primary health care and substance misuse services, which are largely delivered in community-based settings.



As there are no comprehensive data available on Indigenous Australians accessing mainstream services or state- and territory-funded Indigenous-specific services, this section focuses on OATSIH-funded Aboriginal and Torres Strait Islander primary health-care services. The AIHW collects and analyses data received from these services and, by producing reports, helps the services to monitor their activities, provides evidence for policy makers, and informs researchers and the public.

What do we know about Indigenous primary health-care services?

In 2009–10, 223 Aboriginal and Torres Strait Islander primary health-care services were located in all states and territories and across all geographical areas: *Major cities* (13%), *Inner/Outer regional areas* (47%) and *Remote/Very remote areas* (41%) (AIHW 2011e).

These services provided an estimated 2.4 million episodes of health care to about 456,000 clients. The great majority (2.0 million, or 86%) of all episodes of care were provided to Indigenous clients. An episode of care can include client contacts with more than one staff member. More than three-quarters of clients (78%, or 360,000) were Aboriginal or Torres Strait Islander. Compared with 2008–09, the number of Indigenous clients and episodes of care increased substantially in 2009–10, by 22% and 14% respectively.

In 2009–10, the Commonwealth-funded Aboriginal and Torres Strait Islander primary health-care services employed about 3,100 full-time equivalent (FTE) health staff, including nurses (691), Aboriginal and Torres Strait Islander health workers (867), doctors (335), and social and emotional wellbeing staff, such as counsellors, psychologists and social workers (446).

More than half (57%) of all positions in the primary health-care services were held by Aboriginal and Torres Strait Islander people, more commonly for health worker (96%) and social and emotional wellbeing positions (66%).

These services provided clinical health care, population health programs, child and maternal health services, screening programs and health checks, access to allied health and specialist services, group activities, health-related community services, and substance-use treatment and assistance (Figure 7.5).

The ongoing management of illness and disease was a common function among services. About three-quarters of services had shared-care arrangements with hospitals or relevant specialists for people with chronic conditions (76%) and for women accessing prenatal care (73%), and nearly half of services (49%) provided access to dental care.

Pap smears and cervical screening were the most widely offered population screening activities, with three-quarters of services (76%) providing them. Other widely available screening programs were for diabetes, sexually transmissible infections and hearing.

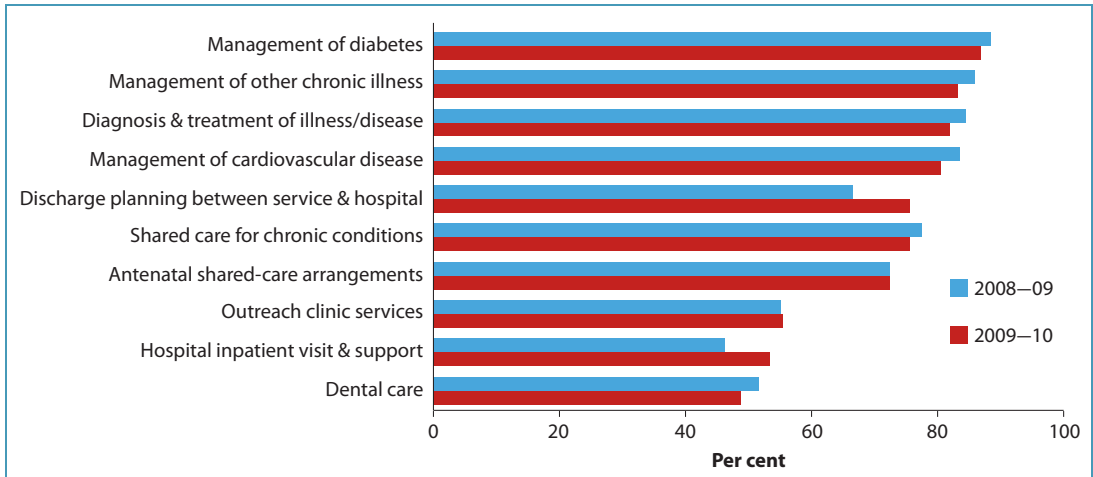


Figure 7.5: Aboriginal and Torres Strait Islander primary health-care services providing clinical health-care activities, selected activities, 2008-09 and 2009-10

Substance-use treatment or assistance to individual clients was offered by 90% of services, mostly for alcohol (93%), tobacco and nicotine (92%), and cannabis and marijuana (82%). The most common activities were providing information and education about substance use (85%) and individual counselling (79%).

What is missing from the picture?

Data received by the AIHW from primary health-care services cover mostly service activity with few details about clients. Other data collections provide some information about clients and health outcomes. For example, the AIHW data collection for the Healthy for Life program includes the number of clients and some health outcomes.

In 2008, COAG announced that the DoHA, in partnership with state and territory health departments and in collaboration with the AIHW, would develop national Key Performance Indicators (KPIs) for all Indigenous primary health-care services that receive funding from Australian, state or territory governments (COAG 2011b).

To meet these commitments, a set of national KPIs was developed and from January 2012 Healthy for Life services will start reporting on these indicators. All Australian Government-funded Aboriginal and Torres Strait Islander primary health-care services will start reporting on KPIs from 2012-13. The national KPI data set is outcomes-based and will provide better and more consistent information across a wider range of services.

Also, a new web-based system of data collection has been developed to replace individual systems, including the paper-based collection of data for primary health-care services. The new system, OCHREStreams, will be used to collect national KPI data from January 2012.

Where do I go for more information?

More information is in the AIHW reports *Aboriginal and Torres Strait Islander health services report 2009-10: OATSIH Services Reporting—key results* (AIHW 2011d) and *Aboriginal and Torres Strait Islander Health Performance Framework 2010: detailed analyses* (AIHW 2011e).



7.6 Specialist medical services

At a glance

- Over the decade to 2010–11, Medicare-subsidised specialist activity has increased in terms of total services (average of 4.6% per year), services provided per person (3.5% per year) and government benefits paid (6.7%).
- The majority of Medicare-funded services (65%) are for pathology (collection and analysis), followed by consultations (15%).
- In 2009–10, use of specialist services decreased with remoteness, and service use was lower for Indigenous than non-Indigenous Australians.



Introduction

Specialised health services are a key component of the health system. Although each type of health professional (including allied health professionals, such as physiotherapists and optometrists) has specialist skills in their area of expertise, this section focuses specifically on the work of medical specialists.

To become a medical specialist in Australia, doctors are required to complete specialised training and are awarded a fellowship by an organisation accredited by the Australian Medical Council. There are more than 60 medical specialities recognised in Australia, including anaesthetics, dermatology, emergency medicine, obstetrics and gynaecology, and radiology (Australian Medical Council 2011). While GPs are, by the above definition, medical specialists, the nature of their work in primary care is quite different from the work of other medical specialists. For this reason, the work of GPs is excluded here, and described in detail in 'Section 7.3 General practitioners'.

In the community, GPs refer patients to medical specialists for specific health matters that are not generally managed by the primary care sector alone. Specialist care can be long term, for example, for patients with chronic conditions, or involve one-off consultations or procedures, such as the removal of a skin cancer. According to self-reports from the 2007–08 ABS National Health Survey, about 1 in 4 Australians aged 15 and over saw a specialist at least once in the previous year (ABS 2009a). In 2010–11, most people who were referred to a specialist visited more than once in the past year (64%), with just over one-quarter of patients seeing a specialist four or more times (ABS 2011a).

Like most health professionals, specialists work in a variety of settings, including hospitals and private practice. In some cases they may provide services to areas outside their main practice, for example, in rural and remote areas.

What do we know about specialists?

Workforce and funding

In 2009, there were more than 26,500 FTE specialists working in Australia—an increase of 34% from 1999 (19,800) (AIHW 2011f). The distribution of specialists varied by remoteness, with almost 6 times as many in *Major cities* compared with *Remote* and *Very remote* areas combined (142 FTE specialists per 100,000 compared with 24) (AIHW 2011f).

Specialist services are funded by a variety of sources, including the Australian Government (through Medicare benefits, tax rebates to private insurers or payments to state and territory governments), state and territory governments (through funding of public hospitals), individuals, and private health insurers. For the most part, this section focuses on specialist activity subsidised by Medicare. This includes services provided by specialists in private practice, as well as those provided for private patients in public and private hospitals.

Specialist services

Medicare reimburses several broad types of specialist services, such as operations, diagnostic imaging and specialist attendances (consultations). During 2010–11, an average of 7.4 specialist services per person were reimbursed (Table 7.7).

Consistent with trends reported in previous editions of *Australia's health*, Medicare specialist activity continues to increase in number, per capita service use and government benefits paid. For the decade 2001–02 to 2010–11, the total number of Medicare services processed increased across all broad types of specialist services, at an average annual rate of 4.6%. Over the same period, the number of services per person increased at an average annual rate of 3.5%, and the government benefits paid increased at an average of 6.7% per year (Medicare Australia 2011b).

In terms of number of services, the largest average annual increase over the period was for radiotherapy and therapeutic nuclear medicine (9.6%), followed by pathology (5.4%) and diagnostic imaging (4.6%) (Table 7.7).



Table 7.7: Medicare services processed for specialist services, 2010–11

Broad type of service	Number ('000)	Services per person ^(a)	Benefits paid (\$ million)	Proportion of total services (per cent)	Average annual change ^(b) (per cent)
Specialist attendances	24,394	1.1	1,718	14.7	2.4
Obstetrics	1,746	0.1	183	1.0	1.9
Anaesthetics	2,666	0.1	348	1.6	3.2
Pathology	108,832	4.8	2,097	65.4	5.4
Diagnostic imaging	19,075	0.8	2,296	11.5	4.6
Operations	7,945	0.4	1,344	4.8	2.9
Assistance at operations	415	0.0	61	0.2	4.1
Radiotherapy ^(c)	1,430	0.1	233	0.9	9.6
Total	166,504	7.4	8,279	100.0	4.6

(a) Refers to Medicare items per person. A single patient consultation with a specialist can result in the provision of multiple specialist services as defined here.

(b) Average annual change in number of services 2001–02 to 2010–11.

(c) Includes therapeutic nuclear medicine.

Source: Medicare Australia 2011b.

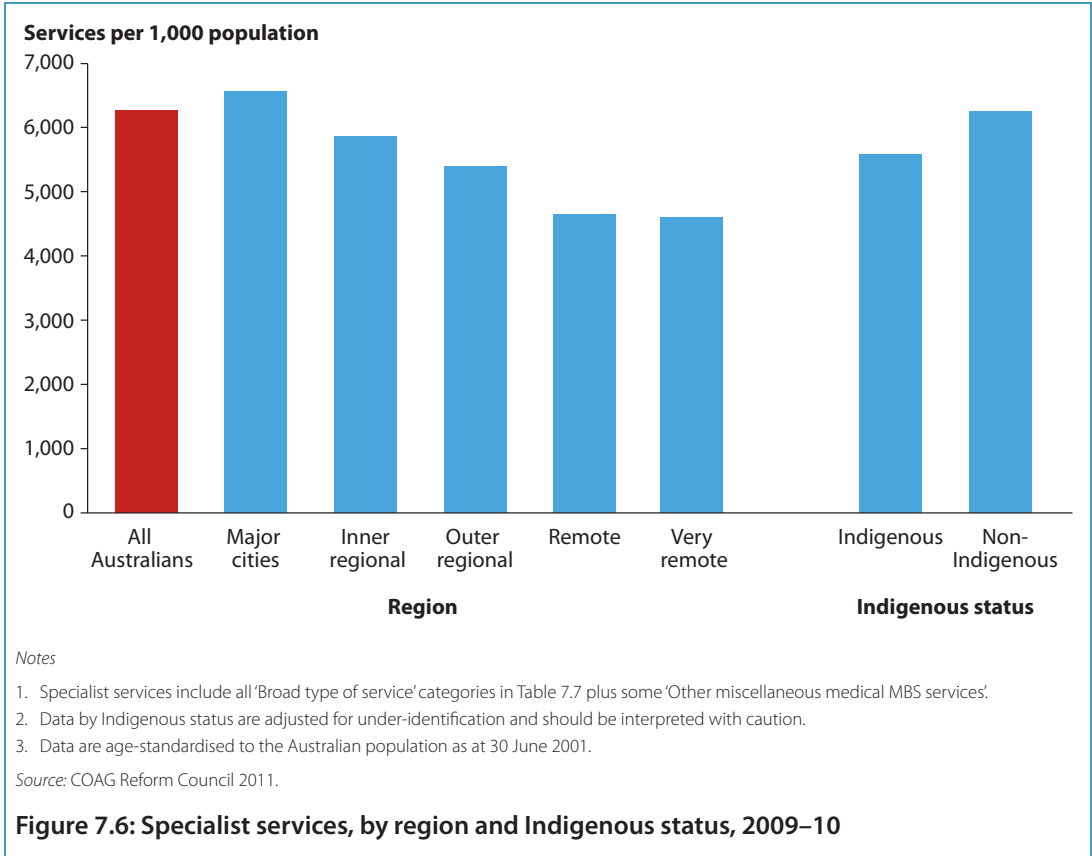
The rate of specialist service use increases with age and is fairly similar for males and females. However, there is some variation in the use of specialist services among some population groups (Figure 7.6). In 2009–10, age-standardised rates of specialist service use, adjusted for Indigenous under-identification, were higher for non-Indigenous Australians than Indigenous Australians. Specialist service use decreased with remoteness, with rates for people living in *Major cities* about 1.4 times as high as the rate for *Very remote* residents (6,600 per 1,000 population compared with 4,600). In contrast, there was less variation in the rates of service use by socioeconomic status, although rates were slightly higher for people living in areas classified as most disadvantaged compared with least disadvantaged (6,500 per 1,000 population compared with 6,200) (COAG Reform Council 2011).

The patient's perspective

The ABS 2010–11 Patient Experience Survey provided national information on patients' experiences with specialist care in Australia. Although the survey covered only limited aspects of care, it found that for Australians referred to a specialist by a GP:

- just over 1 in 10 patients delayed seeking the consultation because of cost
- 1 in 5 people felt they waited longer than was acceptable; in particular, people in *Outer regional* and *Remote* areas were more likely than those in *Major cities* to report unacceptable waiting times (25% compared with 20%) (ABS 2011a).





What is missing from the picture?

A complete picture of the use of specialist services in Australia is not possible as nationally comparable data are not available for some services provided in public hospitals, for example, people visiting hospital emergency departments or public patients seeing a specialist as an outpatient.

Comprehensive national information on the quality of care and outcomes for patients who receive specialist care, either in the community or hospital, is also not available.

Where do I go for more information?

For more information on specialist workforce or expenditure, see 'Section 9.2 Key health professions' and 'Section 8.3 Where does our health dollar go?' For information on Medicare and related services, see *Medicare Benefits Schedule statistics* (Medicare Australia 2011e).



7.7 Use of medicines

At a glance

- In 2010, an estimated 271 million prescriptions were dispensed by community pharmacies, of which three-quarters were subsidised under the PBS and RPBS.
- The most commonly used medicines in Australia are for reducing blood cholesterol, lowering stomach acid, lowering blood pressure, and antibiotics.
- According to a survey of general practitioners, the most frequently prescribed medicines in 2009–10 were antibiotics and pain-management medicines.

Introduction

Medicines are used to prevent and manage a wide range of health conditions. The use of medicines is an important component of the health-care system. Prescribing of, and expenditure on, medicines is constantly increasing.

In Australia, certain medicines can only be obtained by prescription from a medical or dental practitioner. Prescription medicines are provided largely through community pharmacies and hospitals.

Some medicines can be purchased over the counter at a pharmacy or other retail outlet without a prescription. Non-prescription medicines include mild analgesics (pain-killers), cough medicine, vitamins and complementary medicines.

Information on the supply of prescription medicines in the community is derived from two sources:

- information on prescriptions for medicines that are subsidised by the PBS or the RPBS is held by the Department of Human Services—these data are available up to 2010–11
- estimates of the use of non-subsidised prescription medicines are sourced from the Pharmacy Guild of Australia's ongoing survey of community-based pharmacies—these data are available up to 2010.

The PBS and RPBS provide subsidies for many, but not all, prescription medicines. The PBS and RPBS account for the majority of spending on medicines in Australia (see Box 7.5).

This section focuses on community pharmacies, as there are limited national data on hospital-supplied medicines.

What do we know about the medicines that Australians take?

In 2010–11, 201 million pharmacy services were subsidised by the PBS and RPBS (Medicare Australia 2011a). This included nearly 188 million PBS prescriptions claimed—26 million for general patients and 161 million for concessional patients (see Box 7.5 for information on these patient categories)—and about 13 million prescriptions subsidised for war veterans and their dependants under the RPBS. There were an additional 68 million prescriptions that did not attract a subsidy under the PBS or the RPBS (DoHA, unpublished).

Box 7.5: Pharmaceutical Benefits Scheme and the Repatriation Pharmaceutical Benefits Scheme

The PBS subsidises the cost of a wide range of prescription medicines. The RPBS provides assistance to eligible war veterans and their dependants. It is similar to the PBS but covers a broader range of medicines.

Before a medicine can be subsidised by the PBS, it is assessed by the Pharmaceutical Benefits Advisory Committee, which includes medical practitioners, other health professionals and a consumer representative. Once the committee has recommended a medicine, it is considered by the Pharmaceutical Benefits Pricing Authority. The price is negotiated between the manufacturer and DoHA.

Medications listed on the PBS fall into four broad categories of benefits:

- unrestricted benefits that have no restrictions on their therapeutic uses
- restricted benefits that can only be prescribed for specific therapeutic uses
- authority required benefits that require prescribers to record an authority code issued by the Department of Human Services or DVA, obtained over the phone or in writing
- streamlined authority required benefits that require prescribers to include a 'streamlined authority code' provided with the listing of each medicine for which this category of benefits apply.

Patients are grouped into two classes: general and concessional. As at 1 January 2012, general patients paid up to \$35.40 for each PBS prescription item. For concessional patients, payment was up to \$5.80 per prescription item. These copayments increase on 1 January each year, generally in line with the consumer price index.

Once a general patient and their immediate family has spent \$1,363.30 in a calendar year on PBS-subsidised medicines, the patient copayment per item decreases to the concessional rate of \$5.80. For concessional patients, the \$5.80 copayment is not required at all once their expenditure on PBS items exceeds \$348.00.

Patients may pay more than the standard copayment where a PBS item is priced above the benchmark price for different brands of the same drug or the benchmark price for a therapeutic group of medicines. These additional payments do not count towards the PBS safety net.

Trends in prescribed medicines

The number of community prescriptions has steadily increased from 180 million in 1996 to 271 million in 2010, representing a total growth over the period of 51.1% (Table 7.8).

Between 1996 and 2010, prescriptions that cost below the copayment threshold (see Box 7.5) fluctuated between 15% and 19% of total prescriptions. Between 2006 and 2010, there was a 40% increase in the number of prescriptions below the copayment threshold. The reason for this increase is unclear, although the availability of medicines costing less than the co-payment threshold due to patent expiry and discounted medicines may contribute to the increase. Policy changes that broaden the eligibility criteria for certain prescription medicines may also influence these figures.



Table 7.8: Number of community prescriptions, 1996–2010

Type	1996	1998	2000	2002	2004	2006	2008	2010	Change 1996 to 2010
	Number (million)								Per cent
PBS concession	105.8	107.3	120.5	132.3	141.4	141.9	152.6	163.4	54.4
PBS general	18.5	18.8	21.8	25.2	29.5	25.8	26.4	26.8	45.0
RPBS	8.7	10.2	12.5	15	15.7	14.7	14.1	13.1	50.4
<i>PBS/RPBS total</i>	<i>133</i>	<i>136.4</i>	<i>154.8</i>	<i>172.5</i>	<i>186.6</i>	<i>182.3</i>	<i>193.1</i>	<i>203.3</i>	<i>53.1</i>
Private	11.7	15.1	14.3	16	18.1	19.3	18	19	64.5
Below copayment	34.1	35.4	30.7	27.6	28.2	34.6	50.2	48.4	41.8
Other ^(a)	0.7	0.6	0.5	0.5	0.4	0.4	0.4	0.4	-40.6
Total	179.5	187.5	200.3	216.6	233.3	236.7	261.7	271.1	51.1

(a) Includes Doctor's bag, ostomy prescriptions and unknown patient category.

Source: Drug Utilisation Sub Committee drug utilisation database (DoHA, unpublished).

Which medicines are used the most?

There are a number of difficulties in estimating the most commonly used medicines. The available data sources collect information either on the medicines prescribed or the medicines dispensed.

The amount of medicines prescribed or dispensed is not always the same as the amount used.

Medicines may be prescribed, but the prescription is never filled by the patient. Alternatively, the patient may fill the prescription but never take the medicine. Data relating to actual use of medicines are limited.

The use of medicines can be estimated as the daily dose per 1,000 population supplied. A prescription for one type of medicine might contain enough for several months of treatment, whereas another might contain only enough for several days. The use of medicines is based on the assumed average dose per day of the drug for its main indication (reason for use) by adults. This allows for comparisons of different medicines independent of differences in quantities of medicines per prescription (Table 7.9).

According to this estimation approach, medicines used for reducing blood cholesterol, lowering stomach acid, lowering blood pressure, and antibiotics were the most common medicines supplied (Table 7.9).

As measured by the 'daily dose', atorvastatin was the highest supplied drug in both 2000 and 2009–10, increasing from 39.2 to 80.5. Salbutamol and simvastatin were the second and third highest in 2000 with a daily dose of 30.1 and 29.7 respectively, both reducing in 2009–10 to 20.2 (eighth) and 25.9 (fifth).

Table 7.9: Top 15 medicines, 2009–10

Medication name	Action	Defined daily dose per 1,000 population			Prescriptions (million)		
		PBS/ RPBS	Other ^(a)	Total	PBS/ RPBS	Other ^(a)	Total
Atorvastatin	Lowers blood cholesterol	80.4	0.2	80.5	11,064	23	11,088
Irbesartan	Lowers blood pressure	33.7	11.5	45.1	3,130	1,128	4,259
Perindopril	Lowers blood pressure	28.4	11.3	39.7	4,016	1,540	5,557
Paracetamol	Pain-killer & antipyretic	23.9	2.4	26.3	4,317	238	4,556
Simvastatin	Lowers blood cholesterol	25.4	0.51	25.9	4,739	229	4,969
Rosuvastatin	Lowers blood cholesterol	25.4	0.1	25.4	4,709	9	4,718
Esomeprazole	Lowers stomach acid	21.4	0.1	21.4	6,286	23	6,309
Salbutamol	Opens airways	15.5	4.7	20.2	2,763	793	3,557
Metformin hydrochloride	Lowers blood glucose	13.4	4.4	17.8	3,406	1,146	4,552
Pantoprazole	Lowers stomach acid	14.5	1.0	15.5	3,831	294	4,126
Atenolol	Lowers blood pressure & regulates heartbeat	8.6	2.5	11.1	3,152	902	4,055
Amoxicillin	Antibiotic	2.5	3.5	6.1	2,475	3,637	6,112
Amoxicillin with clavulanic acid	Antibiotic	1.8	2.1	3.8	1,736	2,107	3,843
Cephalexin	Antibiotic	1.5	1.2	2.7	2,540	2,139	4,679
Codeine with paracetamol	Pain-killer	n.a.	n.a.	n.a.	2,353	1,519	3,872

(a) Prescription not subsidised by the PBS or RPBS, because they were private prescriptions or the cost to the patient was not more than the copayment threshold.

Source: Drug Utilisation Sub Committee drug utilisation database (DoHA, unpublished).



The BEACH survey of general practice collects information on medicines prescribed by GPs (see Box 7.4 in 'Section 7.3 General practitioners' for more information on the BEACH survey).

In the BEACH survey, medicines are reported at the Coding Atlas for Pharmaceutical Substances (CAPS) level. CAPS are medicines that are prescribed, provided by the GP or advised for over-the-counter purchase, and are coded and classified.

According to the survey, the most frequently prescribed medicines have not changed drastically between 2000–01 and 2009–10. Antibiotics and pain-management medicines were the most highly prescribed medicines by GPs. The three most prescribed medicines in order, for both years, were amoxicillin, paracetamol and cephalexin. Amoxicillin and cephalexin are both antibiotics.

Medicines are sometimes provided directly by GPs, at a rate of 6.9 per 100 encounters in 2000–01, compared with 13.6 medicines per 100 encounters in 2009–10 (AIHW: Britt et al. 2001; AIHW: Britt et al. 2010b).

The BEACH survey shows that vaccines were the most commonly supplied medicines by GPs in 2009–10. The influenza vaccine represented 30% of all medicines supplied (AIHW: Britt et al. 2010b).

What is missing from the picture?

In most cases where a medicine is prescribed, there is little information captured and collated at a national level on:

- the purpose for which it was prescribed
- whether it was taken in compliance with directions for use
- the outcome that occurred from its use.

This information at the patient level would greatly enhance the monitoring of the use of medicines in Australia.

Where do I go for more information?

Detailed data on subsidised medicines can be obtained from the data cubes available at www.medicareaustralia.gov.au/provider/pbs/stats.jsp. More information on the estimates of total community use of pharmaceuticals can be found in the *Australian statistics on medicine* series available at www.health.gov.au/internet/main/publishing.nsf/content/health-pbs-general-pubs-asm.htm.

7.8 Hospitals in Australia

At a glance

In 2009–10:

- there were more than 1,320 public and private hospitals in Australia, with about 57,000 and 28,000 beds respectively
- an estimated \$46.3 billion—about 3.6% of Australia's gross domestic product or about \$2,180 per person—was spent on Australia's hospitals
- Australia's public hospitals employed about 251,000 full-time equivalent staff and private hospitals more than 56,000.



Introduction

Hospitals are an important part of Australia's health landscape, providing services to many Australians each year. In 2009–10, an estimated \$46.3 billion—about 3.6% of Australia's gross domestic product, or about \$2,180 per person—was spent on Australia's hospitals (AIHW 2011c). Access to our hospital services, the quality of the services, as well as their funding and management arrangements, are under constant public scrutiny.

This section provides a profile of public and private hospitals in Australia. Collectively, these hospitals provide almost all admitted patient, outpatient and emergency department services. Information is provided on the number of beds, the people they employ, and overall spending and funding. For summary information on services provided by Australia's hospitals (admitted patient care, emergency department and outpatient) see 'Section 7.9 Admitted hospital care' and 'Section 7.10 Non-admitted hospital care'. Chapter 6 includes data on hospital service use for patients with particular health conditions.

What do we know about Australia's hospitals?

How many hospitals and beds are there?

In Australia, both public and private hospitals provide hospital services. Public hospitals are mainly owned and managed by the state and territory governments. They mostly provide 'acute care' for short periods, although some provide longer-term care, such as for rehabilitation. Public psychiatric hospitals specialise in the care of people with mental health problems, sometimes for long periods of time.

Private hospitals are mainly owned and managed by private organisations, either for-profit companies or not-for-profit non-government organisations. They include day hospitals that provide services on a day-only basis, and hospitals that provide overnight care. In 2009–10, there were more than 1,320 public and private hospitals in Australia, providing almost 85,000 beds for admitted patients (Table 7.10).



Table 7.10: Public and private hospitals, 2009–10

Hospital type	Number	Beds
Public hospitals		
Public acute hospitals	736	54,812
Public psychiatric hospitals	17	2,088
<i>Total public</i>	753	56,900
Private hospitals		
Private free-standing day hospital facilities	293	2,260
Other private hospitals	280	25,778
<i>Total private</i>	573	28,038
Total	1,326	84,938

Source: AIHW 2011g.

Between 2005–06 and 2009–10, the number of hospital beds increased by an average of 1.2% per year, from about 81,000 beds in 2005–06. There was a relatively large increase in beds in private hospitals, compared with public acute hospitals. The number of beds in public psychiatric hospitals decreased relative to other hospitals, reflecting a continuation of the long-term trend to deinstitutionalise services for people with mental illness, and the trend to integrate specialist psychiatric services with public acute care hospital services.

Public hospitals

The 753 public hospitals are diverse in size (Table 7.11). In 2009–10, the largest public hospital had more than 1,000 beds, but more than 70% of hospitals had fewer than 50 beds. The larger hospitals—*Principal referral, Specialist women's and children's* and *Large*—provided the majority of public hospital beds and were mainly in more densely populated areas. *Principal referral, Specialist women's and children's* and *Large* hospitals accounted for about 82% of hospitalisations in public hospitals. Overall these types of hospitals, with *Medium* hospitals, undertook the majority of emergency department, elective surgery and outpatient activity.

Table 7.11: The diversity of public hospitals, 2009–10

Hospital type	Number by location				Average number of beds per hospital	Average number of hospitalisations per hospital
	Major cities	Regional	Remote	Total		
Principal referral	50	24	1	75	412.7	43,591
Specialist women's and children's	11	0	0	11	199.1	20,635
Large	26	16	1	43	142.2	15,190
Medium	23	69	0	92	64.2	5,899
Small acute	0	116	38	154	21.5	1,218
Psychiatric	13	4	0	17	122.8	658
Rehabilitation	6	2	0	8	69.2	975
Mothercraft	8	0	0	8	26.4	1,681
Small non-acute	16	54	13	83	31.9	805
Multi-purpose service	0	45	33	78	12.0	346
Other	28	86	70	184	10.8	284
Total	181	416	156	753	75.6	6,716

Source: AIHW 2011g.

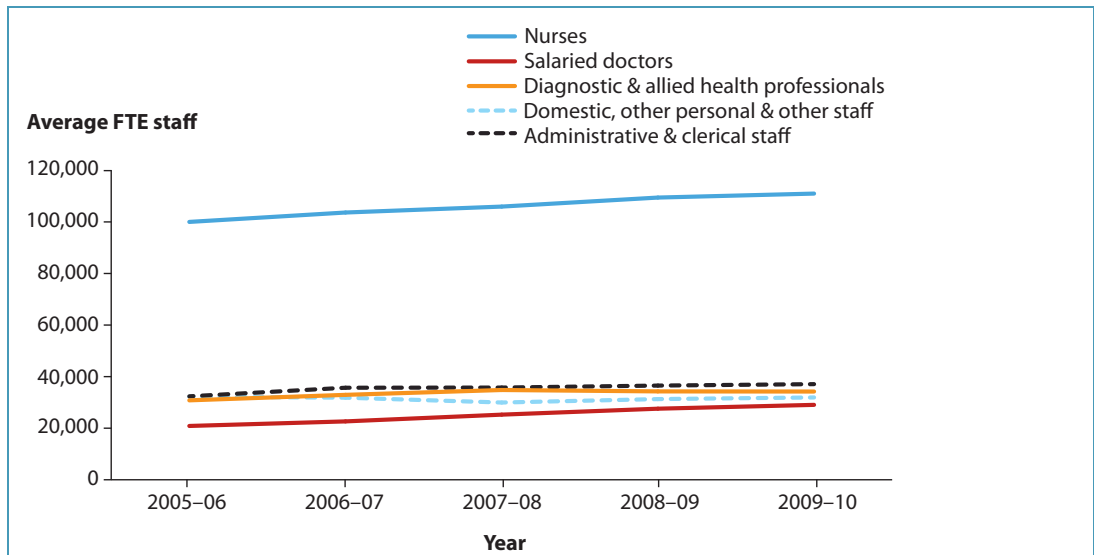
Hospital staffing

Hospital employees include doctors (such as surgeons, anaesthetists, other specialists and doctors in training), nurses, diagnostic and allied health professionals (such as radiologists and occupational therapists), administrative and clerical staff, and domestic and other personal care staff. In 2009–10, Australia's public hospitals employed about 251,000 FTE staff, and private hospitals more than 56,000 (ABS 2011b). These statistics do not include visiting doctors in public hospitals (who are paid on contract, rather than as staff) and most doctors in private hospitals (where the patients and Medicare mainly cover payment, rather than the hospitals).

In 2009–10, just under half (45%) of the staff in public hospitals were nurses, about 12% were salaried doctors and a further 14% were diagnostic and allied health professionals. Between 2005–06 and 2009–10, the number of salaried doctors increased by an average of 7.5% annually, to 31,000. The number of nurses increased by an average of 3.6% annually, to 114,000 (Figure 7.7).

The staffing mix in private hospitals is somewhat different from that in public hospitals, because most medical services are not provided by hospital employees and the range of services provided is different. Nurses accounted for more than half (57%) of staff numbers in 2009–10 (ABS 2011b). Doctors and diagnostic and allied health professionals made up about 7% of private hospital staff numbers.





Source: AIHW 2011g.

Figure 7.7: Average FTE staff, public hospitals, 2005-06 to 2009-10

How are our hospital services funded?

Public and private hospitals are funded from a range of sources, reflecting the types of patients they treat and the services they provide. Emergency department and outpatient services are mainly funded by governments, whereas admitted patient services are commonly funded by private (non-government) sources, as well as government sources. In general terms, state and territory governments and the Australian Government provide most of the funds for public hospitals (see 'Section 8.2 Where does our health dollar come from?'). The proportion of funding that was from the Australian Government declined between 2005-06 and 2006-07, then increased between 2007-08 and 2009-10 (AIHW 2011c). Private hospitals are funded mainly by private health insurance and out-of-pocket payments by patients.

How much do hospitals spend?

Hospital spending includes recurrent spending and capital spending. Recurrent spending is money that is spent on goods and services that are consumed during the year, for example, salaries, and recurs each year. Capital spending includes money spent on buildings and large, usually once-off, pieces of equipment or technology.

Public hospitals

In 2009-10, recurrent spending by public hospitals was \$33.7 billion (excluding depreciation) (AIHW 2011c). After adjusting for inflation, this represents an increase of 3.7% compared with 2008-09. More than 62% of this spending was for salary payments (\$21.1 billion). About 70% of recurrent spending was on admitted patient services, with the rest for non-admitted services and other hospital activities. Between 2005-06 and 2009-10, recurrent spending by public hospitals increased by an average of 5.2% per year (after adjusting for inflation). These data are not directly comparable to those in 'Section 8.3 Where does our health dollar go?' as some spending, such as trust fund spending, is not included here.

Private hospitals

In 2009–10, recurrent spending by private hospitals was \$8.9 billion (including depreciation) (ABS 2011b). About 50% of this was for salary payments (\$4.5 billion). Between 2004–05 and 2009–10, recurrent spending by private hospitals increased by an average of 3.6% per year (after adjusting for inflation) (ABS 2011b).

What is missing from the picture?

The main source of hospital data in this section, the National Public Hospital Establishments Database, does not include public sector hospitals that are not within the jurisdiction of a state or territory (for example, hospitals operated by the Department of Defence or correctional authorities and hospitals in offshore territories).

The counts of available beds for admitted patients do not distinguish between the number of beds available for same-day and overnight admitted patients, although these data should be available in the future.

Hospitals, and the services they provide, represent one component of our health system. Ideally, data on Australia's hospitals could be considered with data on other sectors, such as primary care, to provide a better view of the whole health system. However, as already mentioned in 'Section 7.2 Primary health care in Australia', there is currently no nationally coordinated approach to primary health-care data collection.

Where do I go for more information?

For more information on hospitals in Australia, see the AIHW publications *Australian hospital statistics 2009–10* and its companion publication *Australia's hospitals 2009–10: at a glance* (AIHW 2011g).

For more information on hospital spending, see the AIHW publication *Health expenditure Australia 2009–10* (AIHW 2011c).

For information on primary care, see 'Section 7.2 Primary health care in Australia'.



7.9 Admitted hospital care

At a glance

- Of about 8.5 million hospitalisations in Australia in 2009–10, three-fifths were in public hospitals.
- The number of hospitalisations increased more in private hospitals (22%) than public hospitals (14%) between 2005–06 and 2009–10.
- In 2009–10, Indigenous Australians were hospitalised at 2.5 times the rate of other Australians, and as much as 3 times the rate for same-day stays.



Introduction

Admission to hospital is a formal process, and follows a doctor deciding that a patient needs to be admitted for appropriate management or treatment of their condition, or for appropriate care or assessment of their needs. This section provides a summary of admitted patient services that include both emergency and elective (planned) care, and maternity services, medical care and surgery. It includes information on the people who used these services, the reasons for their hospital admission, and the type of care they received. Information is also included on some aspects of the safety and quality, costs and funding of admitted care. For information on non-admitted services (emergency department and outpatient) see 'Section 7.10 Non-admitted hospital care'.

Total admitted hospital activity is the focus of this section. However, in some subsections, data on activity in public and private hospitals, and acute and non-acute types of care, are also included. Box 7.6 provides information on the National Hospital Morbidity Database (NHMD)—one of the main data sources on admitted hospital care in Australia. Box 7.7 provides a summary of the common terms and definitions used to describe admitted patients in *Australia's health 2012*.

Box 7.6: National Hospital Morbidity Database

State and territory health authorities compile information on hospitalisations and supply it to the AIHW for collation into the NHMD. This database is an electronic record for each episode of care from almost every hospital in Australia, including public acute and psychiatric hospitals (public sector), and private free-standing day hospital facilities and other private hospitals (private sector). Since 1993–94, data have been provided for all public hospital episodes and, for most years, about 95% of private hospital episodes.

As indicators of ill health in the population, hospitalisation data have limitations. First, people who are attended to by the hospital but not admitted are not counted in the hospitalisation data. Also, the counting unit is the episode of care (the hospitalisation), not the patient. Further, the patient cannot be identified in the national database; so, for example, one patient admitted five times cannot be distinguished from five patients admitted once each. Finally, hospitalisation data are also affected by variations in admission practices, and in the availability of, and access to, hospital and non-hospital services.

What do we know about admitted hospital care?

How much activity was there in 2009–10?

In 2009–10, there were about 8.5 million hospitalisations in Australia, with 60% in public hospitals (5.1 million). A total of 26.4 million days of patient care were provided, about 69% in public hospitals (18.1 million). Most hospitalisations (96%) were for acute care.

In 2009–10, just over half (2.6 million) of the hospitalisations in public hospitals and two-thirds of those in private hospitals were for same-day care. The number of overnight hospitalisations per 1,000 population in Australia was in the middle of the range reported by other OECD countries for recent years. However, international comparisons are likely to be affected by differences in definitions of hospitals, collection periods and admission practices (OECD 2011).



Box 7.7: Terms and definitions relating to admitted patients

Statistics on admitted patients are compiled when patients complete an episode of care. The statistics are compiled at the end of the episode because that is when all the data pertaining to that episode of care (such as the length of stay and the procedures carried out) are known, and the diagnostic information is more accurate.

A **separation** can refer to a total hospital stay (from admission to discharge, transfer to another facility, or death), or to a portion of a hospital stay beginning or ending in a change of type of care (such as from acute to rehabilitation). In *Australia's health 2012*, the term hospitalisation is used to describe a separation, and analysis of hospitalisations excludes episodes of care related to organ procurement (from an organ donor, after death), hospital boarders, or care for newborn babies that does not meet admission criteria.

For each hospitalisation, a **principal diagnosis** is reported. This describes the chief reason for the patient's episode of care and is usually a disease, injury or poisoning, but can also be a specific treatment of an already diagnosed condition, such as dialysis for renal disease, or other reasons for hospitalisation. If applicable, **procedures** may also be reported. These can be described as surgical or non-surgical. Procedures can be used to treat or diagnose a condition, support other treatments (such as anaesthesia and physiotherapy), or can be of a patient support nature (such as counselling). In 2009–10, diagnoses and procedures were reported using the sixth edition of the ICD-10-AM (NCCH 2008) incorporating the Australian Classification of Health Interventions classification. For hospitalisations with a principal diagnosis of injury and poisoning, the cause of the injury—for example, a traffic accident or fall—is also recorded (referred to here as 'external causes').

Hospitalisations are commonly described as overnight, when the patient is admitted and separated on different days, and as same-day, when the patient is admitted and separated on the same day.

A **patient day** is a day, or part of a day, that a patient is admitted to hospital to receive treatment or care. Days of patient care are the total number of days spent in hospital by all patients who were discharged from hospital during the reporting period.

Casemix is the range and type of patients (the mix of cases) treated by a hospital or other health service.

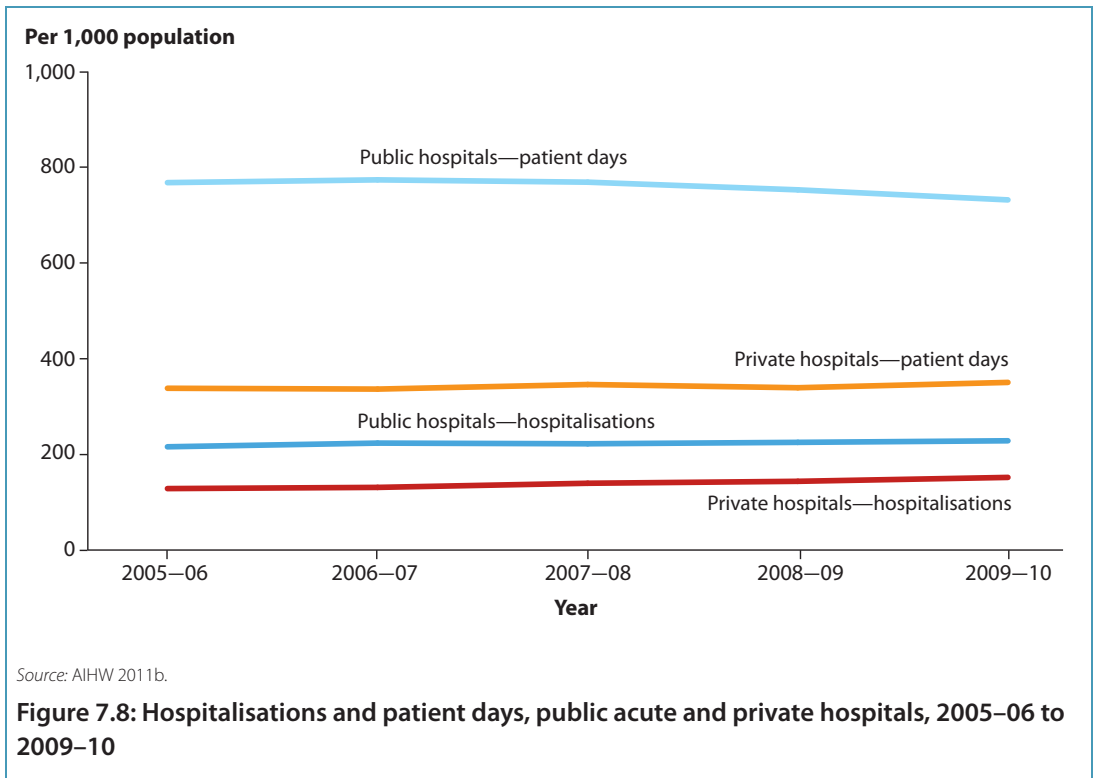
Acute care is care with the intent to cure the condition, alleviate symptoms or manage childbirth. **Non-acute care** includes rehabilitation, palliative care, psychogeriatric care, geriatric evaluation and management and maintenance care.

Information on the number of hospitalisations for Indigenous people is limited by the accuracy with which Indigenous patients are identified in hospital records, and the rates may be underestimated. In *Australia's health 2012*, analysis of hospitalisations by Indigenous status is based on data for those jurisdictions where the quality of Indigenous identification is considered adequate for hospital reporting: New South Wales, Victoria, Queensland, South Australia, Western Australia and the Northern Territory (public hospitals only) (AIHW 2011b). The term 'other Australians' is used to describe records with an Indigenous status of 'Non-Indigenous' or 'Not stated'.

How has this activity changed over time?

Between 2005–06 and 2009–10, hospitalisations increased by 17%, and at a greater rate in private hospitals (22%) than in public hospitals (14%). The overall increase was mainly due to a 23% increase in hospitalisations for people aged 55 and over, compared with a 10% increase for those aged under 55. For both public and private hospitals, the number of patient days also increased over this period (7% and 13% respectively), however the number of patient days per 1,000 population was relatively stable (Figure 7.8).

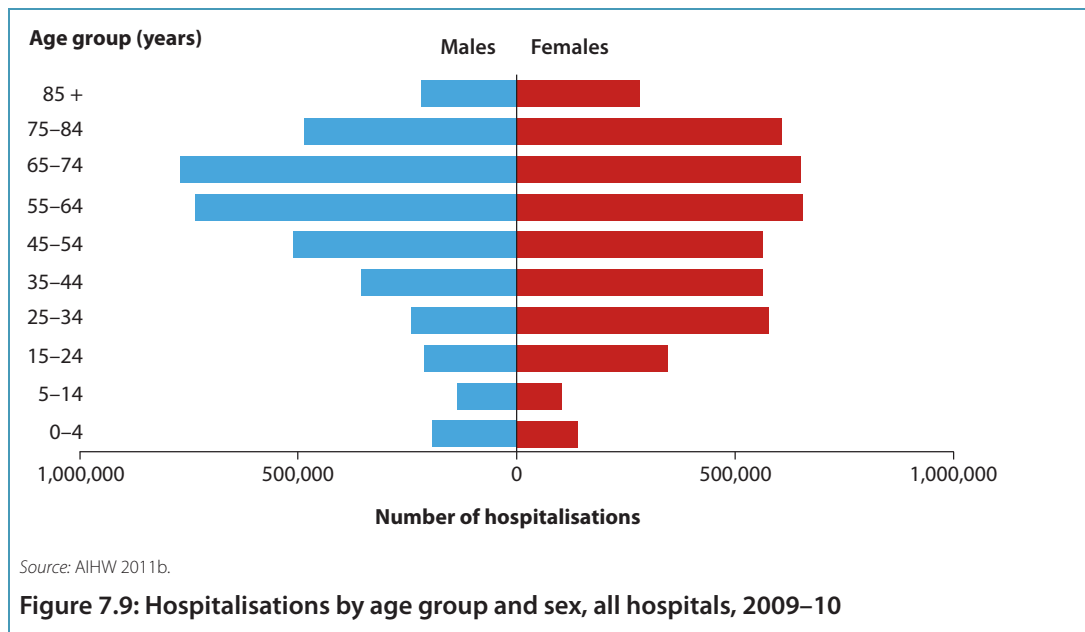
Between 2005–06 and 2009–10, there were notable increases in the amount of non-acute care provided, particularly for rehabilitation care in private hospitals (an increase of 19% per year) and geriatric evaluation and management care in public hospitals (an increase of 11% per year).



Who used these services?

In 2009–10, females were more likely than males to be hospitalised (53% and 47% respectively). Service use was highest for people aged 55 and over, and for women of child-bearing age (Figure 7.9).





Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander people were hospitalised at a greater rate than other Australians (after adjusting for age). In 2009–10:

- Indigenous Australians had a hospitalisation rate almost 2.5 times that for other Australians (898 per 1,000 population compared with 370 per 1,000 population). In particular, they were hospitalised on a same-day basis at about 3 times the rate of other Australians.
- Compared with other Australians, Indigenous Australians had higher hospitalisation rates across all age groups.

However, if hospitalisations for dialysis for kidney disease are excluded, Indigenous Australians were hospitalised about 30% more than other Australians (433 per 1,000 population compared with 328 per 1,000), and the rate of same-day hospitalisations for Indigenous Australians was about 25% lower. This illustrates the impact of kidney disease on the health of Indigenous Australians, and their use of hospital services for dialysis (see 'Section 6.10 Chronic kidney disease').

Remoteness and socioeconomic status

Hospital use also varied by the remoteness of residence and socioeconomic status of the patient, with different patterns evident for public and private hospitals. The differences largely reflect that there are relatively few private hospitals in the more remote areas of Australia.

Overall, hospitalisation rates were highest for patients living in *Very remote* areas and for those living in areas classified as the most socioeconomically disadvantaged. For public hospitals, hospitalisation rates were:

- highest for patients living in *Very remote* areas and lowest for those in *Major cities* (482 and 206 hospitalisations per 1,000 population, respectively)
- highest for patients living in the most socioeconomically disadvantaged areas and lowest for those in the least disadvantaged areas (291 and 146 hospitalisations per 1,000 population, respectively).

Conversely, for private hospitals, the hospitalisation rates were:

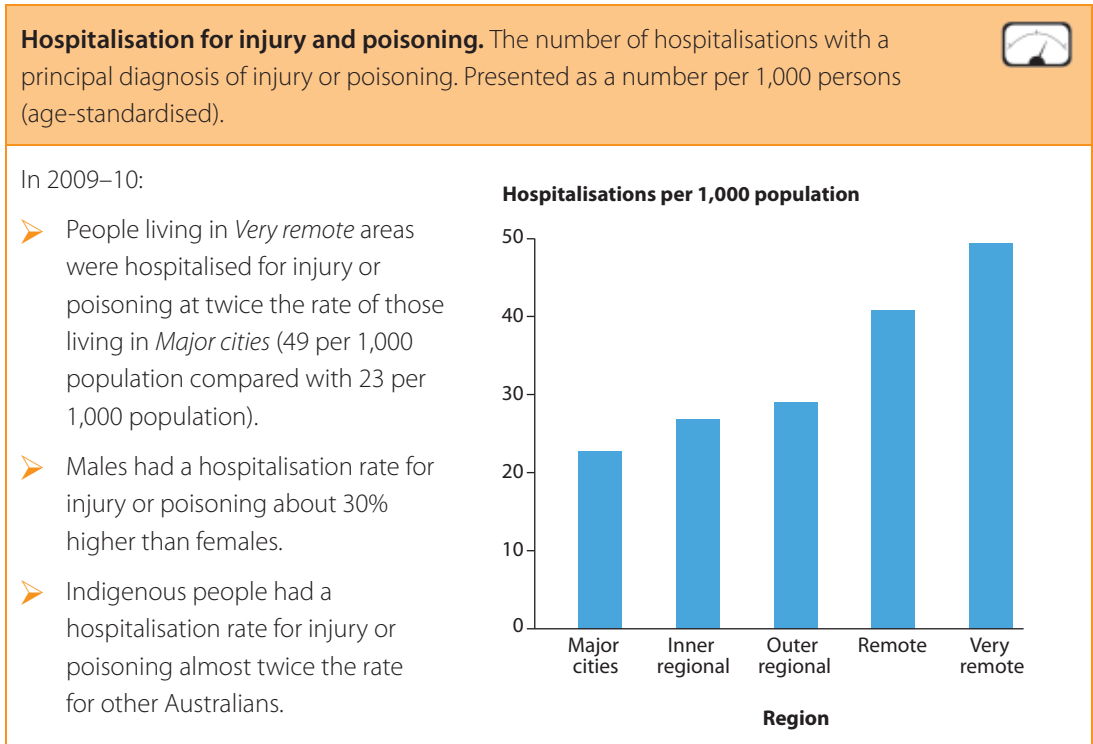
- highest for patients living in *Major cities* and lowest for those living in *Very remote* areas (169 and 58 hospitalisations per 1,000 population, respectively)
- highest for patients living in least socioeconomically disadvantaged areas and lowest for those in the most disadvantaged areas (221 and 102 hospitalisations per 1,000 population, respectively).

Some performance indicators in this section include additional information about hospital service use for these population groups.

Why did people receive this care?

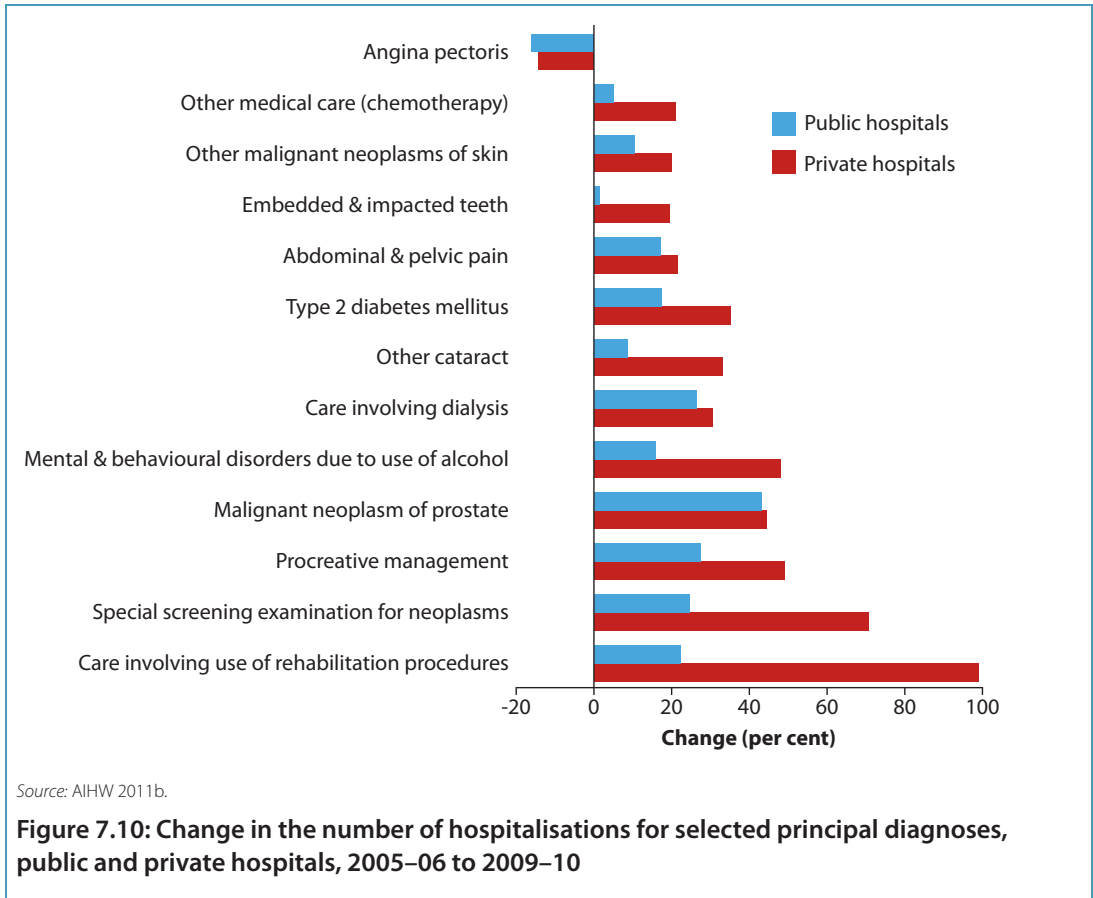
The reason that a patient receives admitted patient care can be described in terms of a principal diagnosis (Box 7.7). For injury and poisoning, it can also be described in terms of the cause of the injury, for example, a traffic accident or fall. For other types of care, it can be described in terms of a treatment for an ongoing condition (for example, dialysis for kidney failure).

In 2009–10, many hospitalisations had a principal diagnosis reported that was a disease of the digestive system (870,000), a cancer (580,000), an injury or poisoning (560,000) (see the performance indicator ‘Hospitalisation for injury and poisoning’), a disease of the circulatory system (480,000), a condition associated with pregnancy and childbirth (480,000), a disease of the respiratory system (375,000), or a mental disorder (340,000). Falls were the most common causes of injury and poisoning (178,000), followed by complications of medical and surgical care (115,000) and transport accidents (59,000).



The most common reasons for hospitalisation were different for same-day and overnight acute hospitalisations. About 24% of same-day acute hospitalisations were for care involving dialysis (more than 1.1 million hospitalisations for kidney failure). Other common principal diagnoses were 'other medical care' (7%, 343,000 hospitalisations, mainly chemotherapy for cancer) and cataract extractions (3%, 134,000). For overnight acute care, the most common principal diagnosis accounted for only 2% of hospitalisations (pain in the throat and chest, almost 71,000 hospitalisations). Other common principal diagnoses were sleep disorders (59,000 hospitalisations), gallstones (54,000) and pneumonia (53,000). About two-thirds of non-acute hospitalisations had a principal diagnosis of 'Care involving use of rehabilitation procedures' (227,000 hospitalisations). For these, the most common reasons for the care (recorded in secondary diagnoses) were related to diseases of the knee and hip, including fracture of the femur.

Between 2005–06 and 2009–10, some high-volume diagnoses have experienced relatively large changes in volume in either public or private hospitals or both (Figure 7.10). For example, hospitalisations for care involving the use of rehabilitation procedures increased by about 22% in public hospitals (to 194,000) and almost doubled in private hospitals (to 170,000). Hospitalisations for angina decreased by 16% in public hospitals (to 46,000) and by 14% in private hospitals (to 19,000).



How urgent was the care?

At admission, a hospitalisation can be categorised as emergency (required within 24 hours), or elective (required at some stage beyond 24 hours). Emergency or elective status is not assigned for some admissions (for example, obstetric care and planned care, such as dialysis).

Hospitalisations categorised as an emergency admission were more common in public hospitals (40% of hospitalisations) than private hospitals (5%). About three-quarters of emergency admissions were overnight hospitalisations. In contrast, elective hospitalisations were more common in private than public hospitals (88% and 55% respectively) and about three-quarters of elective hospitalisations were for same-day stays. Fewer than 5% of non-acute hospitalisations were reported as emergency admissions.

What care was provided?

The care that is provided can be described in two ways:

- broad category of service—childbirth, specialist mental health, medical (not involving a procedure), surgical (involving an operating room procedure), or other (involving a non-operating room procedure, such as endoscopy)
- type of procedure undertaken, for example, surgical or non-surgical.

Broad category of service

In public hospitals in 2009–10, most hospitalisations (76%) were for medical care, 18% were for surgical care, 4% for childbirth and about 2% for specialist mental health care. In contrast, 56% of hospitalisations in private hospitals were for medical care, 37% were for surgical care and 2% for childbirth. Specialist mental health care accounted for almost 5% of hospitalisations in private hospitals.

Procedures

A range of procedures are used in admitted hospital care. In 2009–10, one or more procedures were reported for 7.1 million (83%) hospitalisations in Australian hospitals. Hospitalisations in private hospitals were more likely to have a procedure recorded than public hospitals (94% compared with 77%).

In 2009–10, many hospitalisations had recorded a procedure on the urinary system (1.4 million), the digestive system (1.1 million), the musculoskeletal system (565,000) or the cardiovascular system (325,000). Also commonly reported were hospitalisations with imaging services (683,000) and hospitalisations with non-invasive, cognitive and other interventions, including allied health and general anaesthesia (5.2 million).

For non-acute care, the most common types of services involved allied health interventions, including physiotherapy (for over 251,000 hospitalisations) and occupational therapy (153,000 hospitalisations).

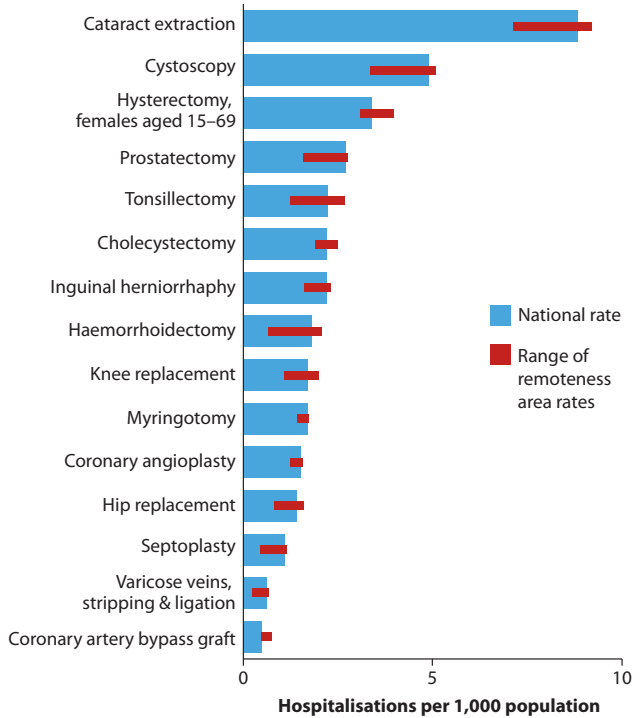
Access to certain hospital procedures can vary by remoteness, socioeconomic status and Indigenous status (see the performance indicator 'Differential access to hospital procedures').



Differential access to hospital procedures. The number of hospitalisations involving selected procedures per 1,000 population for selected population groups. Presented as a number per 1,000 persons (age-standardised).



- The national rate for cataract extraction was 8.8 per 1,000 population, but the rate varied by remoteness, ranging from 7.1 per 1,000 for people living in *Very remote* areas to 9.2 per 1,000 population for those living in *Outer regional* areas.
- The rates of coronary artery bypass graft and coronary angioplasty showed the least variation among remoteness areas.
- Indigenous people generally had lower rates of hospitalisation for the selected procedures than other Australians. However, they had higher rates for cholecystectomy, coronary artery bypass graft and coronary angioplasty.



Elective surgery

Hospitalisations for elective surgery are defined as having a surgical procedure and being admitted on an elective basis (Box 7.8). There were almost 1.9 million elective surgery hospitalisations in 2009–10; 661,000 in public hospitals and 1.2 million in private hospitals. The number increased between 2005–06 and 2009–10 by an average of 1.5% each year for public hospitals and 4.9% for private hospitals.

Box 7.8: Elective surgery

Public elective surgery describes elective surgery provided in public hospitals and elective surgery provided to public patients in private hospitals. Other elective surgery describes elective surgery provided mainly to private patients in private hospitals.

Information on elective surgery activity in Australia is available from two data sources. The NHMD contains information on public and other elective surgery and the National Elective Surgery Waiting Times Data Collection (NESWTDC) contains information about patients on, and removed from, waiting lists for public elective surgery. As data from the NESWTDC is available earlier than the NHMD, this section includes both 2009–10 data from the NHMD and 2010–11 data from the NESWTDC.

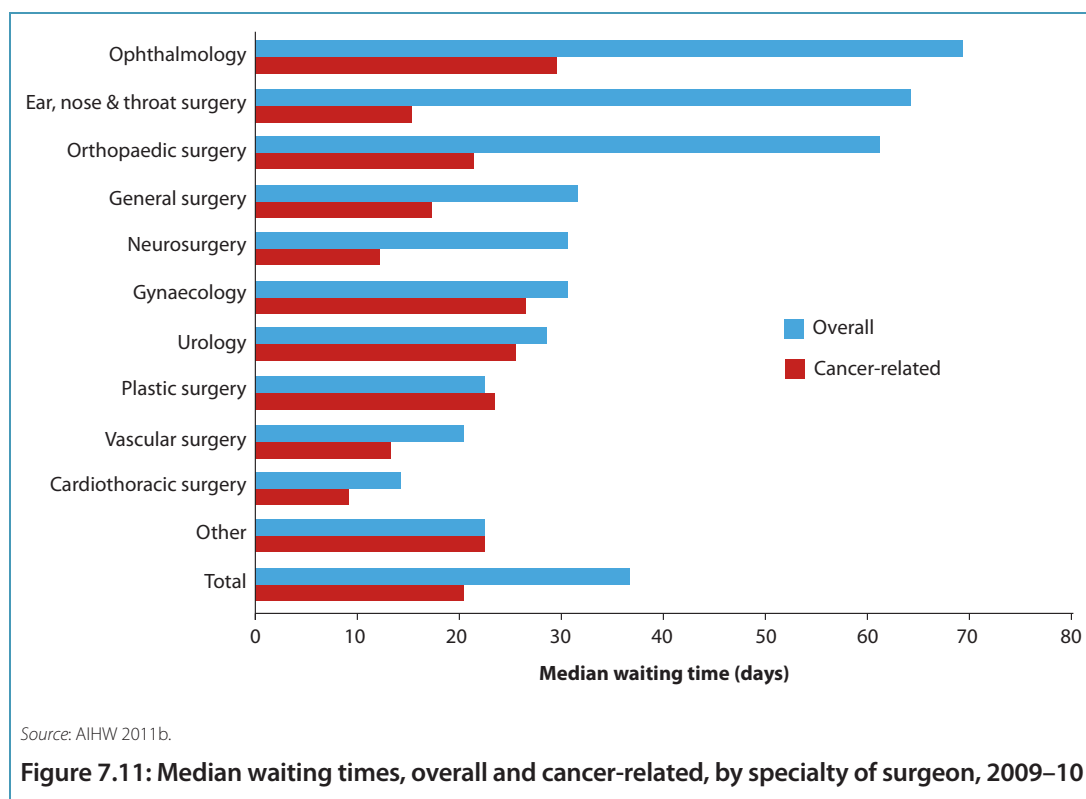


There was some variation in the rates of access to both public elective surgery and elective surgery for other patients by socioeconomic status. In 2009–10, the public elective surgery rate was lowest for patients living in the least socioeconomically disadvantaged areas (18 per 1,000) and highest for those in the most disadvantaged areas (40 per 1,000). In contrast, the number of other elective surgery hospitalisations (in private hospitals) per 1,000 population was highest for those living in the least socioeconomically disadvantaged areas (75 per 1,000), and decreased with socioeconomic status to 41 per 1,000 population for those in the most disadvantaged areas.

How long did patients wait for elective surgery?

The median waiting time for elective surgery—the number of days within which 50% of patients were removed from elective surgery waiting lists—is a measure of access to elective surgery (see the performance indicator ‘Waiting times for elective surgery’). Data were available for about 91% of elective surgery in public hospitals.

In 2009–10, the median waiting time for patients with cancer-related principal diagnoses (20 days) was 15 days shorter than the median waiting time for patients overall (35 days) (Figure 7.11).



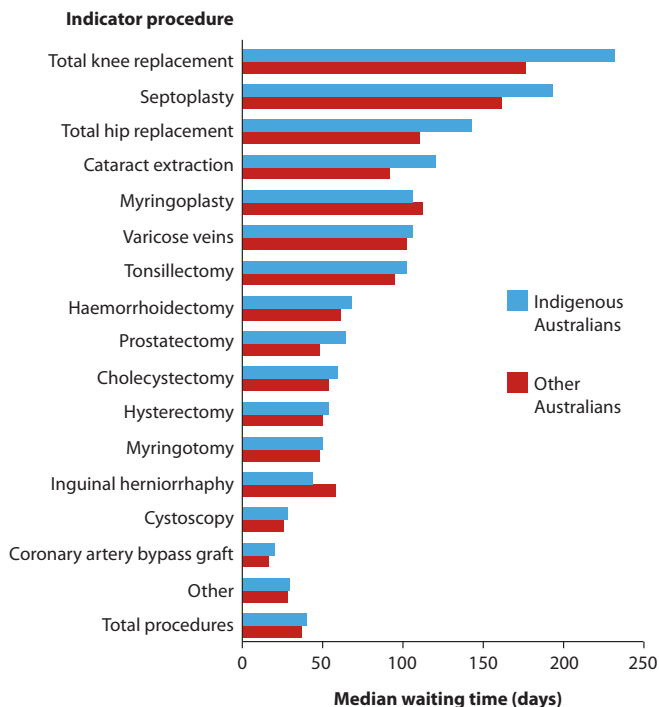


Waiting times for elective surgery. The median waiting times for elective surgery in public hospitals. Presented as number of days.



In 2010–11:

- 50% of patients waited 36 days or less for elective surgery in public hospitals, an increase from 32 days in 2006–07.
- The indicator procedure with the lowest median waiting time was coronary artery bypass graft (17 days). Total knee replacement had the highest median waiting time (173 days).
- Overall, the median waiting time for Indigenous Australians (39 days) was higher than for other Australians (36). This pattern was consistent across the majority of high-volume elective surgery procedures.



Note: Other Australians includes records for which Indigenous status was 'Not reported'.

Source: AIHW 2011a.

What was the safety and quality of the care?

Some information is available on the safety and quality of admitted patient care in hospitals, but it does not provide a complete picture. This section presents data on four measures of safety and quality: adverse events in hospitals, *Staphylococcus aureus* bacteraemia in public hospitals, falls resulting in patient harm in hospitals, and readmissions after surgery. Information on some aspects of quality, such as continuity and responsiveness of hospital services, is not routinely available.

Adverse events

Adverse events are defined as incidents in which harm resulted to a person receiving health care. They include infections, falls resulting in injuries, and problems with medication and medical devices (see the performance indicator 'Adverse events in hospitals'). Some, but not all, of these adverse events are preventable. Hospitalisations data can be used to indicate the occurrence of adverse events because they include information on diagnoses and causes of injury and poisoning that can indicate that an adverse event was treated and/or occurred during the hospitalisation. However, other diagnosis information may also suggest that an adverse event has occurred, and some adverse events are not identifiable using the data. Therefore, the data reported here represent selected adverse events in health care that have resulted in, or have affected, hospital admissions, rather than all adverse events that occurred in hospitals.



Adverse events in hospitals. The number of hospitalisations involving an adverse event. Presented as a number per 100 hospitalisations.



- In 2009–10, an adverse event was reported for almost 5% of hospitalisations (425,000).
- The rate has not changed markedly since 2005–06.
- The majority of hospitalisations with an adverse event related to procedures causing abnormal reactions/complications (55% for public hospitals and 71% for private hospitals).

***Staphylococcus aureus* bacteraemia in Australian public hospitals**

Staphylococcus aureus bacteraemia (SAB) associated with hospital care is an important measure of the safety of hospital care. The aim is to have as few cases of SAB as possible. One of the most effective ways to minimise the risk of SAB and other health-care-associated infections is good hand hygiene. Patients who develop bloodstream infections such as SAB are more likely to suffer complications that result in a longer hospital stay and an increased cost of hospitalisation. Serious infections may also result in death.

A national benchmark has been set for public hospitals that no more than 2.0 cases of SAB occur for every 10,000 days of patient care.

In 2010–11, there were 1,873 cases of SAB reported for Australian public hospitals overall, at a rate of 1.1 per 10,000 patient days. All states and territories had rates of SAB below the benchmark. More than two-thirds of the cases (73%) were methicillin sensitive, and would therefore have been treatable with commonly used antibiotics (AIHW 2011h). These cases occurred during about 17 million days of patient care under SAB surveillance. Data for most private hospitals are not available.

Falls resulting in patient harm in hospitals

Falls resulting in patient harm in hospital are regarded as adverse events, some of which may be preventable. They can be used as an indicator of safety for hospitals—see the performance indicator ‘Falls resulting in patient harm in hospitals’.

Falls resulting in patient harm in hospitals. The number of hospitalisations in which a patient was treated for a fall that occurred in a hospital. Presented as a number, and a number per 1,000 hospitalisations.

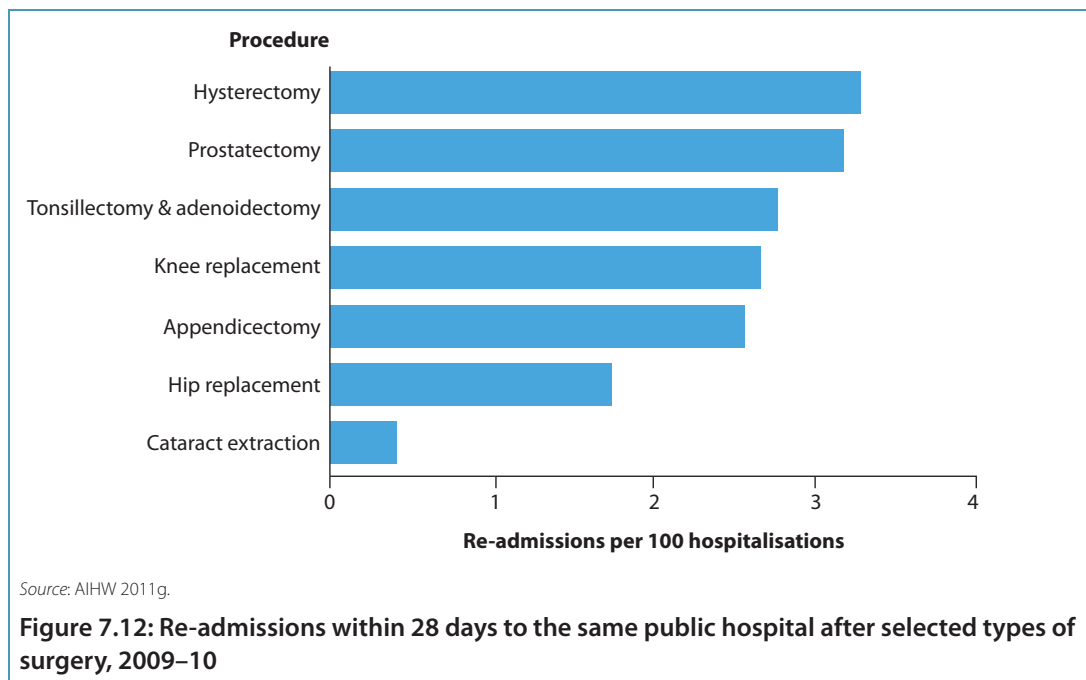


- In 2009–10, there were about 20,000 hospitalisations for which a fall was recorded as occurring in a health service area, an overall rate of about 2.4 per 1,000 hospitalisations (1 in 420).
- The rate was higher in public than private hospitals (3.1 and 1.3 per 1,000, respectively). This may reflect differences between public and private hospitals, in what they do and who they treat.
- These rates are estimates as the place of occurrence was not reported for almost one-quarter of hospitalisations with a fall recorded, and falls that occurred in a health-care setting other than a hospital (such as general practitioner clinics) may be included.



Re-admissions after surgery

The proportion of hospitalisations for selected types of surgery that result in re-admission to hospital within 28 days is also regarded as an indicator of the safety and quality of admitted patient care in hospitals. In 2009–10, hysterectomy was followed by re-admissions on about 3% of occasions, as was prostatectomy (Figure 7.12). Re-admissions after cataract surgery were relatively much rarer. Data for this indicator are only available for public hospitals, and only for re-admissions to the hospital in which the surgery was performed. As re-admissions to other hospitals are not included, rates are likely to be underestimated.



How long did patients stay?

Information on the average length of stay summarises how long admitted patients stay in hospital. Including both same-day care (which is counted as one day's stay, even if it is only for a few hours) and overnight care (that is, for at least one night), the average length of stay was 3.1 days in 2009–10; 2.4 days in private hospitals and 3.4 days in public hospitals. The average length of stay for overnight acute-care hospitalisations was 5.3 days for public hospitals and 4.7 days for private hospitals. This was shorter than for 2005–06 (5.5 and 4.9 days respectively). For non-acute care, the average length of stay for overnight hospitalisations was generally longer; 5.6 days in private hospitals and 20.3 days in public hospitals.

How much did it cost?

Information is available on average costs for public hospitals, but not for private hospitals. The cost of care (expenditure by the hospital) varies according to the length of stay, procedures undertaken and the care needs of the patient. When the average cost per separation (hospitalisation) is calculated taking into account the different lengths of stay, procedures and care needs (that is, taking into account the casemix of the hospital), it is regarded as a measure of efficiency of admitted patient services (see the performance indicator 'Cost per casemix-adjusted separation').

Cost per casemix-adjusted separation. The average cost per separation for acute and non-acute care in public and private hospitals, adjusted for different hospital casemixes. Presented as dollars.

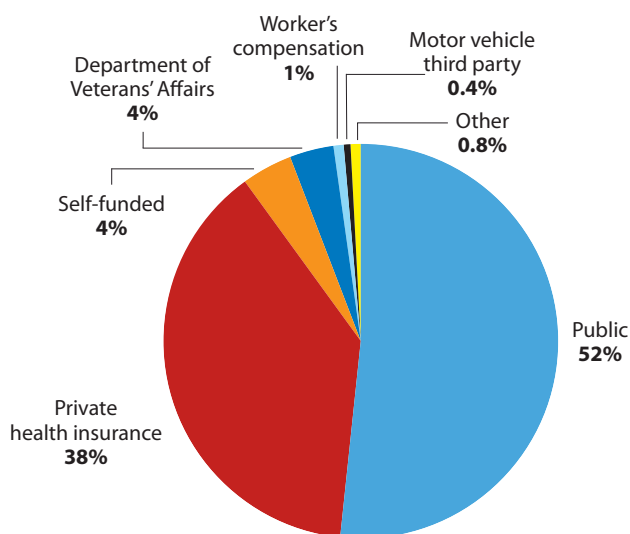


- The average cost per separation in 2009–10 was \$4,684.
- The average cost comprised:
 - \$2,346 for non-medical labour spending
 - \$1,037 for medical labour spending
 - \$1,301 for other recurrent spending.
- The average cost varied by type of hospital. It was higher for *Principal referral and specialist women's and children's* hospitals (\$4,722 per separation) than *Large* hospitals (\$4,291 per separation).

Who paid for the care?

More than half of all hospitalisations in 2009–10 were public patients (52%), who were not charged for their stay (this includes public patients treated in private hospitals under contract arrangements). Private health insurance was the principal source of funds for a further 38%, and self-funded patients and DVA patients accounted for about 4% each (Figure 7.13).

Between 2005–06 and 2009–10, there was an overall increase in hospitalisations of 3.9% per year. Hospitalisations for which the principal source of funds was private health insurance increased by more than the overall increase (6.4% per year).



Source: AIHW 2011g.

Figure 7.13: Hospitalisations by principal source of funds, 2009–10



What is missing from the picture?

Although there are national standards for data on hospital services, there are some variations in how hospital services are defined and counted, between public and private hospitals, among the states and territories, and over time. For example, people receiving the same type of service may be counted as same-day admitted patients in some hospitals, and as non-admitted patients in other hospitals. This makes it difficult to obtain a complete picture on the extent of admitted hospital care, the profile of patients, and their length of stay and costs.

As national data on admitted care is provided at an episode, rather than person level, the data do not allow estimates of the number of people accessing admitted patient services and their patterns of hospital service use.

The national data on admitted patient services also do not cover:

- public sector hospitals that are not within the jurisdiction of a state or territory (for example, hospitals operated by the Department of Defence or correctional authorities, and hospitals in offshore territories)
- private free-standing day facilities in the Australian Capital Territory and the Northern Territory
- aspects of admitted service performance, outside those presented here, including continuity and responsiveness of care
- costs of sub- and non-acute care
- actual length of stay for same-day hospitalisations.

Where do I go for more information?

For more statistics and information on both public and private hospital services, see the AIHW publication *Australian hospital statistics 2010–11* (AIHW 2012a), *Australian hospital statistics 2010–11: emergency department care and elective surgery waiting times* (AIHW 2011a) and *Australian hospital statistics 2010–11: Staphylococcus aureus bacteraemia in Australian public hospitals* (AIHW 2011h).

For information on the local hospital in your area, including performance information for public hospitals, see the MyHospitals website: <www.myhospitals.gov.au/>.

7.10 Non-admitted hospital care

At a glance

- Between 2006–07 and 2010–11, the number of emergency department presentations to Australia's larger public hospitals increased by an average of 4% per year, to about 6.2 million in 2010–11.
- In 2010–11, about 70% of emergency department patients were seen within the recommended time for their medical and nursing care needs.
- In 2009–10, public hospitals provided almost 17 million specialised outpatient clinic consultations, in areas such as allied health, obstetrics, oncology, dental, orthopaedic and other medical services.



Introduction

Hospital services provided in emergency departments and outpatient settings are collectively described as non-admitted care. Emergency departments mainly provide care for patients who may have an urgent need for medical, surgical or other care. However, they may also provide services for patients returning for further care, or for patients waiting to be admitted to a ward. Outpatient services can include a wide range of health services, such as consultations with specialists; the dispensing of medication; diagnostic procedures such as pathology and X-rays, and outreach services such as district nursing. Together, these services represent a substantial component of public hospital activity; for example, in a year there can be more than five times as many non-admitted services as hospitalisations.

As public hospitals provide most emergency department and outpatient services in Australia (about 94% of all emergency services and 96% of other service episodes for non-admitted patients), the majority of the data in this section relate to public hospitals. Box 7.9 provides a summary of the data used to describe non-admitted care.



Box 7.9: Data on non-admitted services

Statistics on non-admitted patients are compiled based on occasions of service. An occasion of service describes any examination, consultation, treatment or other service provided to a patient in each functional unit of a hospital, each time the service is provided. In some cases, a single visit by a patient can result in a number of occasions of service being recorded. National data are categorised in broad clinic or service groups.

Emergency services

This section focuses on emergency department services recorded in the National Non-admitted Patient Emergency Department Care Database (NNAPEDCD). The NNAPEDCD provides detailed information on emergency department presentations, including triage category and time in the emergency department, for a subset of public hospitals. This subset includes all of Australia's larger hospitals and some smaller hospitals.

A count of essentially all emergency occasions of service in public hospitals, that is, not just the subset described above, is also available from the National Public Hospital Establishments Database (NPHEd). In 2009–10, it was estimated that emergency department presentations from the NNAPEDCD comprised just over 80% of the 7.4 million emergency occasions of service recorded in the NPHEd. For more information on 2010–11 NPHEd data, see *Australian hospital statistics 2010–11* (AIHW 2012a).

Variation in data on hospital services

Some services may be provided by hospitals in some states and territories, and by non-hospital health services in others. The national data on hospital care does not include care provided by non-hospital providers, such as community health centres.

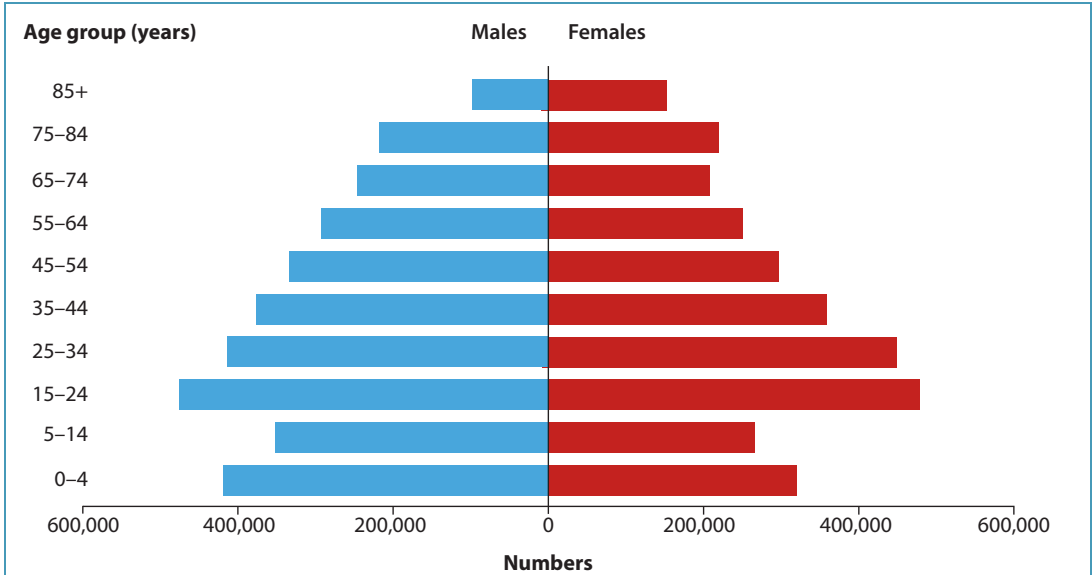
Although there are national standards for data on hospital services, there are some variations in how hospital services are defined and counted, between public and private hospitals, among the states and territories, and over time. For example, people receiving the same type of service may be counted as same-day admitted patients in some hospitals and as non-admitted patients in others.

What do we know about non-admitted hospital care?

Emergency department services

Public hospitals

Between 2006–07 and 2010–11, the number of emergency department presentations increased by an average of 4% per year, to about 6.2 million in 2010–11 (AIHW 2011a). Males accounted for 51% of the presentations in 2010–11, and use of emergency departments was highest among people aged 15–34 and young children aged 0–4 (Figure 7.14). This is in contrast to admitted patient care where service use was highest for people aged 55 and over and women of child-bearing age (see 'Section 7.9 Admitted hospital care').



Source: AIHW 2012a.

Figure 7.14: Public hospital emergency department presentations, by age and sex, 2010–11

Each patient who presents to an emergency department is assessed according to how urgently they should receive care, using a triage category system. The most urgent cases are assigned to the *Resuscitation* triage category (should be treated immediately), and the less urgent are assigned as *Non-urgent* (should be seen within 2 hours). In Australia, the proportion of patients who were treated within national benchmarks for waiting times for each triage category is used as a measure of the accessibility of hospital emergency care (AIHW 2010a, COAG Reform Council 2011). See the performance indicator ‘Emergency department waiting times’.

Improving waiting times for emergency department care in public hospitals is also a key objective under the National Health Reform Agreement (see ‘Section 10.3 Health reform—new information challenges and opportunities’). Under this agreement, states and territories have a new national target for emergency departments: that 90% of all visits are completed in 4 hours or less (COAG 2011a).

The majority (64%) of emergency department presentations in 2010–11 ended with the patients leaving without being admitted or referred to another hospital, and more than one-quarter ended with the patient being admitted to hospital (AIHW 2011a).

Private hospitals

Private hospitals provided about 527,000 emergency occasions of service in 2009–10 (ABS 2011b), about 7% of the total for that year.



Emergency department waiting times. Percentage of patients who were treated within national benchmarks for waiting times for each triage category in public hospital emergency departments. The national benchmarks are:

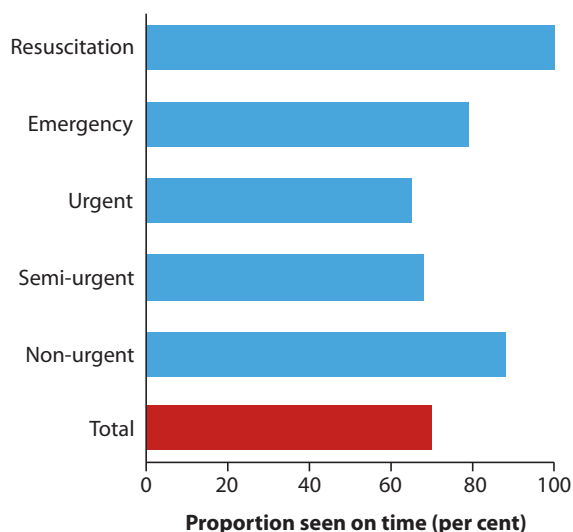


- *Resuscitation*: immediate (within seconds)
- *Emergency*: within 10 minutes
- *Urgent*: within 30 minutes
- *Semi-urgent*: within 60 minutes
- *Non-urgent*: within 120 minutes.

Presented as a percentage.

- In 2010–11, 70% of patients were seen within the recommended time for their triage category, ranging from 65% for *Urgent* patients to 100% for *Resuscitation* patients.
- Overall, 67% were seen on time in *Principal referral and specialist women's and children's hospitals*, and 72% were seen on time in *Large hospitals*.
- Between 2006–07 and 2010–11, the proportion of patients seen within the recommended time for their triage category remained relatively stable (about 70%) despite increasing numbers of emergency department presentations.

Triage category



Note: Resuscitation was considered to be seen on time if the waiting time to service delivery was less than or equal to 2 minutes.

Source: AIHW 2011a.

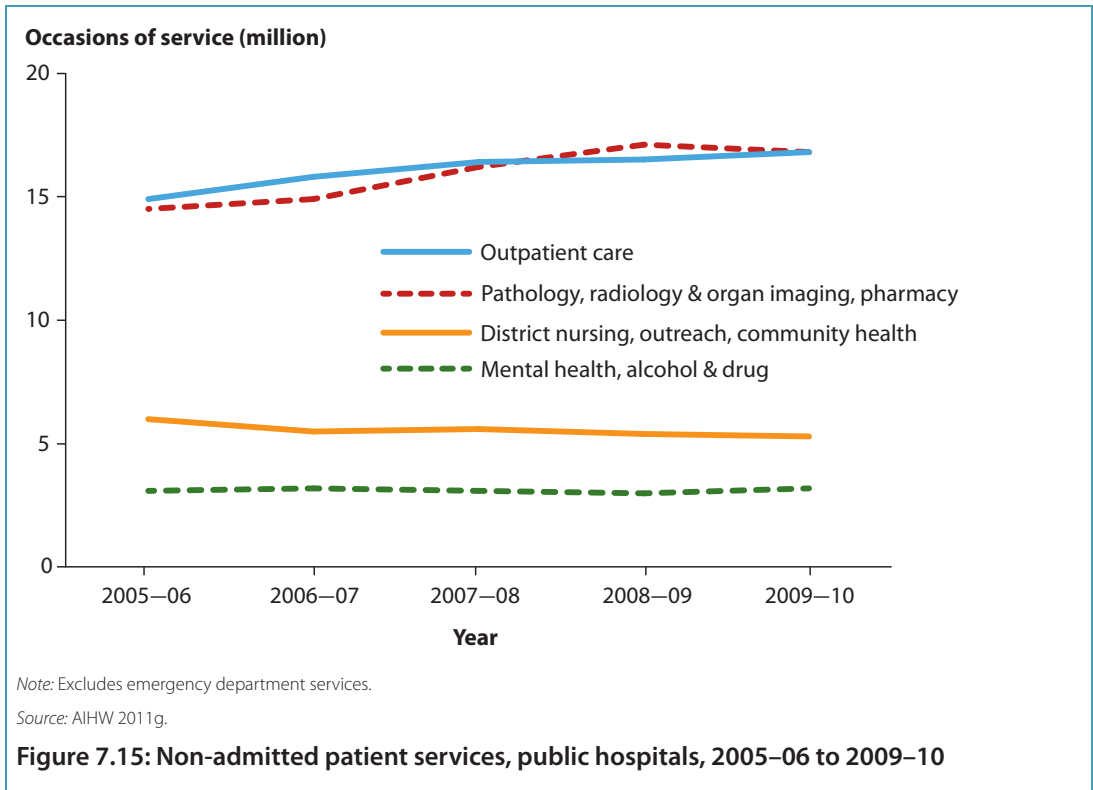
Outpatient services

Public hospitals

In 2009–10, public hospitals provided more than 42 million service episodes for non-admitted patients (not including emergency department services). There were 16.8 million occasions where individuals received a service through specialised public hospital outpatient clinics, which provide allied health, obstetrics, oncology, dental, orthopaedic and other medical services. Additionally, there were more than 25 million other services provided to non-admitted patients of public hospitals, including pathology (8.4 million), pharmacy (5.0 million), radiology and organ imaging (3.5 million), mental health and alcohol and drug services (3.2 million) and district nursing, outreach and community health services (5.3 million).



Between 2005–06 and 2009–10, outpatient care delivered in specialist outpatient clinics increased by an average of 3.0% per year; pharmacy, pathology and radiology and organ imaging services increased by 3.8% per year; mental health and alcohol and drug services increased by 0.8% per year; and district nursing, outreach and community health services decreased by about 2.9% per year (Figure 7.15).



Private hospitals

Private hospitals also provide non-admitted patient services, with a different mix of services from public hospitals. In 2009–10, there were about 1.6 million non-admitted patient services in private hospitals (not including emergency department services) (ABS 2011b). About 468,000 of these were for allied health services and 253,000 for pathology. Private hospitals also provided about 223,000 other services for non-admitted patients, comprising community health, district nursing and non-medical and social services.



What is missing from the picture?

The national data provided for non-admitted public hospital care, both emergency and outpatient, do not include any clinical information, for example, presenting problem, diagnosis or treatment. In addition, the data on outpatient services do not include any patient demographic information. With the exception of emergency department waiting times, national data are also not available to measure aspects of non-admitted service performance, such as safety, access, efficiency and patient outcomes.

Similar gaps exist with national data on non-admitted private hospital care, which do not include any clinical or demographic information, or any data to measure service performance, including waiting times.

There is also variation in hospital admission practices for some services, such as chemotherapy. As a result, people receiving the same type of service may be counted as same-day admitted patients in some hospitals, and as non-admitted patients in others. This makes it difficult to obtain a complete picture of the extent of these hospital services and the profile of the people receiving them.

Where do I go for more information?

For more detailed information on non-admitted hospital care, see the AIHW publications *Australian hospital statistics 2010–11: emergency department care and elective surgery waiting times* (AIHW 2011a) and *Australian hospital statistics 2010–11* (AIHW 2012a).

7.11 Alcohol and other drug treatment services

At a glance

- Alcohol was the principal drug of concern in almost half (48%) of the 147,000 alcohol and other drug treatment episodes in 2009–10, followed by cannabis (23%), heroin (10%) and amphetamines (7%).
- The proportion of episodes involving treatment for alcohol has increased over the past 8 years from 37% in 2001–02 to 48% in 2009–10.
- Counselling was the most common form of main treatment provided (42% of treatment episodes in 2009–10) among clients seeking treatment for their own drug use.



Introduction

Alcohol and other drug treatment services provide a wide variety of treatment interventions in both residential and non-residential settings. The interventions include detoxification and rehabilitation programs, information and education courses, pharmacotherapy—the use of a long-acting opioid medicine to manage opioid dependence (AIHW 2011i)—and counselling.

Since 2001–02, data on completed treatment episodes have been collected for the Alcohol and Other Drug Treatment Services National Minimum Data Set (AODTS–NMDS). A treatment episode refers to a period of contact between a client and a treatment agency that has a defined start and end date. Clients can seek treatment for their own drug use or the drug use of another, such as a friend or family member. The ‘principal drug of concern’ refers to the main substance that clients stated led them to seek treatment from an agency.

In 2009–10, there were about 147,000 publically funded treatment episodes, an increase of about 3,000 (2%) from 2008–09 and 33,000 (29%) from the collection’s inception in 2001–02. The vast majority of episodes (96%) were for people seeking treatment for their own drug use. Treatment was provided by 671 publicly-funded treatment agencies, half (54%) of which were non-government agencies (AIHW 2011j).



What do we know about alcohol and other drug treatment services?

Who uses the services?

In 2009–10, 2 in 3 episodes of alcohol and other drug treatment were for men (66%); this has remained constant over the past 10 years. There were more males than females receiving treatment for all principal drugs of concern except benzodiazepines. The most common age groups were 20–29 (30%) and 30–39 (28%). A description of a typical client, constructed hypothetically from aggregated data, is in Box 7.10.

In 2009–10, Indigenous Australians were over-represented among drug and alcohol treatment episodes, with 1 in 8 episodes for Indigenous Australians, despite representing 1 in 40 in the population. Indigenous Australian clients tended to be younger than non-Indigenous clients.

Box 7.10: An example of an AODTS client*

Keith never thought of himself as the kind of person who would receive a drug or alcohol treatment. But when he decided to do something about his drinking in early 2010, he found that he was a fairly typical AODTS client. He was in his early thirties, was born in Australia and lived in a big city. He was primarily seeking treatment for his alcohol use, although he was also concerned about his cannabis habit.

He had always imagined alcohol and other drug treatment to be like the residential rehab clinics that celebrities seemed to frequent but his counsellor told him that rehabilitation represented the smallest proportion of government-funded treatment in Australia. Keith received counselling in a non-residential treatment facility. His treatment lasted about 3 weeks and ended because he completed the treatment.

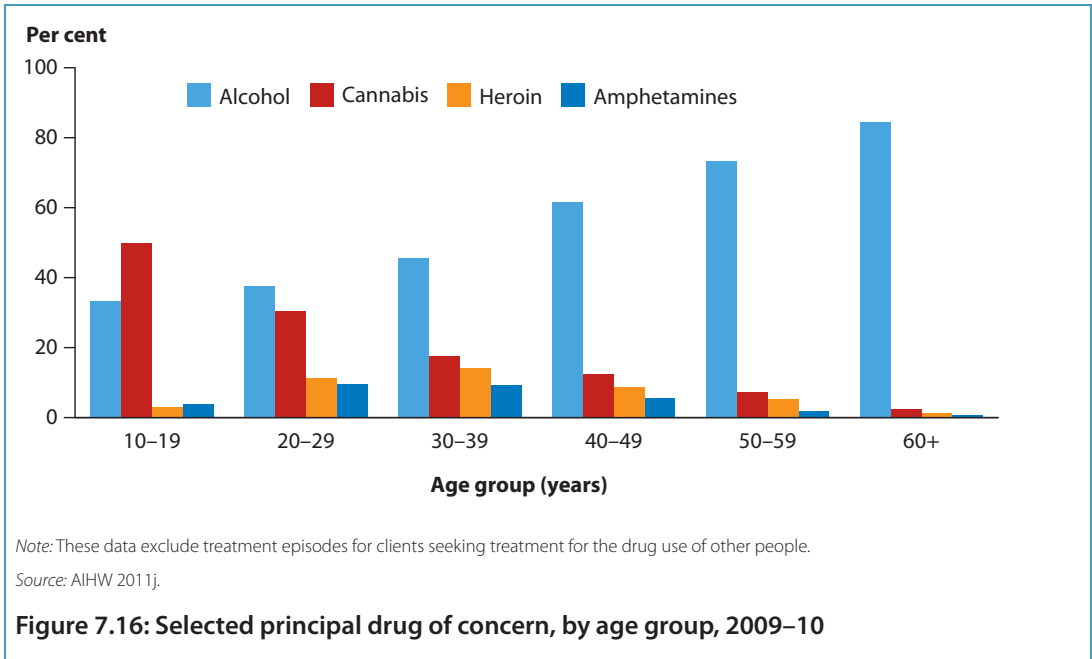
Now, Keith feels like he has more control over his drinking and is proud of what he achieved during his time in treatment.

*This is a hypothetical example constructed from common demographic and treatment characteristics and is not based on any one treatment episode.

Which substances do people seek treatment for?

In 2009–10, there were about 141,000 episodes where clients sought treatment for their own substance use. Nationally, alcohol (48%) and cannabis (23%) remained the most common principal drugs of concern, followed by heroin (10%) and amphetamines (7%).

Cannabis was the drug of concern most commonly reported for clients in the 10–19 age group (50% of their episodes). Alcohol was the most common drug for all other age groups (Figure 7.16). The proportion of episodes where alcohol was the principal drug of concern increased with age, ranging from 3 in 10 for 10–19 year olds to more than 8 in 10 for clients aged 60 or over.



Up to five additional drugs of concern can be recorded for clients. More than half (53%) of episodes in 2009–10 had at least one additional drug of concern. Alcohol was a drug of concern in 64% of episodes but the principal drug of concern in 48%. While nicotine was rarely the main drug for which clients sought treatment (2%), for 1 in 5 episodes (20%) nicotine was a drug of concern in addition to their principal drug of concern.

How has this changed over time?

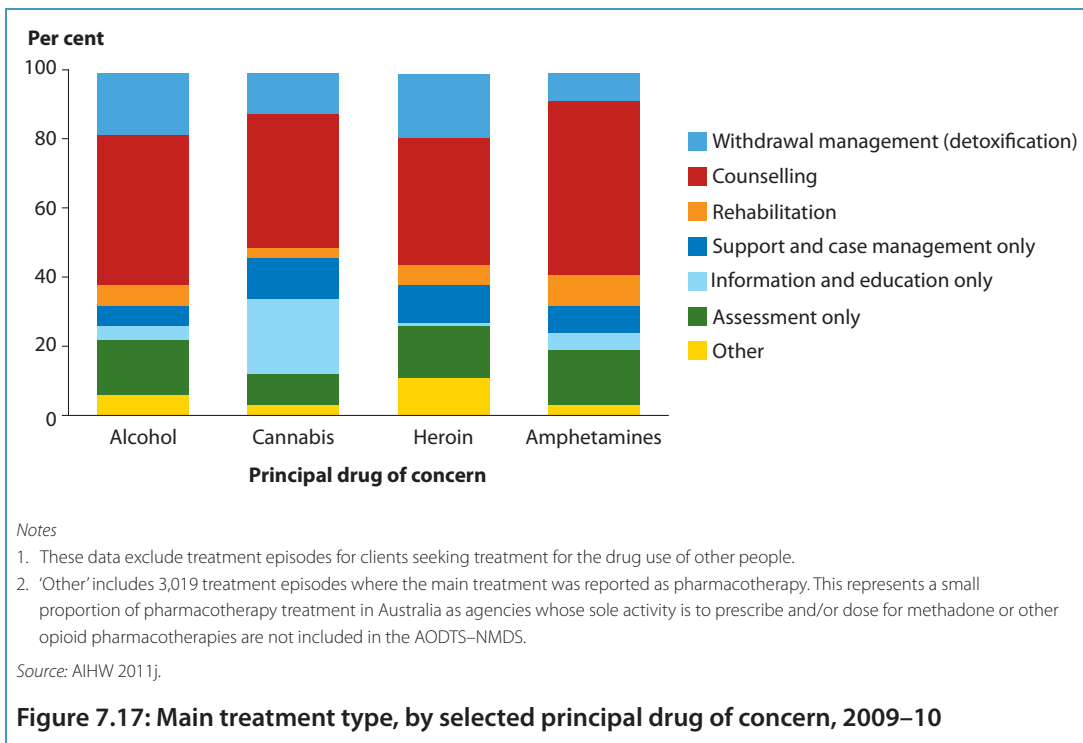
The proportion of episodes with alcohol as the principal drug of concern has increased over time, from 37% in 2001–02 to 48% in 2009–10. The proportion of episodes reporting heroin as the principal drug of concern was stable from 2001–02 to 2003–04 (about 18%) then declined to 10% in 2009–10. Episodes where cannabis was the principal drug of concern have remained stable, between 20% and 25%.

What types of treatments are provided?

Counselling was the most common form of treatment provided among clients seeking treatment for their own drug use (41% of episodes in 2009–10). This was followed by withdrawal management (detoxification) (16%) and assessment only (14%), where clients receive an assessment of their drug issues, health or treatment needs but may not receive additional treatments.

The type of main treatment provided varied depending on the principal drug of concern (Figure 7.17). Overall, counselling accounted for the highest proportion of treatment for all drugs of concern except for morphine, methadone, ‘other’ opioids and nicotine, which were often treated with withdrawal management (detoxification), information and education only, or other treatments.





What about other services for alcohol and other drugs?

The AODTS–NMDS covers almost all government-funded treatment agencies. There are two major exclusions from the data set that are recorded in other collections:

- agencies that are specifically targeted at Aboriginal and Torres Strait Islander people. These are captured in the OATSIH Services Reporting data collection (AIHW 2011d). The AIHW is undertaking a project to include these agencies in the AODTS–NMDS in the future.
- agencies in which clients receive treatment with opioid pharmacotherapy only (for example, methadone maintenance treatment). These are captured in the AIHW’s National Opioid Pharmacotherapy Statistical Annual Data (NOPSAD) collection (AIHW 2011i).

In 2009–10, an estimated 76,000 episodes of care were provided to clients of Australian Government-funded Aboriginal and Torres Strait Islander substance use services. Almost all of the treatment agencies reported providing specific programs for alcohol-related problems (92%) and the majority provided targeted programs for cannabis (77%), multiple drug use (54%) and tobacco (52%). The treatments comprised about 3,400 episodes of residential treatment or rehabilitation, 16,300 episodes of ‘sobering up’ or residential respite, and 56,000 episodes of ‘other’ care (AIHW 2011e).

Nationally, an estimated 46,100 clients received pharmacotherapy treatment for opioid use on a 'snapshot or specified' day in June 2010. Seven in 10 (69%) of these clients received methadone, while the rest received buprenorphine (14%) or buprenorphine–naloxone (17%). The proportion of clients who received buprenorphine–naloxone increased markedly from 2006 (6%) (AIHW 2011i).

What is missing from the picture?

The AODTS–NMDS collection excludes any alcohol and drug treatments provided in general practice and other private settings. There are no national data sets that collect that information.

The current AODTS–NMDS collection captures information about alcohol and other drug treatment data at the episode level, not the client level. As such, the data cannot report client numbers. It has been agreed, however, to include a data element that allows data to be reported at the client level for the 2012–13 collection period. This will allow analysis and reporting of the number of clients and the number of episodes per client and offer insights into clients' treatment patterns.

As noted earlier, the AIHW is undertaking a project to include OATSIH-funded agencies in the AODTS–NMDS in the future.

Where do I go for more information?

For more information on alcohol and other drug treatment services in Australia, see *Alcohol and other drug treatment services in Australia 2009–10: report on the national minimum data set*, available online at <www.aihw.gov.au/alcohol-and-other-drugs>.

For more information on patterns of alcohol, tobacco and other drug use in Australia, see 'Section 5.8 Tobacco smoking', 'Section 5.9 Alcohol consumption' and 'Section 5.10 Illicit drug use' in this report, or the *2010 National Drug Strategy Household Survey report*, available online at <www.aihw.gov.au/alcohol-and-other-drugs>.



7.12 Specialised mental health services

At a glance

- In 2007, 1 in 5 Australians aged 16–85 had experienced a mental health disorder in the previous 12 months, but only 1 in 8 had used a health service for mental health problems.
- More than \$5 in every \$100 spent on health in 2008–09 was for mental health services (\$5.8 billion).
- Between 2005–06 and 2009–10, there was a 34% average annual increase in the number of Medicare-subsidised mental health-related services, with most of this growth due to an increase in the number of psychologist services.



Introduction

Mental health issues are relatively common in the Australian population. The 2007 National Survey of Mental Health and Wellbeing found that 20% of Australians aged 16–85 had experienced a mental disorder in the 12 months before the survey (ABS 2008), and that 12% of the population had used a health service for a mental health problem in the previous 12 months. Despite this, nearly two-thirds of people with symptoms of a mental disorder in the past 12 months did not use a service for mental health problems.

Australia's National Mental Health Policy (DoHA 2009a) and the accompanying Fourth National Mental Health Plan (DoHA 2009b) seek to create a mental health system that focuses on early detection and intervention while ensuring that all Australians with a mental illness have access to effective treatment and community support that promote recovery and meaningful participation in social and community life.

This section reports on the types of facilities and practitioners that provide specialised mental health services and on the services they offer. Specialised mental health services include hospitals, community mental health services and residential facilities, while providers include psychiatrists, psychologists and other allied health providers.

What do we know about specialised mental health services?

Spending on mental health services

Total recurrent spending on mental health services exceeded \$5.8 billion during 2008–09 (AIHW 2011k). This represented \$272 per Australian and 5.4% of all recurrent spending on health for that year. This was funded by a combination of state and territory governments, the Australian Government and private health insurance funds. Between 2004–05 and 2008–09, spending per person increased at an average annual rate of 4.8%.

Almost \$3.6 billion was spent on state and territory specialised mental health services in 2008–09 (running costs only). The largest proportion was spent on public hospital services for admitted mental health care (\$1.6 billion), equating to an average of \$757 per day of patient care, followed by community mental health services (\$1.4 billion). The Australian Government outlaid a combined \$1.4 billion on Medicare and Pharmaceutical Benefits Scheme payments for mental health-related items (see 'Section 7.3 General practitioners' and 'Section 7.7 Use of medicines').

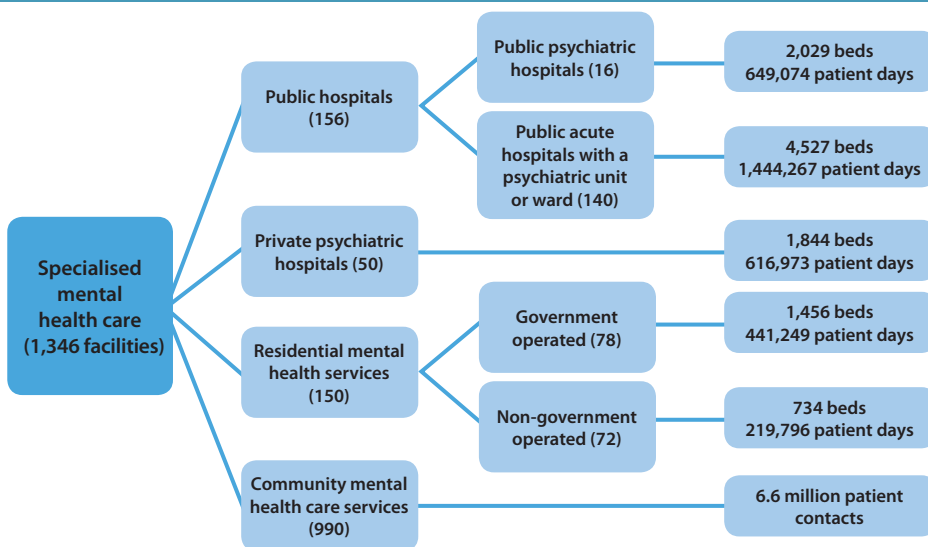
There has also been an increasing allocation of funding to support individuals through specialised community support programs, for example Personal Helpers and Mentors service (PHaMs) and Support for Day to Day Living in the Community (D2DL).

Specialised mental health-care facilities

Specialised mental health care in Australia is delivered in a range of facilities, including public and private psychiatric hospitals, psychiatric units in public and private acute hospitals, community mental health-care services, and residential mental health services (Figure 7.18).

More than 27,000 FTE staff were employed by state and territory specialised mental health-care services in 2008–09. The majority of this workforce comprised nurses (51.1%), followed by diagnostic and allied health professionals (18.7%) and salaried medical officers (9.5%). As well as state and territory specialised mental health-care services, there were just over 2,300 FTE staff employed by private hospitals providing specialised mental health services.





Source: AIHW 2012b.

Figure 7.18: Specialised mental health-care facilities: number, available beds and activity, 2008–09

Community mental health services

State and territory governments provide specialised community mental health services in community-based and hospital-based outpatient settings.

In 2009–10, 339,000 people in Australia accessed community mental health-care services and, with each person likely to use these services more than once, there were more than 6 million contacts. The number of service contacts has increased over the 5 years to 2009–10, at an average annual rate of 3.9%.

People aged 25–34 had the highest rates of contact, as did those living in *Inner regional* areas (AIHW 2012b). The rates for Australian-born patients were more than double those of patients born overseas.

The most frequently recorded principal diagnosis was *Schizophrenia* (30%) followed by *Depressive episode* (11.7%) and *Bipolar affective disorder* (6.3%).

Ambulatory-equivalent admitted patient care

In some circumstances, patients admitted to hospital can be provided with care that is similar to care provided by community mental health-care services. This care—referred to as ‘ambulatory-equivalent’—is provided in either public acute, public psychiatric or private hospitals.

There were 142,000 ambulatory-equivalent mental health-related hospitalisations in 2009–10. The rate for females was higher than that for males (7.8 and 4.8 per 1,000 respectively), and people aged 55–64 had the highest rate of hospitalisations (10.5 per 1,000). The rate for Australian-born patients (7.4 per 1,000) was more than double that for those born overseas (3.0 per 1,000).

People with a principal diagnosis of *Depressive episode* accounted for the largest number of these hospitalisations (20%), and *Mental and behavioural disorders due to use of alcohol* was the second most frequently recorded diagnosis (17%).

An associated procedure (or intervention) was recorded in 42% of the hospitalisations. The most frequent was *Cognitive behaviour therapy* (27%), followed by *Other psychotherapies or psychosocial therapies* (13%).

Services provided in emergency departments

There were about 172,000 mental health-related visits to public hospital emergency departments in 2008–09, an annual average increase of 5.5% since 2004–05. Almost 80% of visits were for people aged 15–54, with slightly more visits for men than women. Indigenous Australians accounted for 6% of the visits, proportionately more than expected given their number in the population.

The most frequently recorded principal diagnoses were *Neurotic, stress-related and somatoform disorders* (28%), followed by *Mental and behavioural disorders due to psychoactive substance use* (25%), *Mood (affective) disorders* (17%) and *Schizophrenia spectrum disorders* (14%).

More than 80% of mental health-related emergency department visits were classified as urgent (requiring care within 30 minutes) or semi-urgent (within 60 minutes). A further 11% were classified as emergency (requiring care within 10 minutes). More than 60% of the visits were resolved without the need for admission or referral to another hospital. However, 36% resulted in admission to hospital.

Admitted patient mental health-related care

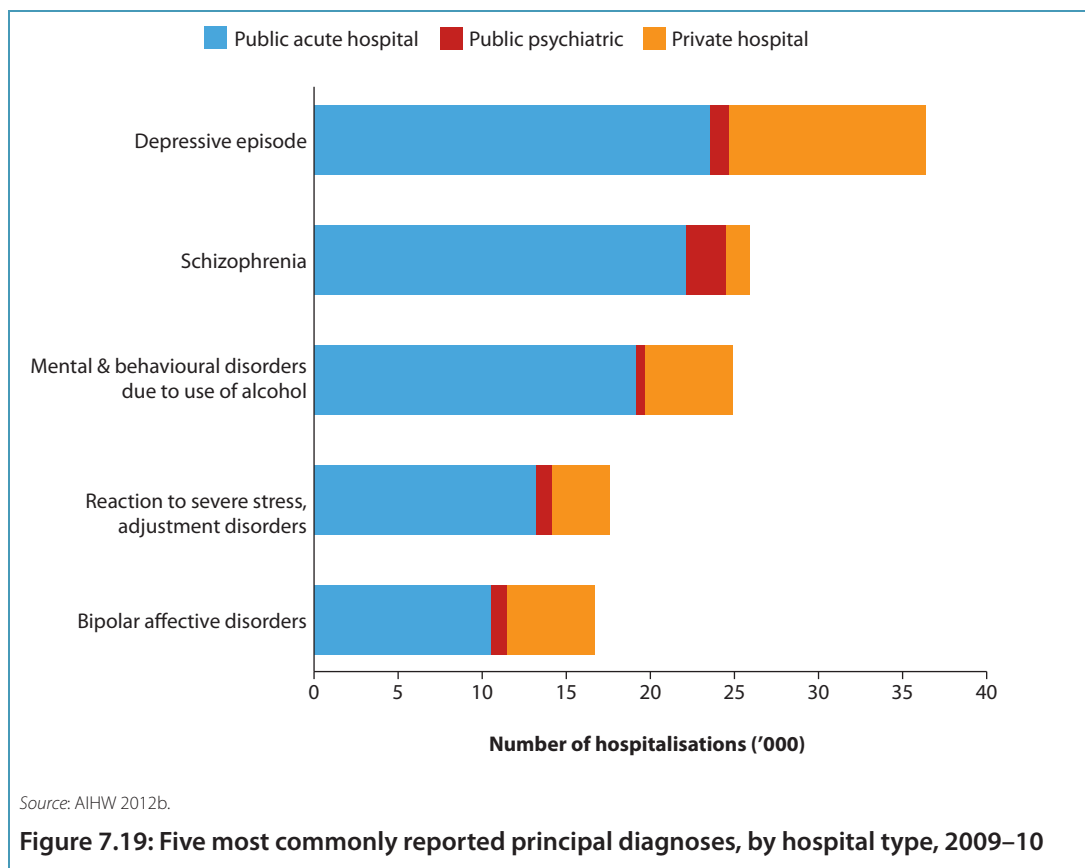
Admitted patient mental health-related hospitalisations are classified as being with or without specialised psychiatric care, that is, in specialised psychiatric units or hospitals, or elsewhere in the hospitals. This care is provided in either public acute, public psychiatric or private hospitals.

There were nearly 223,000 mental health-related hospitalisations reported in 2009–10, an increase of 2.2% per annum over the previous 5 years. Of these hospitalisations, 58% were with specialised care and 42% without. For hospitalisations with specialised psychiatric care, the rate was higher for females (6.3 per 1,000) than males (5.4 per 1,000), and the highest rate was for patients aged 35–44. For hospitalisations without specialised care, there was little difference between males and females, and the highest rate occurred for those aged 65 and over.

A principal diagnosis of *Depressive episode* accounted for 16% of hospitalisations in 2009–10, with *Schizophrenia* (12%) and *Mental and behavioural disorders due to use of alcohol* (11%) being the next most frequently reported causes of hospitalisation (Figure 7.19). Private hospitals treated a much higher proportion of patients diagnosed with a *Depressive episode* or *Bipolar affective disorders* than patients with *Schizophrenia*.

The difference in the profile of principal diagnoses between public and private sectors may contribute to the difference in the rate of hospitalisations for which the patient had an involuntary admission—that is, they were detained in hospital without their consent under mental health legislation for assessment or provision of appropriate treatment to protect their own safety and that of the public. In 2009–10, more than 30% of all hospitalisations with specialised care were for patients who had an involuntary admission. The majority of these hospitalisations were in public acute hospitals (33,000 out of 40,000), but proportionately involuntary hospitalisations were more dominant in public psychiatric hospitals (62% of hospitalisations). Involuntary cases represented only 0.3% of mental health-related hospitalisations in private hospitals.





The most frequently recorded procedure (clinical intervention) reported for hospitalisations with specialised care was *Non-emergency general anaesthesia* (19% of procedures and 10% of hospitalisations). This was most likely associated with the administration of electroconvulsive therapy, a form of treatment for depression. Allied health interventions from a number of different health disciplines were also frequently reported for hospitalisations with or without specialised care. These included interventions by social workers and occupational therapists.

Residential care

Residential mental health-care services help people with a mental illness by providing specialised mental health services—including rehabilitation, treatment or extended care—in a domestic-like environment on an overnight basis.

More than 2,750 Australians used these services in 2009–10, resulting in nearly 4,000 residential episodes of care. This represented an average annual increase of 15% in the number of residents and 14% in the number of episodes over the previous 5 years.

One-quarter of the episodes were for people aged 25–34, and there were more episodes for males than females. Overall, almost half of all residential episodes were for people in *Major cities*, but the number of episodes per 10,000 population was highest for residents from *Inner regional* areas.

The most frequent principal diagnosis was *Schizophrenia*, reported for more than half of all episodes, followed by *Schizoaffective disorder* and *Depressive episode*.

The most frequent length of stay for a completed residential episode was 2 weeks or less (53%), and 5% of all episodes involved a residential stay of more than 1 year. Residents admitted involuntarily accounted for about 30% of all episodes, and these episodes have increased noticeably over the last 5 years from about 10% in 2004–05 (AIHW 2012b).

Medicines

There were an estimated 29 million prescriptions for mental health-related medicines dispensed by community pharmacies in 2010–11, of which 77% were estimated to have been subsidised by the Australian Government through the PBS or RPBS. There were an estimated 7 million non-subsidised prescriptions for mental health-related medications dispensed in 2010–11. Subsidised prescriptions for mental health-related medications accounted for 11% of all subsidised prescriptions dispensed in Australia. Antidepressant medication accounted for 61% (13.7 million) of all mental health-related subsidised prescriptions dispensed in 2010–11, followed by anxiety-reducing medicines (13.6%), antipsychotics (12.5%) and hypnotics and sedatives (10.4%).

GPs provided the majority of these prescriptions (86.3%), with 8.1% prescribed by psychiatrists and 5.5% by non-psychiatrist specialists.

There was an average annual growth of 2% in subsidised prescriptions over the 5 years to 2010–11, with large average increases for *Psychostimulants and nootropics* (19% per annum) and *Antipsychotics* (9%), a small average increase for *Antidepressants* (3%) and decreases on average for *Anxiolytics* (-2% per annum) and *Hypnotics and sedatives* (-4%).

Medicare-subsidised specialised mental health-care services

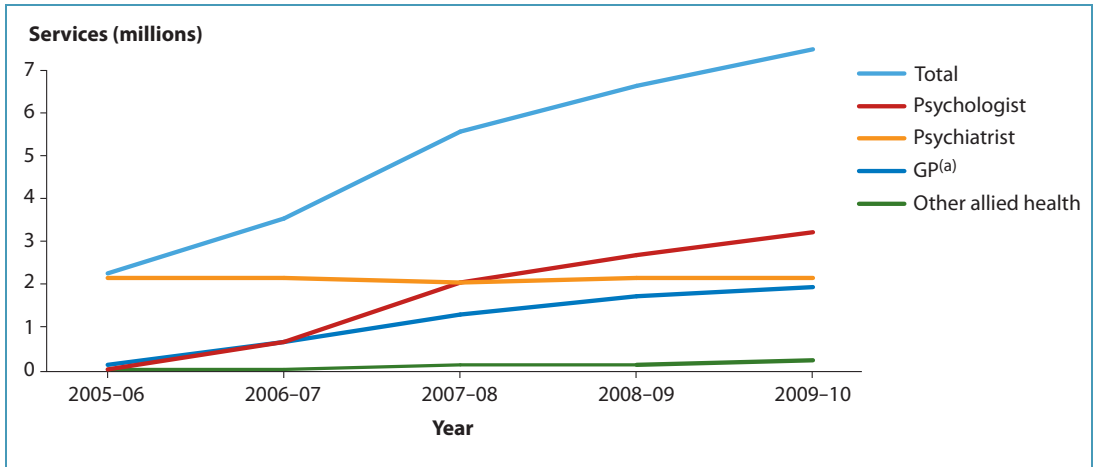
Mental health-related services subsidised under the MBS are provided by psychiatrists, psychologists, and other allied health professionals (for example, social workers, mental health nurses and occupational therapists) as well as GPs. They are provided in a range of settings, for example, in hospital (for private patients), consulting rooms, home visits, and over the phone.

There were almost 7 million MBS-subsidised mental health-related services in 2009–10: 1.8 million provided by GPs, nearly 2 million provided by psychiatrists and 3.2 million provided by psychologists and other allied health professionals. More than 836,000 patients received 5.1 million specialist services (psychiatrist, psychologist and other allied health) in 2009–10, an average of 6.2 services per patient.

Services provided by all specialist provider types were accessed by more females than males, especially services provided by psychologists and other allied mental health services.

There was an average annual increase of 34% in the number of Medicare-subsidised mental health-related services between 2005–06 and 2009–10 (Figure 7.20). Virtually all the growth in subsidised specialist services has been driven by an increase in the number of services provided by psychologists. This growth can be attributed to the implementation of the Better Access initiative in November 2006, which gave patients Medicare-subsidised access to psychologists and other allied health providers. Changes to the MBS were introduced in November 2011 that limit the number of eligible services.





(a) Includes other medical practitioners.
Source: AIHW 2012b.

Figure 7.20: MBS-subsidised mental health services, 2005-06 to 2009-10

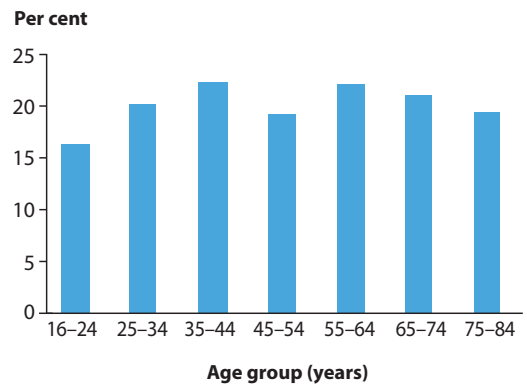
A GP mental health treatment plan is a plan made by a GP for treating a mental health problem over time. It may cover the goals of treatment, where support from other mental health professionals should be sought, and what to do in a crisis or to prevent relapse. The plan may be developed in one visit or across several visits, and should be regularly reviewed. Some of the costs involved may be covered by Medicare for eligible patients. The 'Proportion of people with mental illness who have a GP treatment plan' is a performance indicator.

Proportion of people with mental illness who have a GP treatment plan. The



number of people aged 16-84 with a GP mental health treatment plan, as a percentage of the estimated number of people aged 16-84 with mental illness.

- In 2010-11, the number of people with a GP mental health treatment plan accounted for about 1 in 5 (20%) people with mental illness.
- Young people aged 16-24 were the least likely to have a treatment plan (16%).
- People living in the most disadvantaged areas were less likely to have a plan (17%) than people living in other areas (19-21%).



What is missing from the picture?

While reasonably detailed information is available on the more traditional mental health services provided by state and territories, GPs and other specialist health providers, there is a paucity of information available on some of the specialised community support services that have been introduced in recent years, by both government and non-government organisations. While there are currently moves to more systematically capture data from these programs, it is not anticipated that more comprehensive data will be available in the short term.

As described in 'Section 7.2 Primary care in Australia', the data limitations regarding primary health care in general are pertinent for primary mental health care. Major gaps include why someone went to a health professional, what was the nature of the consultation, and what were the outcomes.

Where do I go for more information?

More detailed data and analysis is on the *Mental health services in Australia* website: mhsa.aihw.gov.au/home/ and in the *National mental health report* (DoHA 2010b).



7.13 Palliative care

At a glance

- In 2008, 343 government-funded agencies were identified by state and territory health authorities as providing palliative care in Australia.
- There was a 51% increase in the number of palliative care hospitalisations between 2000–01 and 2009–10.
- Among all those who died while an admitted patient, there was a 60% increase (from 23% to 37%) between 2000–01 and 2009–10 in the proportion who were palliative care patients during their final hospitalisation.



Introduction

An increase in demand for palliative care services is expected to be one of the many consequences of the growth and ageing of Australia's population. In addition, the pattern of disease at the end of life is changing such that an increasing proportion of people are likely to die from chronic progressive illnesses—people with such illnesses are most likely to make use of palliative care services.

At the same time, there is an increasing focus on the amount and quality of palliative care services. For example, the second National Palliative Care Strategy (DoHA 2010c), which was endorsed by all Australian health ministers in 2010, sets out a number of priority goal areas for meeting the identified demand for high quality palliative care services across Australia. These goal areas cover building and enhancing the capacity of all relevant sectors to provide quality, appropriate and effective palliative care to all Australians who require it. In addition, each of the states and territories has a range of initiatives in place to drive improvements in the delivery of palliative care services.

Defining what is meant by 'palliative care' is not straightforward, since many different definitions exist. Complicating matters further is the fact that 'palliative care' is often used interchangeably with other terms—such as 'specialist palliative care', 'hospice' and 'end-of-life care'.

The National Palliative Care Strategy uses the WHO's definition of palliative care (DoHA 2010c): 'an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual' (WHO 2002).

A description of a number of aspects of palliative care delivery in Australia is in Box 7.11.

Box 7.11: Delivery of palliative care in Australia

In Australia, the states and territories are responsible for planning and delivering publicly-funded palliative care services. There is considerable diversity in the way such care is delivered, with the model of care provision differing between and within states and territories depending on such factors as: local service delivery practices and the structure of the health-care system, the demographics of the population (including the remoteness of where people live), and the demand for particular types of services.

A range of health professionals provide palliative care services, including primary care providers (general practitioners, community nurses, and so forth) and specialist palliative care providers. Those in the latter group typically provide palliative care to patients with more complex or resource-intensive needs, with such care delivered on either a consultancy basis to support the work of other care providers, or through the direct provision of ongoing care. In addition to the care provided by health professionals, informal carers (in particular, family and friends) and volunteers also play an important role in the delivery of palliative care.

While palliative care can be provided to patients in a variety of settings, a distinction is commonly made between the delivery of such care in hospitals (some of which include hospices or dedicated palliative care wards), and the community (such as in the patient's home or in residential aged care facilities).

The funding for publicly-funded palliative care services is provided through the Australian government to states and territories, as well as directly from the jurisdiction's own resources. In addition, funding from other areas of the Australian health system, such as Medicare funding for care by GPs, contributes to the overall provision of publicly-funded palliative care services.

There is no single, comprehensive data collection that provides a complete picture of palliative care in Australia. Nonetheless, three key national data sources that describe various aspects of palliative care delivery are:

- the National Palliative Care Surveys, which provide information on the characteristics of agencies that deliver palliative care services
- the NHMD, which includes information on the number and characteristics of palliative care hospitalisations in Australian hospitals
- the Palliative Care Outcomes Collaboration (PCOC) data collection, which provides information on the outcomes and quality of care delivered by those specialist palliative care agencies that participate in the data collection.



What do we know about the provision of palliative care?

Agencies providing care

In 2008, 343 government-funded agencies were identified by state and territory health authorities as providing palliative care in Australia. Of these, 227 (66%) responded to the fourth National Palliative Care Survey conducted by the AIHW in 2008 (AIHW 2010b).

The survey found that almost 2 in 3 (65%) responding agencies delivered palliative care 'mostly in the community' (and most commonly in private residences) and 23% provided palliative care 'mostly in admitted patient settings'.

It also found that:

- the majority (63%) of the agencies were 'specialist palliative care providers' (that is, they worked substantively in the area of palliative care)
- 45% had seen 100 or fewer palliative care patients during 2007–08, while 16% had seen more than 500
- most (61%) had 10 employees or fewer; 7% had 51 or more employees
- just over half (52%) employed a coordinator of volunteers.

The main aim of the survey was to measure the performance of palliative care agencies against nationally agreed high-level performance indicators. These indicators were developed to provide information on the extent to which the goals and objectives of the first National Palliative Care Strategy (DoHA 2000) had been achieved nationally. Key findings regarding these performance indicators include:

- 74% of palliative care agencies indicated that they used the Palliative Care Australia standards (PCA 2005) in some way
- 61% routinely collected feedback about their services and service delivery from clients and staff
- 89% had formal working partnerships with other organisations, with the most common type of partner organisations being other palliative care agencies (74% of those with formal partnerships), followed by hospitals (71%).

Palliative care in Australian hospitals

Data are available from the NHMD on the number of hospitalisations for admitted patients for which palliative care was a substantial component of the care provided. The approach used to identify such hospitalisations is detailed in the AIHW technical paper *Identifying admitted patient palliative care separations* (AIHW 2011). Since the NHMD contains a record for each hospitalisation, not for each patient, any one patient may be represented in the database one or more times. However, PCOC data suggest that a relatively small proportion (14%) of patients in Australia have two or more hospitalisations for palliative care within a 12-month period (Currow et al. 2008a).

In 2009–10, there were almost 56,000 hospitalisations for which palliative care was a substantial component of the care provided (Table 7.12). These hospitalisations may have occurred in hospices affiliated with hospitals, dedicated palliative care wards, or in other hospital wards. Patients aged 75 and over accounted for almost half (49%) of these hospitalisations, while those aged under 55 accounted for 12%. In contrast, the corresponding percentages for all hospitalisations in the same year were 21% and 46%.

Table 7.12: Palliative care hospitalisations and all hospitalisations, all hospitals, 2009–10

Age (years)	Palliative care hospitalisations		All hospitalisations
	Number	Per cent	Per cent
0–34	749	1.3	22.9
35–54	5,948	10.6	23.4
55–74	21,593	38.6	33.0
75+	27,693	49.5	20.8
Total	55,983	100.0	100.0

Source: AIHW National Hospital Morbidity Database.

The majority (85%) of palliative care hospitalisations were in public rather than private hospitals in 2009–10. This is substantially higher than the proportion of all hospitalisations (59%) in public hospitals in that year.

Cancer patients comprised the majority of those with palliative care hospitalisations: 59% of the palliative care hospitalisations had a principal diagnosis of cancer. When both principal and additional diagnoses are taken into account, a diagnosis of cancer was recorded for 76% of the palliative care hospitalisations. These findings mirror those from other research which has consistently found that cancer patients comprise the majority of those using palliative care services (for example, Currow et al. 2008b). A variety of explanations have been given for this result, including difficulties in predicting the disease trajectory for non-cancer patients, and the skills of current palliative care specialists (Coventry et al. 2005; Murray et al. 2005).

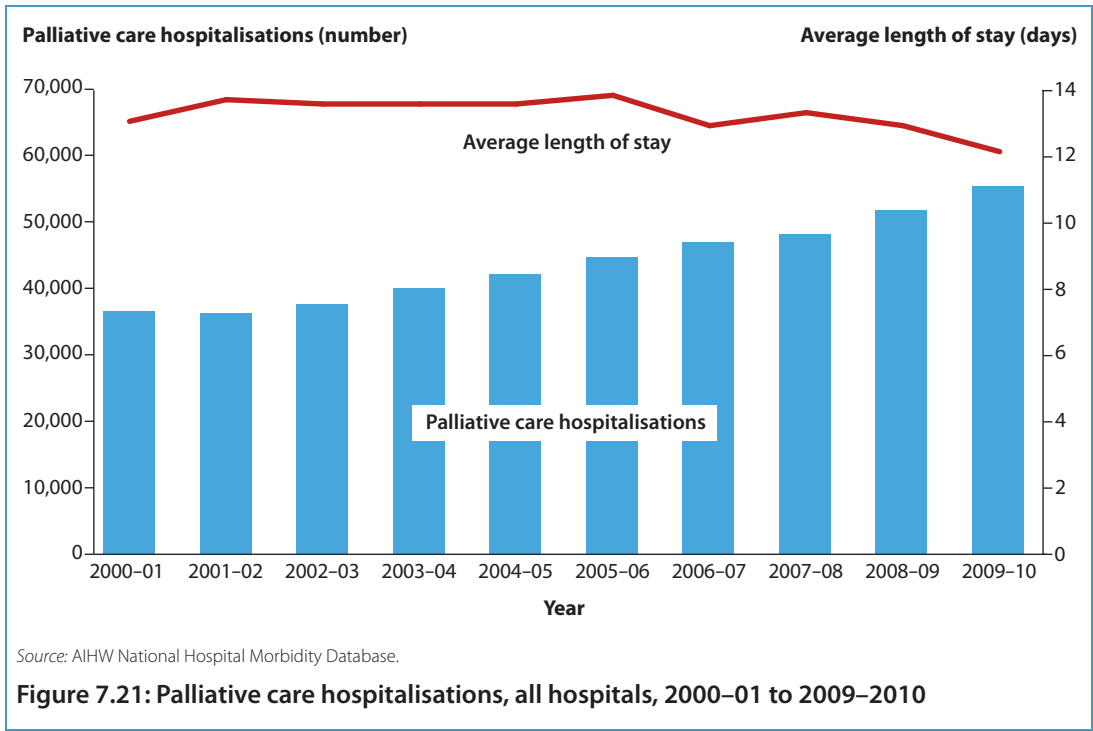
Almost all (93%) of the palliative care hospitalisations involved at least one overnight stay, while less than half (42%) of all hospitalisations did so. The average length of stay in hospital for palliative care hospitalisations was 11.9 days, almost four times as long as the average length of stay of 3.1 days for all hospitalisations. When only those hospitalisations that involved an overnight stay are considered, the difference narrows to 12.6 days for palliative care hospitalisations and 5.9 days for all hospitalisations.

The number of palliative care hospitalisations has increased substantially and steadily between 2000–01 and 2009–10, from about 37,000 to 56,000 (Figure 7.21). This increase was more prominent in public hospitals (60%) than private hospitals (17%). This contrasts with an increase of 39% for all hospitalisations, with this increase more heavily weighted to private (52%) than public hospitals (31%).



There are likely to be a range of factors that have caused this increase in palliative care hospitalisations. However, the age-standardised rate of palliative care hospitalisations increased from 19.3 per 10,000 population in 2000–01 to 23.8 in 2009–10. This indicates that, over the 10 years there was a ‘real’ increase in the number of admitted patient palliative care episodes that goes beyond the increase that can be explained by population growth and an ageing population.

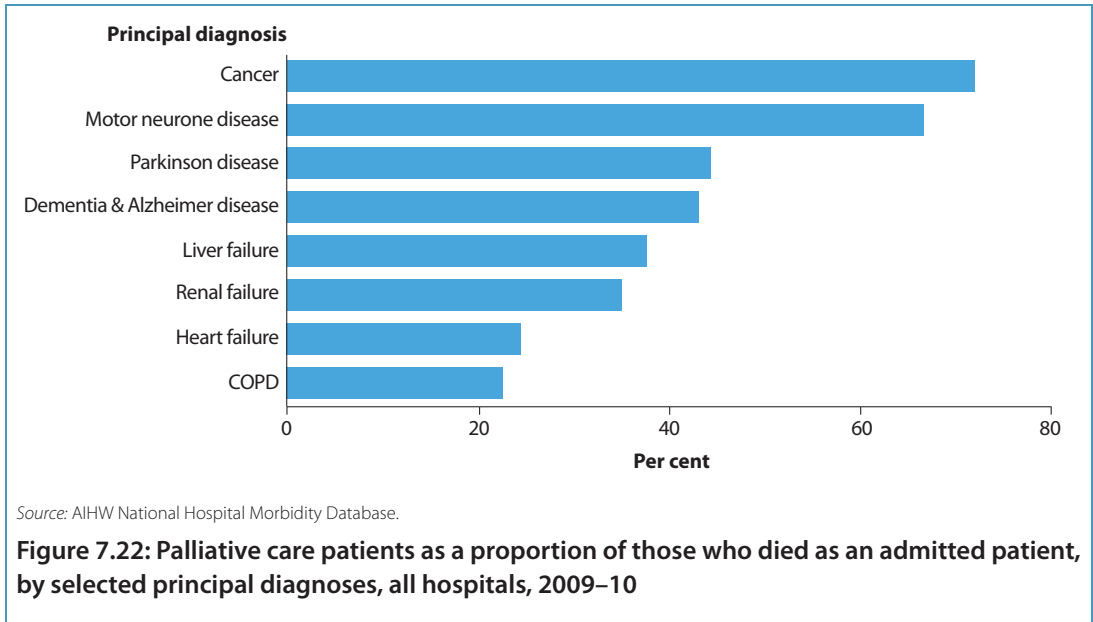
The average length of stay in hospital for palliative care remained within a narrow range for the 10 years, from a low of 11.9 days for 2009–10 to a high of 13.2 days in 2005–06.



Palliative care and deaths in hospital

Among those who died while an admitted patient in 2009–10, more than 1 in 3 (37%) had been a palliative care patient during the hospitalisation that ended with their death. This represents a 60% increase since 2000–01 (from 23%).

The proportion who were palliative care patients during their final hospitalisation varied considerably by disease (Figure 7.22). Of those admitted patients who died with cancer as a principal diagnosis, 71% had been a palliative care patient during their final hospitalisation, as had 66% of patients with motor neurone disease and 44% with Parkinson disease.



Outcomes and quality

The second National Palliative Care Strategy (DoHA 2010c) describes the need for national measurement of both palliative care provision and quality. The PCOC, funded by the Australian Government under the National Palliative Care Program (DoHA 2011f) since 2005, aims to improve palliative care patient outcomes through benchmarking. Participation in the PCOC data collection is voluntary, with 100 agencies submitting data for the January to June 2011 period (Allingham 2011). It is difficult to estimate what proportion of specialist palliative care agencies this represents due to the lack of information on the total number of such agencies in Australia.

Since 2009, details on the performance of specialist palliative care agencies against four national quality and outcomes measures and corresponding benchmarks have been included in the PCOC reports. These measures cover: time from referral to first contact, time spent in an unstable phase (defined as the development of a new unexpected problem or a rapid increase in the severity of existing problems, either of which require an urgent change in management or emergency treatment), change in pain, and change in selected symptoms relative to a baseline reporting period of July–December 2008.

In the January–June 2011 reporting period, national benchmarks were not met for either overnight admitted or not admitted overnight (same-day, outpatient and community) patients for any of the first three measures, but were met for the change in overall symptoms measure (Table 7.13).



Table 7.13: Summary of palliative care outcome benchmark results, by broad episode type, January–June 2011

Measure	Benchmark met?		Total
	Admitted overnight	Not admitted overnight	
Patients contacted on same day of referral or next day	No	No	No
Patients in unstable phase for less than 7 days	No	No	No
Patients' pain same or better at end of phase	No	No	No
Patients' change in overall symptoms better than baseline period	n.p.	n.p.	Yes

Source: Allingham 2011.

National reports about the performance of those agencies that participated in the biannual PCOC data collections since 2009 are on the PCOC website, and a number of state-based reports are also available (PCOC 2011).

What is missing from the picture?

Due to limited data sources, it is difficult to provide a comprehensive description of the provision of palliative care across Australia. Further, due to differences in definitions and coverage, individual data sets cannot be easily consolidated.

The lack of information on the amount and nature of palliative care provided by GPs is a major data gap, as is the amount of specialist palliative care provided in the community (AIHW 2004). While some information on the latter is potentially available from the PCOC data collection, participation in that collection is voluntary. While the PCOC data collection allows community-based care to be differentiated from outpatient/same-day care, the current PCOC reports place them both into the same broad level group.

Another major data gap relates to inputs. While national estimates of the number of palliative care medical specialists exist (AIHW 2011f), a comprehensive picture of all health professionals in the palliative care workforce is not available. Further, national information on the amount of resources allocated to palliative care in terms of funding and dedicated palliative care beds is also not available.

Where do I go for more information?

More information about palliative care hospitalisations is available in *Trends in palliative care in Australian hospitals* (AIHW 2011m).

Detailed results from the 2008 survey of palliative care agencies are in *National palliative care performance indicators: results of the 2008 performance indicator data collection* (AIHW 2010b).

7.14 Blood, organ and tissue donation

At a glance

- There were more than 1.3 million donations of whole blood, plasma or platelets in Australia in 2009–10, from about 0.6 million donors.
- In 2010, Australia had a deceased organ donation rate of 13.8 donors per million population. This rate of organ and tissue donation is low by international standards—Spain, the world leader in organ donation, had a rate of 32.0 per million.
- In 2010, 309 deceased donors gave 987 organs and 370 tissue donations, benefiting about 1,200 people.



Introduction

Blood, organ and tissue donation is the process of collecting blood and blood components, organs and tissues, for the purpose of transfusing (blood) or transplanting (organs and tissues) into a recipient. Donation in Australia is a voluntary and unpaid act that can contribute to improved quality of life and life expectancy for people with a range of health conditions. This section is presented in two parts—blood donation, and organ and tissue donation—and focuses on donation and donors. Information on the use of blood and blood products and on transplantation recipients is limited and this information has been included where possible.

What do we know about blood donation?

In Australia, blood donors are generally aged between 16 and 70, in good health and without any restricted lifestyle factors, health conditions or travel history. For information on who can be a blood donor, visit <www.donateblood.com.au>. The Australian Red Cross Blood Service (ARCBS) estimates that 1.4 million donations are needed each year to save the lives of Australians with conditions such as cancer, trauma and burns, and patients undergoing surgery. In 2009–10, there were just over 1.3 million blood donations, from more than half-a-million donors (NBA 2010).

Each blood donation has three components—red cells, plasma and platelets—and can help multiple recipients. A volunteer can donate all three components in whole blood donation, or they can donate plasma or platelets separately in a procedure called apheresis. In apheresis, whole blood is donated but the red cells are returned to the donor.

Blood is a versatile and valuable commodity that can be used in a range of clinical settings to treat numerous conditions (Table 7.14).



Table 7.14: Blood donation in Australia

Donation type	Frequency of donation	Shelf-life	Used to treat
Whole blood/red blood cells	12 weeks	42 days, refrigerated	Anaemia, severe bleeding from trauma or surgery
Plasma apheresis	2 weeks	12 months, frozen	Trauma, burns, cancer, haemophilia; used to create immunisations, concentrated blood proteins and coagulation factors
Platelet apheresis	2–4 weeks	5 days, room temperature	Cancer, bleeding disorders

Source: ARCBS 2010a, NBA 2010.

Australia has one of the most safe and secure blood supplies in the world, protected by nationally coordinated and consistent donor screening and blood testing processes and a centralised supply system (NBA 2010; ARCBS 2011). The ARCBS coordinates blood donation and collection, and the National Blood Authority (NBA) coordinates the supply of blood products to patients. Australian, state and territory governments oversee the NBA's operations.

The national screening and testing processes ensure that blood donation does not put the donor's health at risk, that 'risky' blood products do not enter the national blood supply, and that donor and recipient blood typing and matching is accurate (ARCBS 2010b).

The two most clinically important blood typing systems in Australia are the ABO system and the Rhesus system. There are four ABO blood types—A, B, AB and O—determined by the presence or absence of A-antigens and B-antigens on a person's red blood cells. There are two important Rhesus blood types—denoted as a '+' (positive) or '-' (negative)—determined by the presence or absence of the Rhesus-D antigen, also called the Rhesus factor. The combination of the ABO and Rhesus systems gives eight blood types.

Accurate typing and matching of donor and recipient blood is vital to avoid adverse transfusion reactions in the recipient. Although the most common blood group in Australia is O+ (40%), the most compatible donor blood group is O- (9%), as this can be safely transfused to recipients of all blood types (Table 7.15). The least common blood type is AB- (1%) and the least compatible is AB+ (2%), which can only be transfused to AB+ recipients. People with the O- blood type are referred to as 'universal donors' and are always needed, particularly for whole blood donation. Plasma donors with blood types A, B and AB, and platelet donors with blood types A and O, are also in high demand (ARCBS 2010a).



Table 7.15: Blood type of donors and recipients

Donor blood type	Recipient blood type								Population with donor blood type (Per cent)	Population who can receive donor blood type (Per cent)
	A+	A-	B+	B-	AB+	AB-	O+	O-		
A+	✓				✓				31	33
A-	✓	✓			✓	✓			7	41
B+			✓		✓				8	10
B-			✓	✓	✓	✓			2	13
AB+					✓				2	2
AB-					✓	✓			1	3
O+	✓		✓		✓		✓		40	81
O-	✓	✓	✓	✓	✓	✓	✓	✓	9	100

Source: ARCBS 2010c.

What do we know about organ and tissue donation?

There are two types of organ and tissue donation: deceased donation (after brain or cardiac death) and living donation.

Organs and tissues are most commonly transplanted from a deceased donor, and always with family consent (AOTDTA 2011a). A single, deceased, organ and tissue donor can save up to 10 lives, restore sight, repair serious burns and restore mobility (AOTDTA 2009). In Australia, there are seven organs and six types of tissue that can be donated (Box 7.12). Living donors can donate a kidney, part of their liver, bone and bone marrow.

In 2010, 309 deceased donors gave 987 organs to 931 transplant recipients (ANZOD 2011a). The organs most frequently consented for donation (but not always transplanted) were kidneys (610), lungs (536) and livers (280). Of the 309 donors:

- 58% were male
- 84% were aged under 65
- 78% had been declared brain dead
- 50% had died from stroke.

These 309 deceased donors also made 370 tissue donations, including 270 corneas, 29 donations of bone tissue and 71 heart valves (ANZOD 2011a).



Box 7.12: Criteria for organ and tissue donation by deceased donors

Organ donation

Deceased people of all ages are eligible to be organ donors. However, there are some restrictions on the circumstance and cause of death as to whether their organs can be transplanted. Organs are not viable for transplant after cardiac death, where the heart stops beating and organs begin to deteriorate. Organ donation is only considered if the donor is declared brain dead in an intensive care unit, while on artificial ventilation. Organ transplantation usually occurs within hours of brain death. In some situations, the cause of death will mean that organs are not suitable for transplant. In Australia, there are seven types of organs that can be donated for transplant: heart, intestines, kidneys, liver, lungs, pancreas and pancreatic islet cells, and stomach.

Tissue donation

Deceased people of all ages are eligible to be tissue donors. Tissues can be donated after brain death or cardiac death. Some tissues can be donated up to 24 hours after cardiac death. In some situations the cause of death will mean that tissues are not suitable for transplant.

In Australia, there are six types of tissue that can be donated for transplantation: bone and bone marrow, eye tissue (cornea), heart valves, ligaments and tendons, skin, veins and arteries.

Source: AOTDTA 2009.

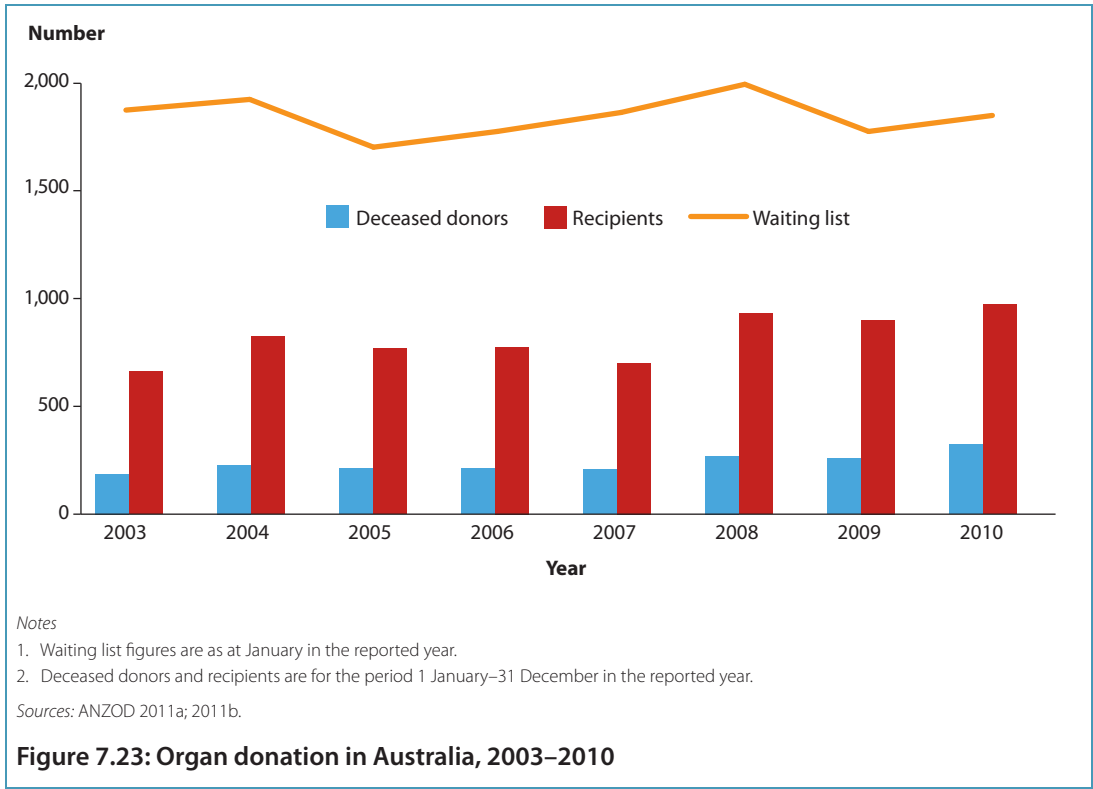
In 2009, the Australian Bone Marrow Donor Registry had 173,000 registered donors, and in 2009–10, 70 Australian patients and 39 international patients received a transplant with bone marrow from Australian donors on the register (ABMDR 2010).

While deceased donor and transplant numbers are gradually increasing over time, the number of people waiting for organ transplantation continues to exceed the number of donor organs (Figure 7.23). During 2011, there were about 1,600 Australians on the transplant waiting list at any one time (ANZOD 2011b).

The rate of deceased organ and tissue donation in Australia is considered low by international standards (AOTDTA 2011b). In 2010, the rate of deceased organ donation was 13.8 donors per million population (AOTDTA 2011c). Spain, the world leader in organ donation, recorded 32.0 donors per million population in that year.

International comparisons of organ donation rates require careful consideration as reasons behind differences are complex. Countries vary in their social, demographic and mortality characteristics, hospital resources, strategies to encourage donation, and whether donation occurs on an 'opt-in' or 'opt-out' basis (Gimbel et al. 2003). There are also differences in how donors and donations are defined, for example, whether live donors or unsuccessful donations are included in the statistics.

The International Registry of Organ Donation and Transplantation placed Australia 17th in the world for organ donation in 2007, with a rate of 9.0 donors per million population (Transplant Australia 2010). Spain (34.3), Belgium (28.0), France (24.7), the USA (24.6) and Italy (20.9) had the highest rates of organ donation in that year. The USA was the only one of these five countries to have an 'opt in' system for organ donors, with the other four countries having 'presumed consent' laws. New Zealand (9.0) had the same rate of donation as Australia in 2007 and Greece (5.8) had a lower rate.



To improve donor rates, in 2008 Australian governments endorsed the national reform package A World’s Best Practice Approach to Organ and Tissue Donation for Transplantation. The Australian Organ and Tissue Donation and Transplantation Authority was established in 2009 as part of this package, and works with states and territories to deliver a nationally coordinated approach to organ and tissue donation. One arm of the reform agenda is to increase donor awareness and consent rates. In 2010, the Authority launched the DonateLife campaign to achieve this aim, asking Australians to discover the facts about organ and tissue donation, decide about becoming a donor, and discuss their decision with family and friends.

In 2000, the Australian Organ Donor Register was established as the only national register for organ and/or tissue donation in Australia. The Register keeps a record of a person’s donation decision and ensures that it can be verified 24 hours a day, seven days a week by authorised medical personnel.



What is missing from the picture?

Data on blood donor characteristics are not readily available. Published data focus on the supply of blood and blood products to recipients, rather than on donation and donors. Despite this focus, there are minimal data available on the characteristics of recipients of blood products.

National reporting on tissue donation is incomplete because, unlike organ donation, there is no nationally coordinated information on tissue donation. A key objective of the national reform agenda on organ and tissue donation is to increase the capability and capacity of the organ and tissue donation sector. One way to increase capability and capacity is to establish a national eye and tissue donation and transplantation network. Once established, this network may facilitate more complete national reporting of tissue donation.

Where do I go for more information?

To find out how to donate blood, visit <www.donateblood.com.au>, and for how to become an organ and tissue donor, visit <www.donatelife.gov.au>.

For more information on blood, organ and tissue donation statistics, see the websites of the National Blood Authority (<www.nba.gov.au/>), the Australia and New Zealand Organ Donation Registry (<www.anzdata.org.au/anzod/v1/indexanzod.html>) and the European Transplant Coordinators Organisation (<www.europeantransplantcoordinators.org/>).



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How much does Australia spend on health?
How is this changing?

Every year Australia spends more on its health, even after allowing for inflation. However, there is a lot that needs to be done with those increasing dollars, both by hospitals and in the community.

This chapter looks at health as an industry, and examines where our health dollars come from and where they go. It also discusses the role of the private health insurance system.

CHAPTER 8

THE ECONOMICS OF HEALTH



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8.1 How big is the health industry?

At a glance

- Australia spent \$121.4 billion on health in 2009–10, up from \$72.2 billion a decade earlier.
- Health accounted for 9.4% of total spending on all goods and services in the Australian economy in 2009–10, up from 7.9% a decade earlier.
- In 2008–09, Australia's average per-person spending on health was \$6,787 for Aboriginal and Torres Strait Islander people, compared with \$4,876 for non-Indigenous people.



Introduction

As outlined in 'Section 1.4 Australia's health system—an overview', the health industry in Australia is large and complex. It comprises a wide range of goods and services across a diverse range of providers—from hospitals and general practitioners to community health centres.

This section provides an overview of the size of the industry in Australia, including international comparisons. It covers how much Australia spends on health, how that spending compares with other developed countries, and how much the industry has grown in the decade to 2009–10.

The section is based on *Health expenditure Australia 2009–10* (AIHW 2011a) and all figures are from that report, unless otherwise stated.

What do we know about the size of the health industry?

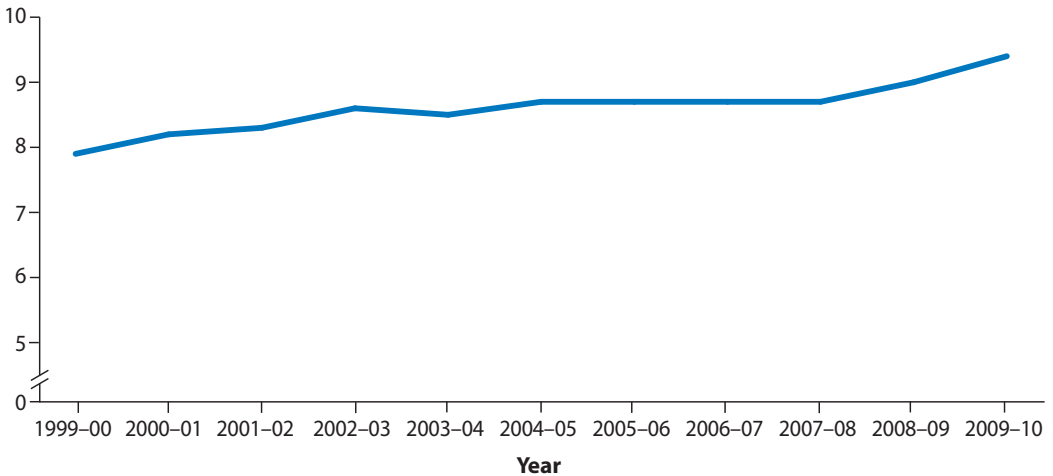
Many different approaches could be taken to estimate the size of such a complex and diverse industry, including employment, income, or contribution to production. One measure that has broad relevance is total expenditure—in other words, how much is spent on all health goods and services in Australia (see Box 8.5 in 'Section 8.3 Where does our health dollar go?' for the definition of health expenditure). In this report, the term health spending is generally used instead of health expenditure.

The estimated total spent on health in Australia in 2009–10 was \$121.4 billion. By way of comparison, total spending on all goods and services in the Australian economy—known as the gross domestic product, or GDP—was \$1,285 billion for the same year.

A measure commonly used to describe and compare the relative sizes of health systems in different countries is the health-to-GDP spending ratio. It measures a country's spending on health as a percentage of its spending on all goods and services. This measure is also useful to determine how health spending within a country changes over time.

Australia's health-to-GDP spending ratio has grown over the past decade, from 7.9% in 1999–00 to 9.4% in 2009–10 (Figure 8.1).

Per cent



Sources: AIHW 2011a; ABS 2011.

Figure 8.1: Annual health to GDP spending ratio, 1999–00 to 2009–10

Over the decade, estimated real growth in health spending averaged 5.3% per year, compared with average annual GDP growth of 3.1%. Real growth in spending is measured using constant prices (see Box 8.1).

Box 8.1: Constant price and current price

The use of constant prices is a way of comparing spending over time, without the distorting effects of inflation. In general, the prices of most goods and services rise over time, although some goods become cheaper because of changes in technology or other factors.

Current prices refers to spending reported for any year, unadjusted for inflation. To obtain constant prices, the current prices for all years are adjusted for inflation to reflect the prices in a chosen reference year. This enables comparisons of the volumes of health goods and services used over the years.

Constant prices are also referred to as 'real' spending, and growth is referred to as 'real growth in spending'.

By using constant prices, the comparison of spending in different years will reflect only the changes in the amount of health goods and services used and not the changes in the prices of these goods and services caused by inflation. The reference year used in this report is 2009–10.

In contrast, changes in current price spending reflect changes in prices through inflation, as well as changes in the amount of health goods and services that are used.



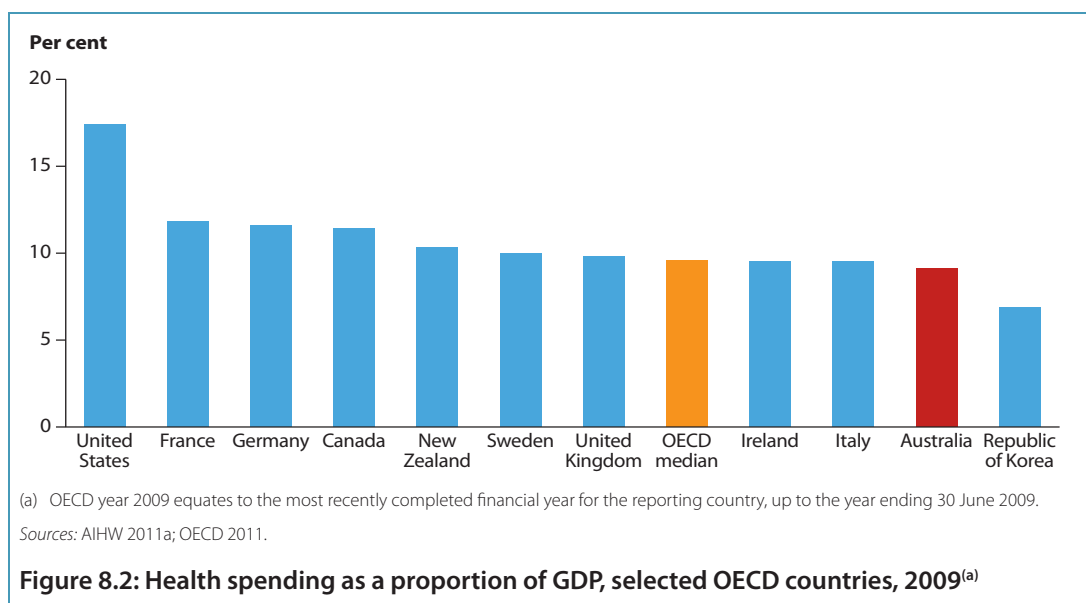
How does Australia's health industry compare?

Health spending for OECD countries, like Australia, has increased over the past decade at a faster rate than spending on all goods and services. In 1999, the median rate of health spending in OECD countries was 7.8% of GDP. By 2009, this rate had increased to 9.6% (AIHW 2011a; OECD 2011).

At 9.1% in 2009 (relating to the 2008–09 financial year, the latest year for which comparable data are available), Australia's health spending as a proportion of GDP was slightly lower than the OECD median (Figure 8.2). It is important to note that Australia's ratio does not include spending on long-term care outside hospitals, unlike many other OECD countries.

Of all OECD members, the United States had the highest health spending as a proportion of GDP, at 17.4%. Other OECD countries similar to Australia, including Canada (11.4%), New Zealand (10.3%) and the United Kingdom (9.8%), were above the median.

Note that for international comparisons, the estimates of Australia's total health spending have been adjusted to fit the OECD's System of Health Accounts (2000) framework (see Box 8.2).



Box 8.2: OECD definition of health expenditure

Section 8.1 uses a slightly different definition of health expenditure to that in other parts of this chapter. This is because for national (that is, internal) reporting, Australia uses the concept of health expenditure adopted by the WHO in the 1970s. However, in 2000, the OECD and the WHO adopted the OECD's System of Health Accounts (International Classification of Health Accounts) as the basis for international reporting of health expenditure. The major difference is the OECD's definition of health expenditure includes expenditure on all long-term care and excludes expenditure on health research and development, food standards and hygiene, and environmental health.

Despite recent moves to standardise the international reporting of health expenditure, there continues to be some differences between countries in terms of what is included as 'health goods and services'. Consequently, while comparative reporting of health expenditure is becoming more meaningful, readers are urged to be cautious in drawing conclusions from these comparisons.

The health-to-GDP spending ratio allows comparisons to be made at the broad (country) level. To understand these ratios and comparisons at a personal level, population figures are used to translate total spending into average per-person estimates.

In 2009, Australia's average per-person spending on health was \$5,287. Of all OECD members, the United States was again the highest, with average per-person spending of \$11,940 (Australian dollars).

Health spending for Aboriginal and Torres Strait Islander people

In 2008–09, average spending per person was \$6,787 for Aboriginal and Torres Strait Islander people, compared with \$4,876 for each non-Indigenous person (in constant prices) (AIHW 2011b).

From 2006–07 to 2008–09, government spending per person for Aboriginal and Torres Strait Islander people rose by 7.9%, or \$910, with most of the growth (about 74%) in state and territory spending (AIHW 2011b).

What is missing from the picture?

Total health spending reported for Australia (both domestically and internationally) is slightly underestimated as it excludes spending on health services provided by the Australian Defence Force, some school health spending, and some health spending incurred by corrective services institutions in the states and territories.

Some of the spending by non-government health organisations, such as the Heart Foundation and Diabetes Australia, is not included in Australia's accounts. In particular, as data are not available, most of the non-research spending funded by donations to these organisations is not included. By convention, expenditure on long-term care outside hospitals is also excluded.

Where do I go for more information?

The AIHW publication *Health expenditure Australia 2009–10* has detailed information and analyses of health spending and funding in Australia (AIHW 2011a), see www.aihw.gov.au/publication-detail/?id=10737420435.

The AIHW publication *Expenditure on health for Aboriginal and Torres Strait Islander people 2008–09* presents estimates on health expenditure for Aboriginal and Torres Strait Islander people and their non-Indigenous counterparts for 2008–09 (AIHW 2011b), see www.aihw.gov.au/publication-detail/?id=10737419257.

The AIHW publication *Expenditure on health for Aboriginal and Torres Strait Islander people 2008–09: an analysis by remoteness and disease* complements the preceding report, providing a more detailed analysis of health expenditure estimates for Indigenous and non-Indigenous Australians. Estimates are disaggregated at the regional level as well as for specific disease and injury groups, see www.aihw.gov.au/publication-detail/?id=10737420243.

The OECD has detailed information on health spending for member countries, plus reports and analyses for selected members, see www.oecd.org.



8.2 Where does our health dollar come from?

At a glance

- More than two-thirds of the \$121.4 billion spent on health care in Australia in 2009–10 was funded by governments, which is about the same as each year in the previous decade.
- The Australian Government funded almost two-thirds (62%) of government health spending, with the balance provided by state and territory governments.
- Individuals funded nearly 20% of recurrent health-care expenses through out-of-pocket payments.



Introduction

Funding for health goods and services comes from a range of sources, including the Australian Government; state, territory and local governments; and non-government sources, such as private health insurers, out-of-pocket payments by individuals and injury compensation insurers.

This section describes the main sources of health funding, how it is shared between government and non-government sources, and how these shares have changed over time.

It is important to understand the term health funding, which is used to describe health finances (see Box 8.3). A related concept, health spending, is described in Box 8.5 in 'Section 8.3 Where does our health dollar go?' Both concepts are needed to explain the financial resources used by the health system.

This section is based on *Health expenditure Australia 2009–10* (AIHW 2011a) and all figures are from that report, unless otherwise stated.

Box 8.3: Defining health funding

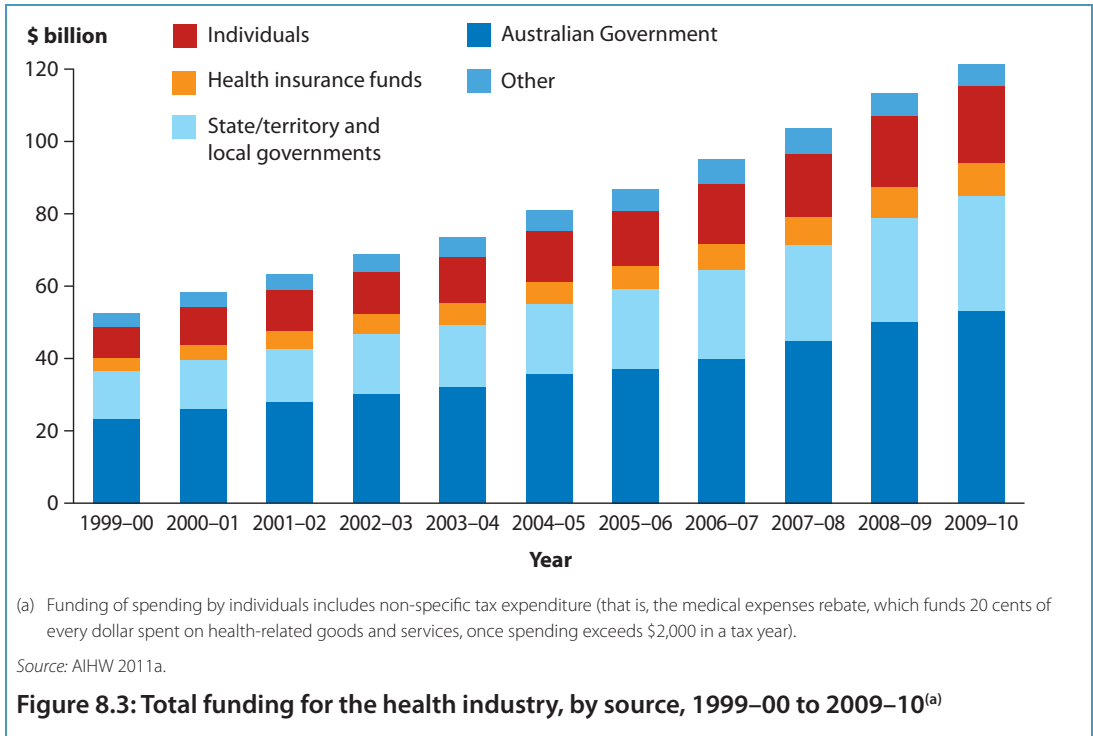
Health funding is reported in terms of who provides the money used for health spending; however, those providing the money are not necessarily responsible for actually spending it.

For example, in the case of public hospital services in 2009–10, the Australian Government provided 38.3% of the funding and the states and territories 53.9%, which together accounted for more than 90% of the funding. These funds were derived from taxation and other sources of government revenue; however, all the money was actually spent by the states and territories to run public hospitals.

What do we know about health funding?

Of the total health funding of \$121.4 billion in 2009–10, the Australian Government contributed 44% and state, territory and local governments 26%. The non-government sector funded the remaining 30%.

This means that more than two-thirds of health-care spending was funded by governments; about the same contribution as each year in the previous decade. While overall health funding has steadily increased, the share that each funding source contributes to the total has changed very little over time (Figure 8.3). However, there has been greater variation in the shares of funding each source provides for particular areas of health spending, as presented in 'Section 8.3 Where does our health dollar go?'



Australian Government

The Australian Government contributed \$52.9 billion of the total health funding in 2009–10. The three areas that received the most—almost 73% of its contribution—were medical services, public hospital services and benefit-paid pharmaceuticals.

The Australian Government’s funding included:

- direct spending of \$31.9 billion on health programs it administers (60% of Australian Government total health funding), including the MBS and PBS—\$16.6 billion and \$7.5 billion respectively
- payments to the states and territories, such as the National Healthcare Agreement covering hospital services, and National Partnership payments covering other activities (\$12.7 billion, or 24% of Australian Government total health funding)
- rebates for people with private health insurance (\$4.3 billion, or 8%)
- goods and services provided by DVA to eligible veterans and their dependants (\$3.5 billion, or 7%).



The Australian Government provided 43% of the total funding for health services for Aboriginal and Torres Strait Islander people in 2008–09 (AIHW 2011b). It also funds capital spending through grants and subsidies to state, territory and local governments and to non-government organisations.

The Australian Government Medicare levy (see Box 8.4) provided 15% of the Australian Government's total health funding for 2009–10 (Australian Government 2011).

Box 8.4: Medicare levy

All Australian Government funding for health services comes from general revenue, one part of which is notionally health-related—the Medicare levy.

The levy was introduced in 1984 and was originally set at 1.0% of taxable income. It has increased several times and in 2012 is 1.5% of taxable income.

Since October 1997, a further surcharge of 1.0% was levied on high-income earners who did not have private insurance cover for hospital care. The thresholds for the surcharge have been indexed over time.

The *Fairer Private Health Insurance Incentives Act 2012* introduced two tiers of surcharge: individuals earning between \$93,001 and \$124,000 in 2011–12 will pay a 1.25% surcharge, and those earning \$124,001 or more will pay 1.5%. The equivalent thresholds for families are \$186,001 and \$248,001.

Historically, Australian Government funding to state and territory governments was provided under Australian Health Care Agreements. These payments were primarily for public hospital services, with funding for public health activities provided through Public Health Outcome Funding Agreements.

As part of changes to federal financial relations in 2009, the National Healthcare Specific Purpose Payment, associated with a new National Healthcare Agreement, became the major source of funding from the Australian Government. These payments are for a range of health activities provided by the state and territory governments, including hospitals.

In August 2011, COAG committed to the National Health Reform Agreement, which includes a new framework for funding public hospitals and additional investment. Under the framework, the Australian Government's contribution to public hospital services will increase to 60% over the next decade—when the Agreement was introduced it was below 40% (DoHA 2010). There will also be a focus on improving emergency department and elective surgery waiting times and primary care services. For more information on health reform, see <www.yourhealth.gov.au>.

State and territory governments

The states and territories have the major responsibility for operating and regulating public hospitals in their jurisdictions. In 2009–10, state and territory governments allocated more than 60% of their total health funding to public hospitals. This was 54% of the funding for these services, or \$19.5 billion.



State and territory governments provided the greatest share of funding for health services for Aboriginal and Torres Strait Islander people in 2008–09, contributing 48% of the total funding. They also fund large capital assets, such as hospitals and community health centres (AIHW 2011b).

Local governments contribute some of the funding for public and community health services. Estimates of local government funding have not been available since 2000–01 because more recent data have not been of high quality.

Non-government sources

In 2009–10, the non-government sector provided 30% (\$36.6 billion) of funding for total spending on health goods and services.

Out-of-pocket payments

More than half of non-government funding (58%) came from out-of-pocket payments by individuals. This included circumstances where individuals met the full cost of goods or services, as well as where they shared the cost, for example, with private health insurance funds or the Australian Government (through Medicare). In 2009–10, out-of-pocket payments funded almost half (47%, or \$7.7 billion) of spending on medications, and 61%, or \$4.7 billion, of total spending on dental services.

Other sources

Private health insurers provided a further 8% (\$9.2 billion) of total funding. The remaining 5% came from other non-government sources (the largest being compulsory third-party motor vehicle and worker's compensation insurers).

In 2009–10, the private health insurance system funded two-thirds (\$6.6 billion) of total spending on private hospital services, with more than half (\$4.5 billion) funded from premiums paid by members and the rest from the Australian Government private health insurance rebate (\$2.1 billion).

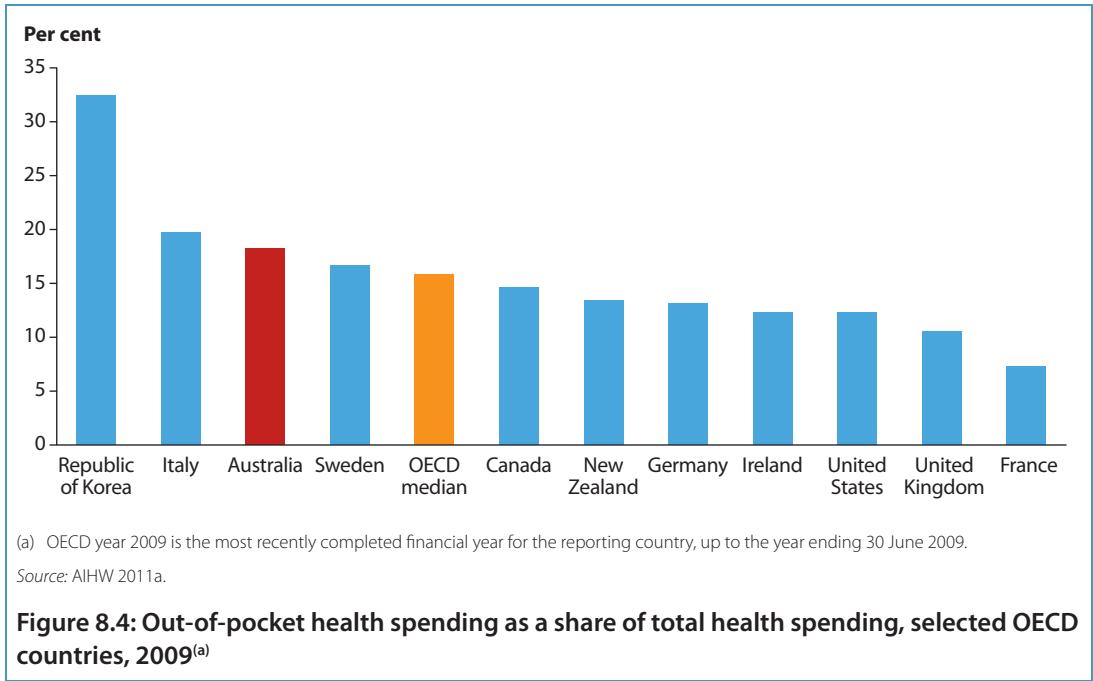
Non-government sources funded about 8% of public hospital services, and 9% of the total funding for health services for Aboriginal and Torres Strait Islander people in 2008–09 (AIHW 2011b).

How do Australia's out-of-pocket payments compare?

In 2009, Australia's per-person out-of-pocket health spending was \$900, which was \$50 below the weighted average for OECD countries. In 1999, per-person out-of-pocket spending was \$497, or \$21 below the OECD weighted average. (Averages are weighted by population for per person out-of-pocket expenditure.)

As a share of total health spending, Australia's out-of-pocket payments (18.2%) were high compared with most other OECD countries, and higher than the OECD median (15.8%) (Figure 8.4).





As a share of total household spending, Australia's out-of-pocket payments for health rose from 2.4% to 2.8% over the decade. The OECD weighted average rose from 2.7% to 2.9% over the same period (AIHW 2011a; OECD 2011).

What is missing from the picture?

Data on health funding does not include the philanthropic contribution of individuals, such as the donations people make to non-government organisations or to research institutions for health projects. In addition, not all of the out-of-pocket expenses paid by individuals are available; in particular, estimates of what people pay for over-the-counter preparations are likely to be incomplete. Many governments departments, such as education or environment, also fund activities that have a health focus and data on these are not included in estimates. Some public health activities receive funding this way and this varies across the jurisdictions. Similarly, many local governments fund health-related activities, such as those that promote health and focus on prevention. Not all health funding from local government is available as some is included in state and territory estimates and this varies across the jurisdictions.

Where do I go for more information?

The AIHW publication *Health expenditure Australia 2009–10* has detailed information and analyses of health funding in Australia (AIHW 2011a), see <www.aihw.gov.au/publication-detail/?id=10737420435>. For more information on the federal financial arrangements for health funding, see <www.federalfinancialrelations.gov.au/content/national_agreements.aspx>.



8.3 Where does our health dollar go?

At a glance

- Of the \$121.4 billion spent on health in 2009–10, the vast majority (96%) was recurrent spending.
- The greatest share of recurrent spending was for hospital services—\$46.3 billion—with nearly four-fifths of this being spent on public hospitals. Real growth in spending for public hospitals over the decade was 4.9% per year, and 5.6% for private hospitals.
- Spending on cardiovascular diseases was higher than for any other disease, at \$7.9 billion.



Introduction

The bulk of health expenditure, or health spending, is on health goods and services, such as medications and hospital care. It also includes spending on a number of health-related activities, such as research and administration. Capital items account for a relatively small share of total health spending.

This section describes the main components of health spending. It covers how much Australia spends on health, the trends in health spending for the decade to 2009–10, and the amounts spent on specific population groups and diseases.

It is important to understand the term health expenditure, which is used to describe health finances (see Box 8.5). A related concept, health funding, is described in ‘Section 8.2 Where does our health dollar come from?’ Both concepts are needed to explain the financial resources used by the health system.

This section is based on *Health expenditure Australia 2009–10* (AIHW 2011a) and all figures are from that report, unless otherwise stated.



Box 8.5: Defining health expenditure

Health expenditure is reported in terms of who spends the money, rather than who ultimately provides the money for any particular expenditure. In the case of public hospital care, for example, all expenditures (that is, expenditure on medical and surgical supplies, medications, salaries of doctors and nurses, and so forth) are incurred by the states and territories, but a considerable proportion is funded by transfers from the Australian Government.

In this report, the term health spending is generally used instead of health expenditure.

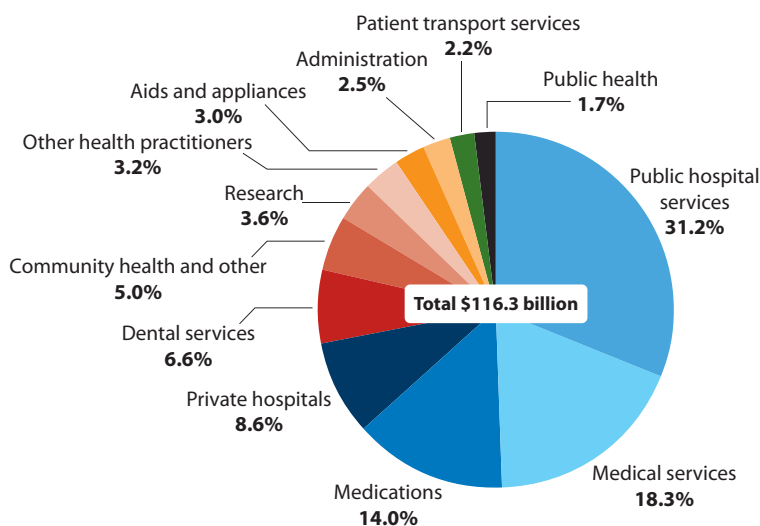
Spending on health comprises recurrent spending (which includes depreciation) and capital spending, and together they are reported as total health spending. In this chapter, recurrent spending, which relates largely to operating costs, is split according to the major types of health goods and services, and health-related activities.

Spending on the training of health professionals is not treated in Australia's national accounts as health spending, as it is regarded as spending on education.

Note that the collection and reporting of information on public hospital expenditure changed from 2003–04 onwards. For information before 2003–04, this expenditure is referred to as public hospital expenditure and from 2003–04 it is referred to as public hospital services expenditure. In this chapter, public hospital expenditure is only used when reporting time series data.

What do we know about health spending?

Total spending on health in 2009–10 was \$121.4 billion. Of this, \$116.3 billion (almost 96%) was recurrent spending. The largest component of recurrent spending was for hospital services, totalling \$46.3 billion (31% for public hospital services and 9% for private hospitals) (Figure 8.5).



Source: AIHW 2011a.

Figure 8.5: Recurrent spending on health goods and services, 2009–10

The next largest component was medical services (\$21.2 billion, or more than 18%), comprising mainly services provided by general practitioners and specialists, but excluding those provided to public admitted patients and outpatients in public hospitals (which are counted under hospital services). Spending on medications was \$16.3 billion (14%), dental services \$7.7 billion (7%) and community health and other \$5.8 billion (5%).

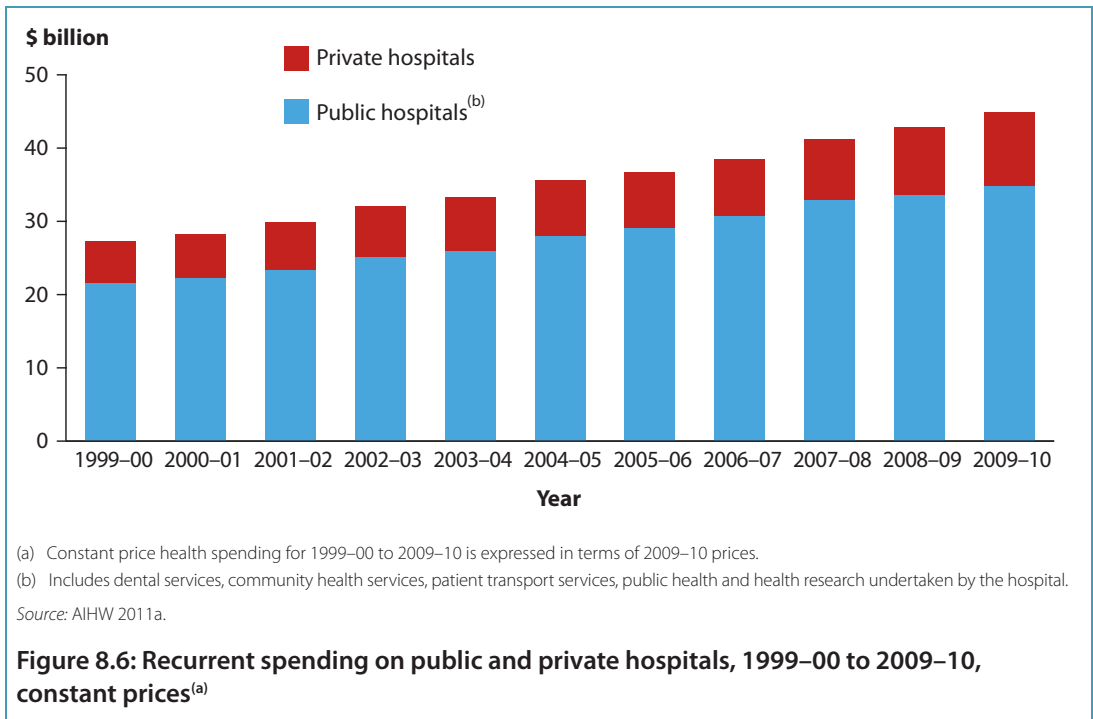
In 2008–09, the total amount spent on health goods and services for Aboriginal and Torres Strait Islander people was estimated at \$3.7 billion, or almost 4% of total recurrent spending on health.

How much is spent on each type of health service?

Hospitals

In 2009–10, \$44.9 billion was spent on hospitals (excluding spending on capital items). The majority (78%) of this was spent on public hospitals (\$34.8 billion) and the balance (\$10.1 billion) on private hospitals.

In real terms (adjusted for inflation), spending on hospitals (both public and private) grew by 5.1% per year between 1999–00 and 2009–10. Real growth over the decade for public hospitals was 4.9% per year, and 5.6% for private hospitals (Figure 8.6).



Medical services

Spending on medical services (see Box 8.6) increased from \$14.5 billion in 1999–00 to \$21.2 billion in 2009–10. In real terms, this was an increase of 3.9% per year over the decade.



Box 8.6: Medical services

The term 'medical services' refers to services provided by private medical practitioners operating on a fee-for-service basis, notably GPs and specialists operating privately. These services are generally funded by a combination of benefits under the MBS and patient copayments. Also included in the spending estimates are medical services provided to private patients in both public and private hospitals, and spending under some Australian Government programs, such as those encouraging the supply of medical practitioners in regions where there are shortages.

Medical services provided to public patients in public hospitals are not included.

Medications

In 2009–10, total spending on medications (see Box 8.7) was \$16.3 billion (of which \$14.4 billion, or 88%, was spent on prescription medications). Total spending comprised \$9.6 billion for benefit-paid pharmaceuticals, and \$6.7 billion for other medications, which includes over-the-counter medications.

Spending on medications for admitted hospital patients was an additional \$2.7 billion—\$2.4 billion for public hospitals and \$0.3 billion for private hospitals.

Box 8.7: Spending on medications

Medications comprise:

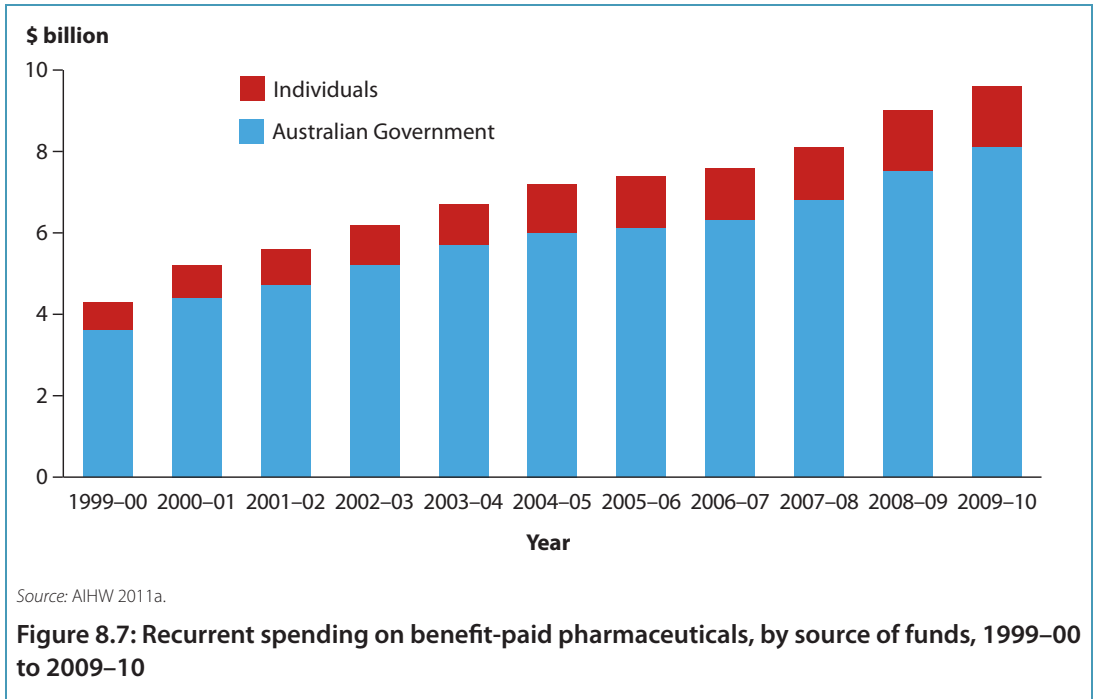
- pharmaceuticals whose payments are subsidised by the PBS or the RPBS, including payments for human growth hormones, in-vitro fertilisation drugs and other subsidised medications
- other medications for which no benefit was paid by the PBS or the RPBS, including:
 - private prescriptions that do not fulfil the criteria for a benefit
 - under-copayment prescriptions, which are items listed on the PBS or the RPBS that are equal to or less than the cost of the statutory patient contribution (copayment)
 - over-the-counter medicines, such as pharmacy-only medicines, pain-killers, cough and cold medicines, vitamins and minerals
 - a range of medical non-durables, such as bandages and other dressings.

Spending on medications for admitted patients is included in estimates of hospital spending, not in estimates of spending on medications.

The Australian Government spent \$8.1 billion on benefit-paid pharmaceuticals (84% of the total). The bulk of this (78% of the total) was under the PBS and the RPBS, with the remainder spent on Section 100 drugs and other items administered by the DoHA. Individuals contributed \$1.5 billion (16% of the total) for benefit-paid pharmaceuticals in 2009–10. For the decade to 2009–10, real growth in spending on benefit-paid pharmaceuticals averaged 8.4% per year (Figure 8.7).

Spending on Aboriginal and Torres Strait Islander people through the PBS was \$0.1 billion in 2008–09 (AIHW 2011b).





Dental services

In 2009-10, spending on dental services was \$7.7 billion. For 2003-04 to 2009-10, real growth in dental services spending averaged 3.7% per year—0.9% for state and territory dental services and 4.0% for private providers.

Public health activities

Public health activities, such as cancer screening and immunisation programs, focus on the whole population or on population groups. This distinguishes them from treatment services for diseases and injuries, such as those provided to patients in hospitals.

Spending on public health by government and non-government agencies was \$2.0 billion in 2009-10, down from \$2.2 billion in 2008-09 and \$2.3 billion in 2007-08. It should be noted that changes in public health spending from year to year are strongly influenced by the funding of specific initiatives that occur or begin in particular years.

In 2009-10, Australian governments spent \$1.9 billion on public health activities through programs administered by their health departments. This was 1.6% of total recurrent spending on health—a fall from \$2.2 billion, or 2.0%, in 2008-09. The higher spending in 2007-08 and 2008-09 was attributed to the increased spending on organised immunisation programs in those periods—mainly the costs associated with the implementation of the National HPV Vaccination Program.

Spending on organised immunisation was \$0.6 billion during 2008-09. Health promotion activities accounted for a further \$0.4 billion and screening programs—covering breast, bowel and cervical cancer—cost \$0.3 billion. Communicable disease control, and activities directed at preventing hazardous and harmful drug use, each cost \$0.3 billion.



How much is spent on capital items?

Spending on capital was \$5.0 billion in 2009–10, or 4.2% of total health spending. State, territory and local governments funded \$2.8 billion of total capital spending, non-government sources \$2.1 billion, and the Australian Government \$0.1 billion. Estimates of spending on capital come from the ABS and have been revised for earlier years. Comparisons should not be made with data provided in previous editions of *Australia's health*.

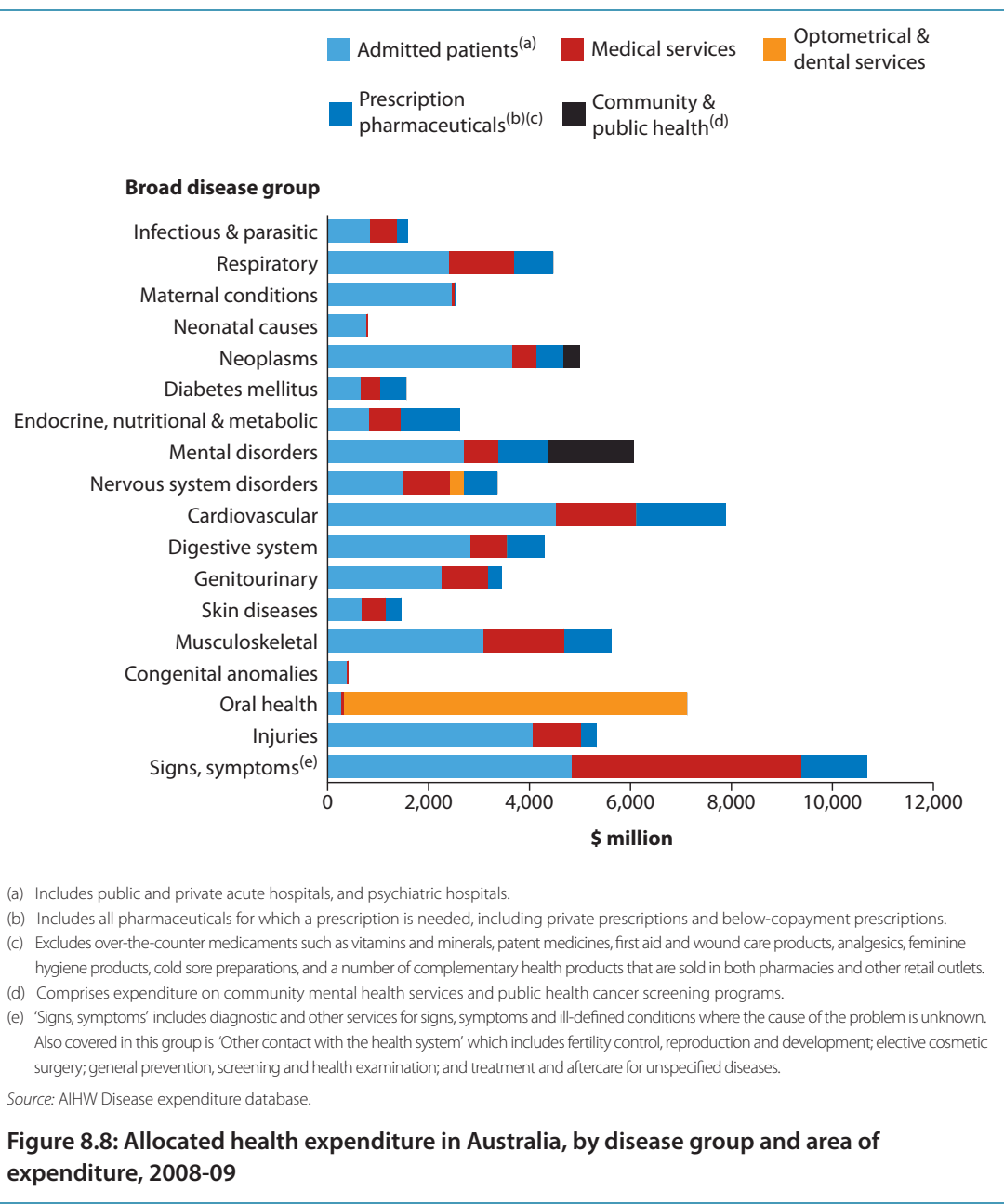
How much is spent on each type of disease and injury?

In 2008–09, \$74.2 billion, or 64% of total recurrent health spending, could be allocated to 18 broad disease groups. More than half, or \$38.7 billion, was for admitted patient hospital services (52%), \$15.9 billion was for out-of-hospital medical services (21%), \$10.6 billion for prescription pharmaceuticals (14%), and \$7.1 billion for optometrical and dental services (10%).

The non-specific group *Signs, symptoms, ill-defined conditions and other contact with health system* accounted for the greatest share of allocated health spending (\$10.7 billion, or 14%) (Figure 8.8). Of the specific disease groups, cardiovascular diseases accounted for the greatest spending (\$7.9 billion, or 11%), followed by oral health (\$7.1 billion, or 10%) and mental health (\$6.1 billion, or 8%).

Different disease groups have different patterns of spending across the areas of health spending. For example:

- *Maternal conditions* and *Neonatal conditions* had a high proportion of their spending (97% and 96% respectively) under admitted patient care
- *Endocrine, nutritional and metabolic conditions* had the highest proportion of its spending under prescription pharmaceuticals (45%), mainly due to the high cost of cholesterol-lowering drugs allocated to this group.



(a) Includes public and private acute hospitals, and psychiatric hospitals.
 (b) Includes all pharmaceuticals for which a prescription is needed, including private prescriptions and below-copayment prescriptions.
 (c) Excludes over-the-counter medicaments such as vitamins and minerals, patent medicines, first aid and wound care products, analgesics, feminine hygiene products, cold sore preparations, and a number of complementary health products that are sold in both pharmacies and other retail outlets.
 (d) Comprises expenditure on community mental health services and public health cancer screening programs.
 (e) 'Signs, symptoms' includes diagnostic and other services for signs, symptoms and ill-defined conditions where the cause of the problem is unknown. Also covered in this group is 'Other contact with the health system' which includes fertility control, reproduction and development; elective cosmetic surgery; general prevention, screening and health examination; and treatment and aftercare for unspecified diseases.

Source: AIHW Disease expenditure database.

Figure 8.8: Allocated health expenditure in Australia, by disease group and area of expenditure, 2008-09



What is missing from the picture?

The AIHW's definition of health expenditure closely follows the definitions and concepts provided by the OECD's System of Health Accounts (2000) framework (OECD 2000), however, there are some differences in inclusions/exclusions. For details, see Box 8.2 in 'Section 8.1 How big is the health industry?'

Not all data relating to prevention are identified separately in AIHW spending estimates. Many areas of health spending include elements of preventive health and/or health promotion. A wide range of activities are funded by an equally wide range of programs; as a result, spending on these activities cannot currently be quarantined from other health spending. In future, the provision of specific funding for preventive health under an Australian Government National Partnership payment may allow for some of this expenditure to be reported.

Not all health expenditure can be allocated to disease and injury groups. In 2009–10, health expenditure not allocated by disease included capital expenditure and consumption, and expenditure on non-admitted patients, over-the-counter pharmaceuticals, patient transport (ambulance), aids and appliances, administration, and most community and public health services and other health practitioner services.

Where do I go for more information?

The AIHW publication *Health expenditure Australia 2009–10* contains detailed information and analyses of health expenditure and funding in Australia (AIHW 2011a), see www.aihw.gov.au/publication-detail/?id=10737420435.

The AIHW publication *Expenditure on health for Aboriginal and Torres Strait Islander People 2008–09* presents estimates on health expenditure for Aboriginal and Torres Strait Islander people and their non-Indigenous counterparts for 2008–09 (AIHW 2011b), see www.aihw.gov.au/publication-detail/?id=10737419257.

The AIHW publication *Expenditure on health for Aboriginal and Torres Strait Islander People 2008–09: an analysis by remoteness and disease* complements the preceding report, providing a more detailed analysis of health expenditure estimates for Indigenous and non-Indigenous Australians. Estimates are disaggregated at the regional level as well as for specific disease and injury groups, see www.aihw.gov.au/publication-detail/?id=10737420243.

8.4 Private health insurance

At a glance

- The private health insurance system provided \$13.5 billion—almost 12%—of total funding for health care in 2009–10. More than \$9 billion of this came from premiums paid by members, and the rest from government subsidies.
- Private hospitals received almost 50% of the total funding provided by private health insurers.
- Overall, 10.4 million people—46% of the Australian population—were covered by private health insurance at the end 2011, which is the highest coverage since 2001.



Introduction

Private health insurers provide cover for their members who choose to be treated as private patients, in either public or private hospitals. They may also provide cover for a range of non-hospital benefits to insured people, such as physiotherapy, dental or podiatry services (see Box 8.8). The benefits paid by private health insurers finance part of the health costs incurred by their members.

This section describes the role of the private health insurance system as a source of funding for the Australian health system. It covers what health services are funded by private insurers, who is covered by private health insurance, and what are the trends in private health insurance coverage.

What do we know about the private health insurance system?

In 2009–10, the private health insurance system provided \$13.5 billion for the health system, or about 12% of total health funding (AIHW 2011). These funds came from two main sources: insurance premium payments made by members (\$9.2 billion) and premium rebates from the Australian Government (\$4.3 billion).

Note that the funding reported in the rest of this section relates only to the \$9.2 billion funded from premium payments, as the government rebate component of the pool of funds available to insurers is counted elsewhere in this chapter under government funding.



Box 8.8: Private health insurance arrangements

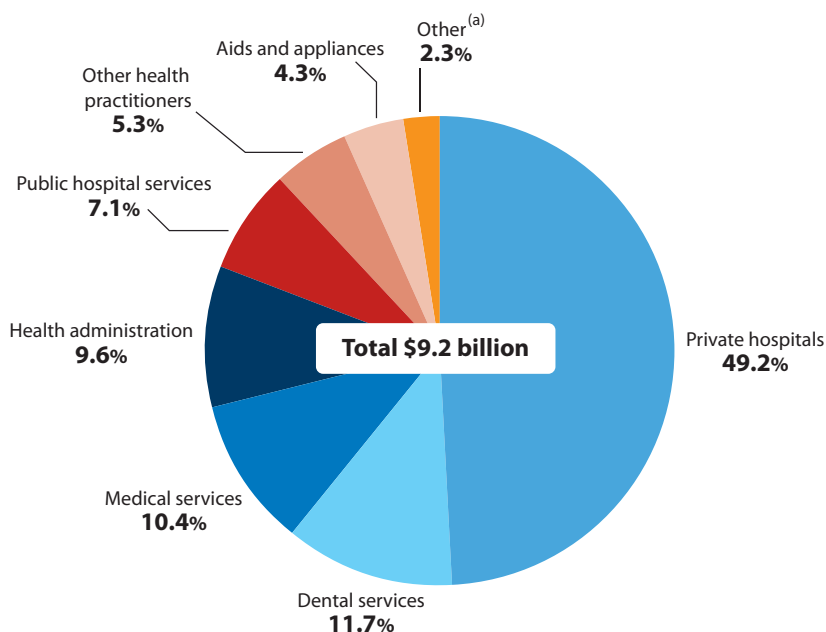
Private health insurers in Australia offer cover for various services provided in public and private hospitals (hospital cover). They also offer cover for a range of non-hospital health and health-related services, such as dentistry, physiotherapy, podiatry, pharmaceuticals and spectacles (general treatment or extras cover). From 2007, health insurers were able to expand cover to include medical treatments outside hospital that substitute for, or prevent, hospitalisation.

Through the *Private Health Insurance Incentives Act 1997*, the Australian Government introduced a means-tested subsidy, the Private Health Insurance Incentives Scheme, to help low-to middle-income earners obtain private health insurance cover. This was replaced in January 1999 by a 30% premium rebate payable to anyone with private health insurance cover, with higher rebates available for people aged 65 and over. The *Fairer Private Health Insurance Incentives Act 2012* reintroduced a means test so that individuals earning above \$80,000 in 2011–12 and families earning more than \$160,000 receive reduced rebates, and singles earning more than \$124,000 a year and families above \$248,000 receive no rebate.

On 1 July 2000, Lifetime Health Cover (LHC) incentives were introduced, to encourage people to hold private health insurance cover throughout their lives. An LHC deadline was determined—1 July after a person's 31st birthday, or for people who were older than 31 at the time 1 July 2000. People who join a health insurance fund by their LHC deadline, and continue to hold hospital cover, pay lower premiums throughout their life. Those joining after their LHC deadline pay an age-based loading on top of the premium, up to a maximum 70%. People aged 65 or over at 1 July 1999 are exempt from this loading. People who keep their insurance for 10 continuous years, and remain members, stop paying a loading.

What health services are funded?

Funding by private health insurers is directed chiefly towards private hospital services. In 2009–10, private hospitals received \$4.5 billion from insurers (Figure 8.9). Other major health areas that received funding were dental services (\$1.1 billion), medical services (\$1.0 billion) and administration (\$0.9 billion). The funding for medical services covers some of the cost of in-hospital services provided to private patients (AIHW 2011).



(a) 'Other' comprises patient transport services, medications, aids and appliances, and community and public health.

Source: AIHW 2011.

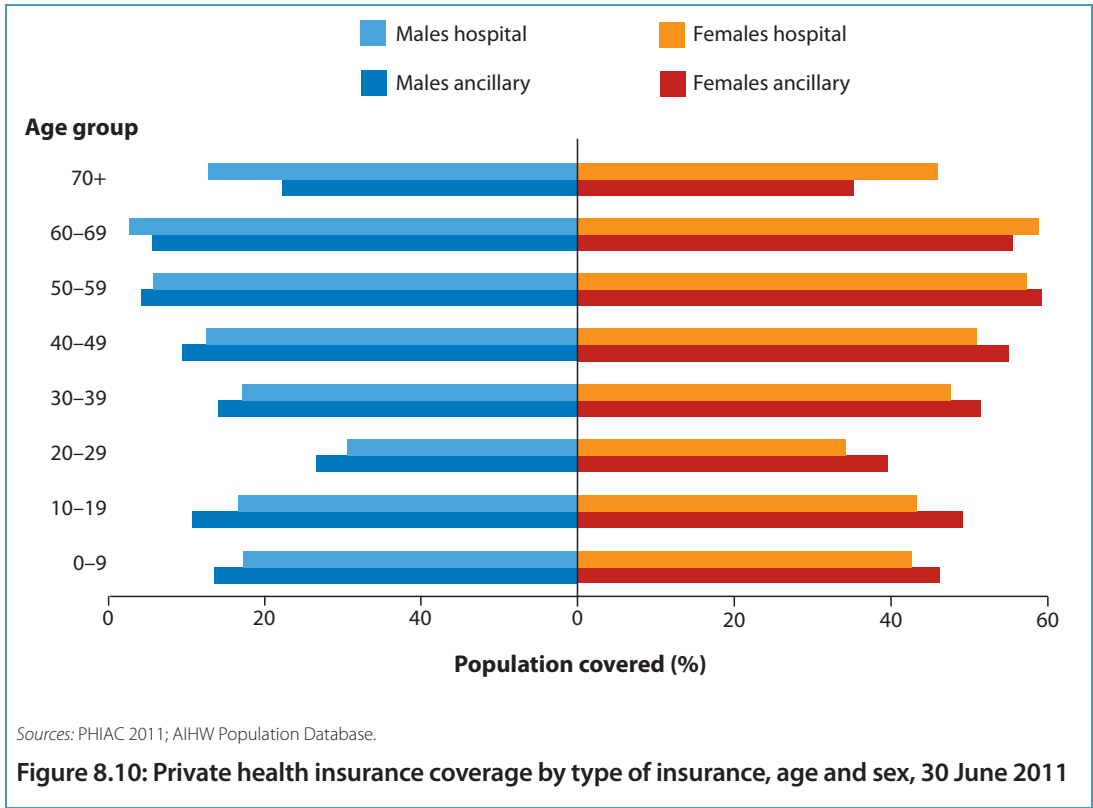
Figure 8.9: Funding of recurrent health spending by private health insurers, by area of spending, 2009–10

Who is covered by private health insurance?

At the end of December 2011, 45.7% of the Australian population—more than 10.4 million people—were covered by private hospital insurance. Below the age of 60, higher proportions of the population were covered by ancillary or extras (officially known as general treatment) insurance than by hospital insurance (Figure 8.10). Within each age group, similar proportions of males and females were covered.

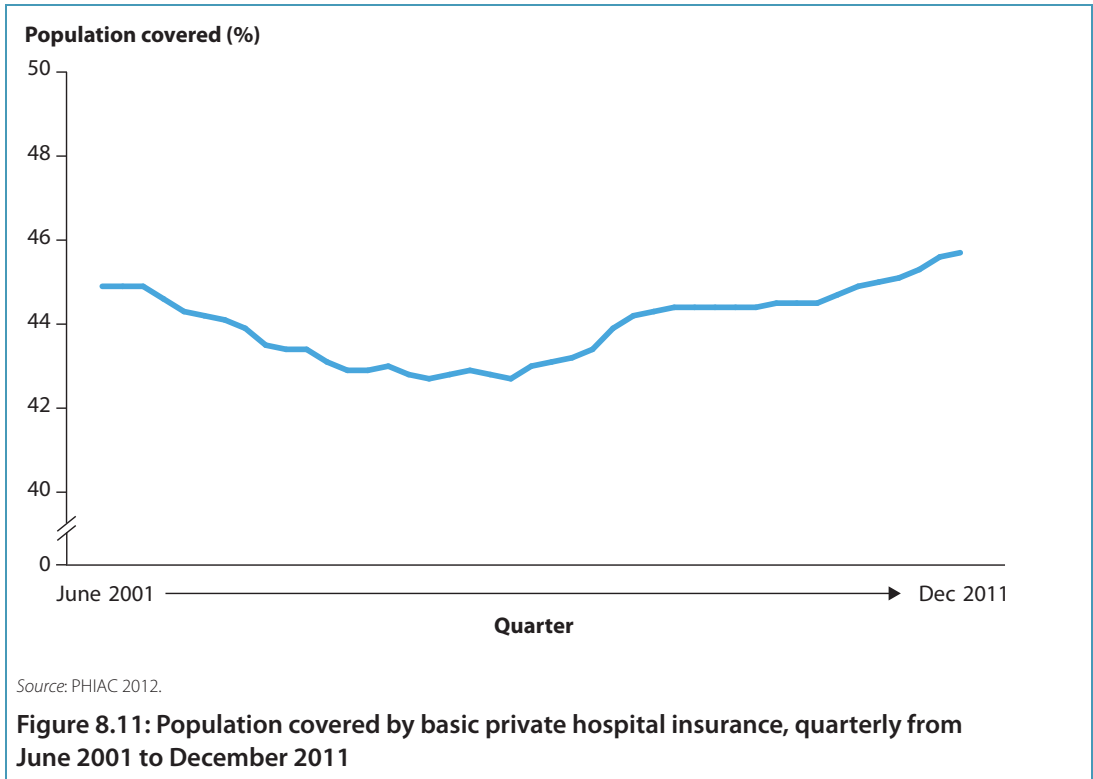
A spike in hospital coverage is seen around the age of 30, consistent with the Lifetime Health Cover surcharge being applied to anyone who has not taken out hospital insurance by the July after their 31st birthday. The accompanying increase in ancillary cover at that age reflects the fact that most people with private health insurance have combined 'hospitals plus ancillary' cover.





What are the trends in private health insurance coverage?

Overall, hospital insurance coverage in December 2011 (45.7%) was slightly higher than at the end of December 2010 (45.0%) (Figure 8.11). The increase continues the gradual upward trend in coverage rates since a low of 42.7% in June 2005 and June 2006 (PHIAC 2012).



What is missing from the picture?

There is limited information on the patterns of coverage for individuals over time, and how they relate to life stage and health status.

Where do I go for more information?

The AIHW publication *Health expenditure Australia 2009–10* has detailed information and analyses of health expenditure and funding in Australia (AIHW 2011a), see www.aihw.gov.au/publication-detail/?id=10737420435.

The Private Health Insurance Administration Council is an independent statutory authority that regulates the private health insurance industry. It collects and reports financial and statistical data regarding health funds and private health insurance. See www.phiac.gov.au.

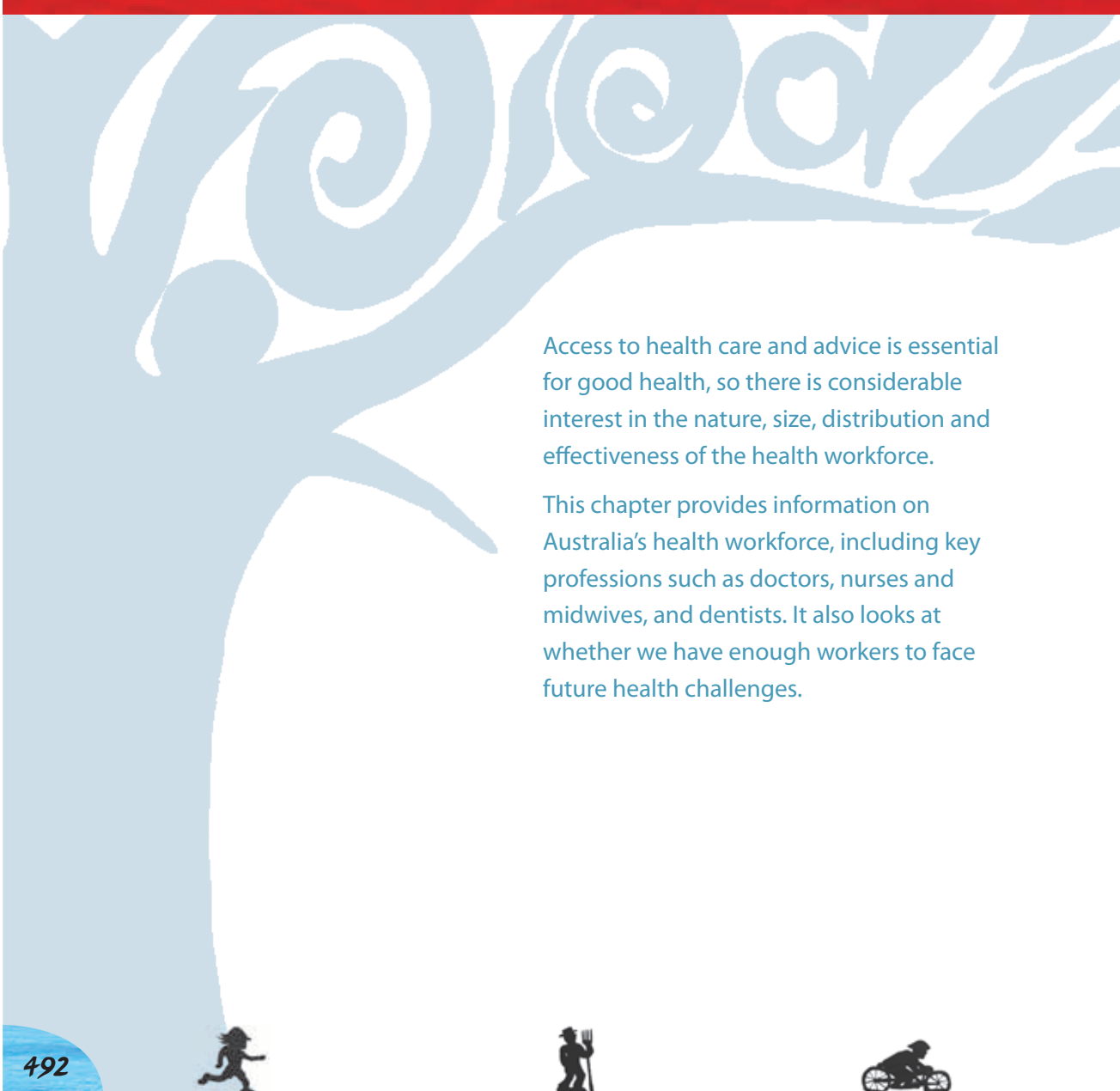


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Access to health care and advice is essential for good health, so there is considerable interest in the nature, size, distribution and effectiveness of the health workforce.

This chapter provides information on Australia's health workforce, including key professions such as doctors, nurses and midwives, and dentists. It also looks at whether we have enough workers to face future health challenges.

CHAPTER 9

HEALTH WORKFORCE



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9.1 About the health workforce

At a glance

- There were 737,400 workers in the health services industries in 2010, up from 599,000 in 2005, and employment grew faster in this sector than total employment for the same period (23% compared with 12%).
- The number of workers in health occupations increased by 26% between 2005 and 2010 (606,900 to 766,800). This was higher than the 12% increase for all occupations.
- On average, workers in health occupations are older than for other occupations, and the proportion aged 55 or older rose from 15% in 2005 to 19% in 2010.



Introduction

Information on the number and demographic characteristics of health workers in Australia helps to better understand this population and support the development and evaluation of policies for sustaining the existing workforce.

The health workforce refers to people employed to provide health care, including those who are self-employed. It does not include volunteers, individuals taking action to improve their own health, or people who work in other areas related to the wellbeing of the population.

Historically, the health workforce has been defined using two different approaches. The first defines the workforce as people employed in *occupations* that are health-related. This approach uses the activities of employees to assess whether the activities fall within the scope of the health workforce. The second approach defines the workforce according to the industry in which people work (that is, defined by the services that organisations provide). Both approaches have been used in this chapter to present information on the categories of 'health occupations' and 'health services industries'.

Health occupations include medical practitioner (GP and specialist), dentist, dental hygienist, dental therapist, dental prosthetist, nurse, midwife, medical imaging worker, pharmacist, allied health worker, complementary therapist, and other health workers (ABS 2006a)—see Table 9.3 for more detail of what occupations are included under these headings. In this section, social worker—classified as a social and welfare professional in the Australian and New Zealand Standard Classification of Occupations—has been included in the group of health occupations.

The health services industries cover the provision of hospital services (including psychiatric hospitals); medical services; pathology and diagnostic imaging services; allied health services; and other health-care services. It excludes industries outside health care, notably aged care and child care services (ABS 2006b).



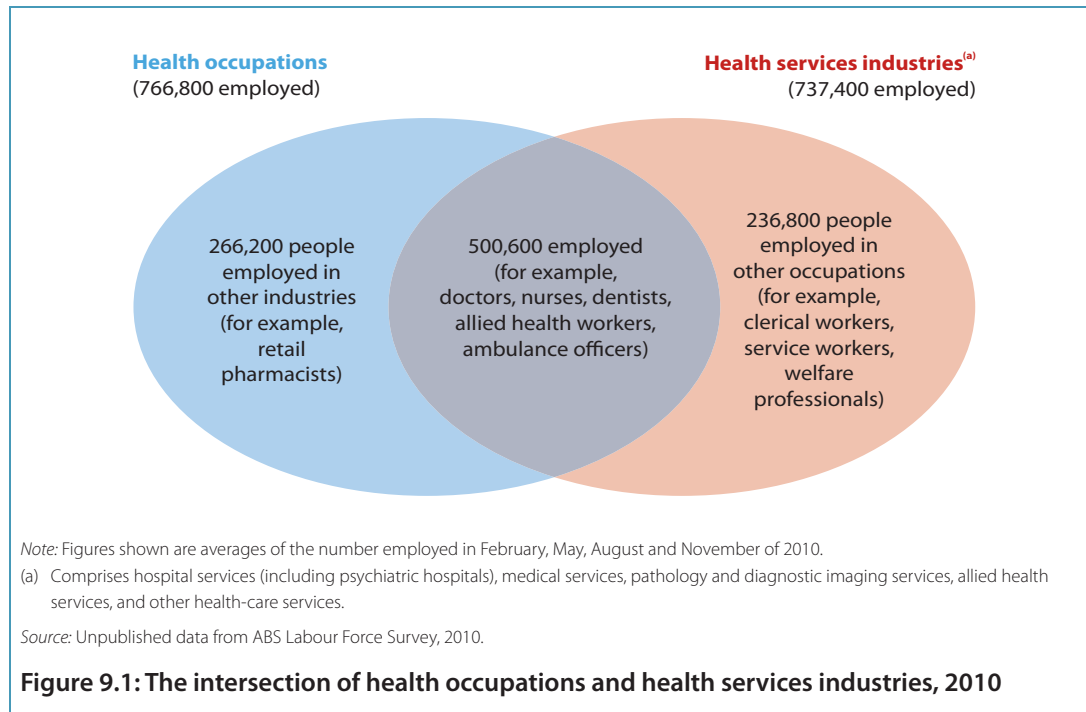
This section features two factors that affect the current and future capacity of the existing workforce: how many hours each person works and how long they are likely to remain in the workforce. For example, information on women in the workforce is provided because, on average, they work fewer paid hours per week than their male counterparts. The age profile of the workforce is also reported because the proportion of workers aged 55 or older provides an indication of those likely to retire in the short to medium term. The main source of data on the health workforce for this section is the ABS Labour Force Survey (see Box 9.1).

Box 9.1: Labour Force Survey

Information from the Labour Force Survey is reported monthly (for example, the unemployment rate) while more detailed information (for example, occupation and industry) is reported quarterly. The survey provides information on the number of people aged 15 and over employed according to their industry and occupation, as well as the total hours worked. Annual data in this section are based on the average of the four quarters in a calendar year, and exclude members of the permanent defence forces, certain diplomatic personnel of overseas governments, overseas residents in Australia, and members of non-Australian defence forces (and their dependants) stationed in Australia.

What do we know about the health workforce?

In 2010, the majority of people working in health services industries (500,600 employed people) were in direct health-care occupations (Figure 9.1). The rest (236,800) held other occupations, and 266,200 people in health occupations were not working in health services industries.



Who works in health-care industries?

People in the health workforce work mainly in the health services industries. The health services industries comprised 7% of the total labour force in 2010 (Table 9.1). Over the past two decades, the number of people employed in the health services industries has grown considerably, from 422,500 in 1990 to 737,400 in 2010. In the 5 years from 2005 to 2010, growth in health industries employment was 23%, compared with 12% growth in total employment over the same period.

Table 9.1: Employment in health services industries^(a), 1990–2010

Year	Number employed in health services industries ^{(a)(b)(c)} ('000)	All employed people ^{(b)(c)} ('000)	Proportion of all employed people ^{(a)(b)(c)} (per cent)
1990	422.5	7,836.6	5.4
1995	455.2	8,218.2	5.5
2000	510.9	8,951.3	5.7
2005	599.0	9,968.6	6.0
2010	737.4	11,214.5	6.6
Per cent			
2005 to 2010 increase	23.1	12.5	..
2000 to 2010 increase	74.5	43.1	..

.. Not applicable.

(a) Includes hospital services (including psychiatric hospitals), medical services, pathology and diagnostic imaging services, allied health services, and other health-care services.

(b) Due to a definitional change in 'employed' and 'unemployed' people, there is a break in the series for data at the detailed industry level after 1996. Some care should be taken in comparing numbers of employed people within the health services industries over time.

(c) Figures shown are averages of the number employed in February, May, August and November of that year.

Source: Unpublished data from ABS Labour Force Survey, 1990, 1995, 2000, 2005 and 2010.



In 2010, 51% of people who worked in the health services industries were employed in hospital services, followed by allied health services (20%) and medical services (16%) (Table 9.2).

Table 9.2: Employment in health services industries, 2005 and 2010

Industry	2005			2010			Change in number 2005–2010 (per cent)
	Number	Female (per cent)	Aged 55 and over (per cent)	Number	Female (per cent)	Aged 55 and over (per cent)	
Hospital services ^(a)	309,100	81	16	378,100	78	18	22
Medical services ^(b)	101,400	76	18	121,000	72	27	19
Pathology and diagnostic imaging services	32,500	70	15	40,700	77	18	25
Allied health services ^(c)	117,400	71	15	145,700	77	15	24
Other health-care services ^(d)	18,800	68	13	23,200	56	18	24
<i>Total health services industries^(e)</i>	<i>599,000</i>	<i>77</i>	<i>16</i>	<i>737,400</i>	<i>76</i>	<i>19</i>	<i>23</i>
Other industries	9,369,600	43	13	10,477,200	43	16	12
Total all industries	9,968,600	45	14	11,214,500	45	17	12

Note: Figures shown are averages of the number employed in February, May, August and November of that year.

(a) Includes psychiatric hospitals.

(b) Includes general practice medical services and specialist medical services.

(c) Includes dental services, optometry and optical dispensing, physiotherapy services, chiropractic and osteopathic services, and other allied health services.

(d) Includes ambulance services and other health-care services not elsewhere classified.

(e) Includes medical and other health-care services not further defined.

Source: Unpublished data from ABS Labour Force Survey, 2005 and 2010.

Who works in health occupations?

Between 2005 and 2010, the number of workers in health occupations increased by 26%, from 606,900 to 766,800. This was higher than the increase of 12% across all occupations over the same period (Table 9.3). Growth over this period was highest for social workers (55%), psychologists (53%) and 'other health workers' (50%). The two groups with the lowest growth rates were enrolled and mothercraft nurses, which declined by 7%, and nursing and personal care assistants, which grew by 14%.



People working in health occupations are mainly female: in 2010, 75% were female, compared with 45% across all occupations. The health occupations with the highest proportions of females in 2010 were midwifery and nursing professionals (91%), enrolled and mothercraft nurses (90%), dental associate professionals and assistants, and social workers (both 82%). In comparison, 31% of specialist medical practitioners and 37% of dental practitioners were female, although this has increased since 2005 (Table 9.3).

The health workforce in 2010 was older compared with the overall workforce, with 19% of workers aged 55 or older compared with 17% of the total Australian workforce. Nearly one-quarter of generalist medical practitioners (including GPs and doctors in training) were aged 55 or older, compared with about one-sixth in 2005. The proportions of older social workers and midwifery and nursing professionals also increased, from 10% to 19% and 14% to 20%, respectively, over the same period. However, the proportion of older pharmacists decreased by half between 2005 and 2010, from 34% to 17%. The share of older medical imaging professionals also decreased, from 14% in 2005 to 5% in 2010 (Table 9.3).

Table 9.3: Employment in health occupations, 2005 and 2010

Occupation	2005			2010			Change in number 2005–2010 (per cent)
	Number	Female (per cent)	Aged 55 and over (per cent)	Number	Female (per cent)	Aged 55 and over (per cent)	
Generalist medical practitioners ^(a)	37,200	43	15	44,600	44	24	20
Specialist medical practitioners ^(b)	21,900	28	21	29,300	31	24	33
Medical imaging workers	10,700	76	14	14,400	66	5	34
Dental practitioners	9,800	24	24	11,500	37	23	17
Dental associate professionals and assistants ^(c)	23,000	86	8	27,000	82	5	17
Midwifery and nursing professionals ^(d)	196,700	91	14	236,000	91	20	20
Enrolled and mothercraft nurses	32,300	94	13	30,100	90	19	-7
Nursing and personal care assistants ^(e)	71,700	80	19	81,900	79	20	14

(continued)



Table 9.3 (continued): Employment in health occupations, 2005 and 2010

Occupation	2005			2010			Change in number 2005–2010 (per cent)
	Number	Female (per cent)	Aged 55 and over (per cent)	Number	Female (per cent)	Aged 55 and over (per cent)	
Allied health workers							
Optometrists ^(f)	3,700	39	6	*2,200	*54	*2	*-40
Pharmacists ^(g)	14,800	58	34	19,200	57	17	30
Chiropractors and osteopaths	4,200	30	13	4,900	53	15	17
Physiotherapists	14,400	59	6	20,400	61	10	42
Podiatrists	*2,100	*67	*4	*2,800	*60	*4	*37
Psychologists	14,100	79	17	21,500	75	23	53
<i>Total allied health workers</i>	<i>53,200</i>	<i>60</i>	<i>17</i>	<i>71,100</i>	<i>64</i>	<i>16</i>	<i>34</i>
Complementary therapists ^(h)	21,200	78	12	26,700	73	18	26
Social workers	13,200	70	10	20,400	82	19	55
Other health workers ⁽ⁱ⁾	115,900	67	13	173,900	71	19	50
<i>Total health occupations</i>	<i>606,900</i>	<i>75</i>	<i>15</i>	<i>766,800</i>	<i>75</i>	<i>19</i>	<i>26</i>
Other occupations	9,361,700	43	14	10,447,700	43	16	12
Total all occupations	9,968,600	45	14	11,214,500	45	17	12

Note: Figures shown are averages of the number employed in February, May, August and November of that year.

* Relative standard error (RSE) of 25% to 50%. The ABS advises that Labour Force Survey estimates with an RSE of 25% to 50% should be used with caution.

- (a) Includes GPs, doctors in training, and medical practitioners not further defined.
- (b) Includes anaesthetists, internal medicine specialists, psychiatrists, surgeons and other specialist medical practitioners.
- (c) Includes dental hygienists, dental technicians, dental therapists and dental assistants.
- (d) Includes midwifery and nursing professionals not further defined, midwives, nurse educators and researchers and registered nurses.
- (e) Includes personal carers and assistants not further defined, nursing support and personal care workers.
- (f) Includes orthoptists in 2005 because optometrists could not be identified separately. However, 2010 data excludes orthoptists.
- (g) Includes retail pharmacists.
- (h) Includes health therapy professionals not further defined, complementary health therapists, massage therapists and personal care consultants.
- (i) In 2010, other health workers include health professionals not further defined, health and welfare services managers, nurse managers, medical laboratory scientists, occupational and environmental health professionals, other health diagnostic and promotion professionals, medical technicians, ambulance officers and paramedics, diversional therapists, counsellors, Aboriginal and Torres Strait Islander health workers, speech professionals and audiologists, dietitians, occupational therapists and orthoptists. However, 2005 data for other health workers exclude orthoptists; they were reported with optometrists as they could not be separately identified.

Source: Unpublished data from ABS Labour Force Survey, 2005 and 2010.

What is missing from the picture?

The ABS Labour Force Survey provides the most recent data available on all health workers (see Box 9.1), but information required to identify and monitor real and potential changes in the size and composition of individual health professions is often not available for small-sized professions (for example, podiatrists and optometrists). Data may be available but often at a level too broad for informed analyses. Two other sources of data will become available in the second half of 2012 that will fill this gap:

- the ABS Census of Population and Housing 2011, which will allow more detailed analysis of the characteristics of those who report working in health occupations and industries
- the National Registration and Accreditation Scheme, introduced in July 2010, which will provide detailed information on registered health professionals, including many of the smaller professions (see 'Section 9.2 Key health professions').

Where do I go for more information?

Other sections in this chapter provide more detail on aspects of the health workforce.

For more information on key professions in the health workforce, see AIHW's labour force publications on the AIHW website < www.aihw.gov.au >.

Health Workforce Australia (HWA) analyses information on the composition and characteristics of the health workforce to support their work to monitor and project the demand and supply of health professionals in the future. The development of a national plan to oversee this work is under way, with the release in 2011 of two documents: *National training plan—methodology paper* (HWA 2011a) and *National training plan—overview* (HWA 2011b).



9.2 Key health professions

At a glance

- Between 1999 and 2009, the supply of employed medical practitioners increased by 16%. However, the supply of primary care clinicians decreased by 2% over the same period.
- The supply of employed nurses increased 15% between 1999 and 2009. This is partly due to an increase in average hours worked, from 31 to 33 per week.
- From 2000 to 2009, the supply of employed dentists increased by 10%. This may be attributable, in part, to a 32% increase in the number of dentists over the same period.



Introduction

The delivery of health care is increasingly complex and technologically sophisticated, requiring input from one or more highly trained health professionals, often with specialised skills.

Many health professionals need to complete a relevant university course and successfully complete supervised training to begin their practice. This means substantial investment of time and money are required to educate and train a health professional to a level where they can contribute to high-quality health-care delivery. For this reason, the supply, size, composition and working hours of the existing health profession workforce are of great interest to health workforce planners and health policy makers.

What do we know about key health professions?

At 30 June 2011, there were about 530,000 people registered as health practitioners with the Australian Health Practitioner Regulation Agency (AHPRA) (see Box 9.2). Registrations include people who are retired or working outside their profession or outside Australia, as well as those currently working in the Australian health system. About 63% of those registered were nurses and/or midwives, with medical and dental practitioners accounting for 17% and 3% respectively, and allied health practitioners 17% (Figure 9.2).

Despite 2011 data from the National Registration and Accreditation Scheme (NRAS) being the most recent information, the level of detail available does not enable FTE rates to be calculated (see Box 9.3). Therefore, data from the 2009 AIHW labour force surveys are presented in this section for the medical, nursing and midwifery and dental workforces.



Box 9.2: Data sources

Registration

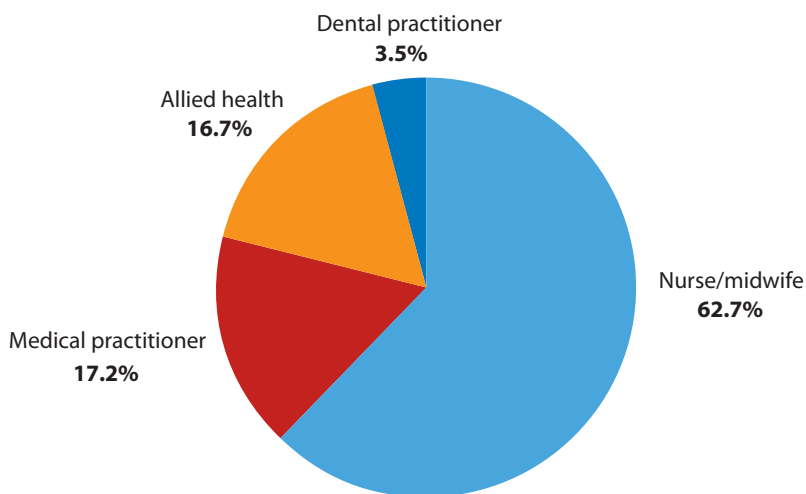
The NRAS data, administered by AHPRA, include registration and demographic details for 10 health professions. The information is collected as part of the annual registration process governed by the health profession boards. These data do not include information on their work characteristics, such as number of hours worked.

Workforce surveys

Until 2009, the AIHW compiled data from surveys of the medical, nursing and dental workforces conducted by the states and territories, usually in conjunction with the registration of these health professionals. The annual surveys were of all people registered or enrolled with the relevant registration boards, regardless of employment status. Information was collected on demographic characteristics, labour force status, type of work and location, specialty fields, and qualifications. The AIHW surveys were not compulsory and response rates varied over time.

Census of Population and Housing

The ABS Census of Population and Housing, conducted every 5 years, collects information from all people aged 15 and over about their employment status, occupation and industry. Due to the timing of this publication, the most recent data available are from the 2006 Census. ABS expects to release data from the 2011 Census in December 2012.



Notes

1. Nurse/midwife includes midwives, nurses and those with dual registration as a midwife and nurse.
2. Dental practitioner includes dentists, dental therapists, dental hygienists, oral health therapists and dental prosthetists.
3. Allied health practitioner includes chiropractors, optometrists, osteopaths, pharmacists, physiotherapists, podiatrists and psychologists.

Source: AHPRA 2011.

Figure 9.2: Registered health practitioners, Australia, 30 June 2011

Medical practitioner workforce

In 2009, about 82,900 people were registered as medical practitioners in Australia, of whom 72,700 (88%) reported that they were working in medicine at the time of the AIHW Medical Labour Force Survey (AIHW 2011a) (see Box 9.2). Between 1999 and 2009, the number of employed medical practitioners increased by 45%, which represents a 4% annual change on average (Figure 9.3). The FTE supply of practitioners increased by 16% in the same period, from 303 FTE practitioners per 100,000 population to 350 (see Box 9.3 for descriptions of FTE).

Box 9.3: Measuring supply: FTE numbers and rates per 100,000 population

The FTE number is the number of full-time workloads provided by health workers. This is a useful measure of supply as it takes into account both the number of health workers and the hours they work.

The AIHW designates 38 hours per week to be full-time work for nurses, dental and allied health workers, and 40 hours for medical practitioners. This has been used as the basis for calculating FTE number for occupations.

The FTE number is calculated as the number of health workers in a particular category multiplied by the average hours they work, divided by the hours considered to be full time. For example, if two health workers work a full-time week and two other health workers work half the hours of a full-time week, then the total will equal 3 FTE workloads.

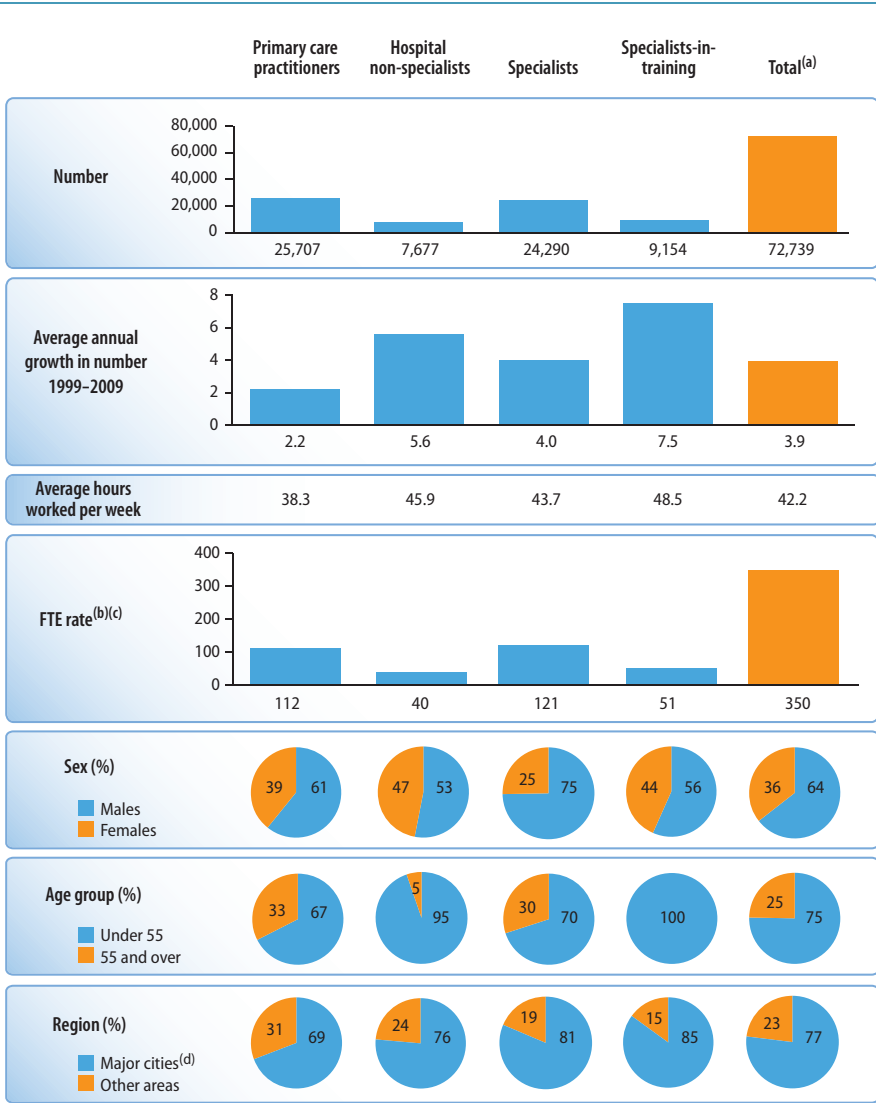
The FTE rate (the number of FTE health workers per 100,000 population) is a measure of supply. By defining supply in terms of the FTE rate, meaningful comparisons can be made across geographic areas and over time. ABS estimated resident population data are used to calculate the FTE rates.

In 2009, 93% of employed medical practitioners were clinicians (practitioners who spent most of their working time doing clinical work) and the rest had other roles, such as administrators, teachers, researchers and occupational health physicians. Of the clinicians, 38% were primary care practitioners, 36% were specialists, followed by specialists-in-training (14%) and non-specialists working in hospitals (11%) (Figure 9.3). Many practitioners report working in multiple settings across both the public and private sectors, but the figures presented here are based on the main role for the previous week, as reported by the medical practitioner at the time of completing the Medical Labour Force Survey.

Medical practitioners are not evenly distributed across Australia, contributing to different levels of health-care access for people living in different geographical areas. The supply of medical practitioners in Australia in 2009 was highest in *Major cities*, with 392 FTE practitioners per 100,000 population. This was higher than the rates of 224 and 206 in *Inner regional* and *Outer regional* areas respectively. The FTE rate of specialists in *Major cities* was 2, 3 and 6 times as high as *Inner regional*, *Outer regional*, and *Remote/Very remote* areas, respectively. The supply of primary care practitioners was more evenly distributed across the geographical regions than specialists, ranging from 103 FTE primary care practitioners per 100,000 population in *Inner regional* areas to 143 in *Remote/Very remote* areas (Figure 9.4).



Between 1999 and 2009, the number of primary care clinicians rose by 25% (from 20,600 to 25,700), while their average working hours declined from 42.2 to 38.3. As a result, the supply of primary care clinicians declined from 115 FTE to 112 FTE per 100,000 population over the period.



(a) Total includes other clinicians who are not primary care practitioners, hospital non-specialists, specialists or specialists-in-training, and non-clinicians.

(b) Based on a full-time working week of 40 hours.

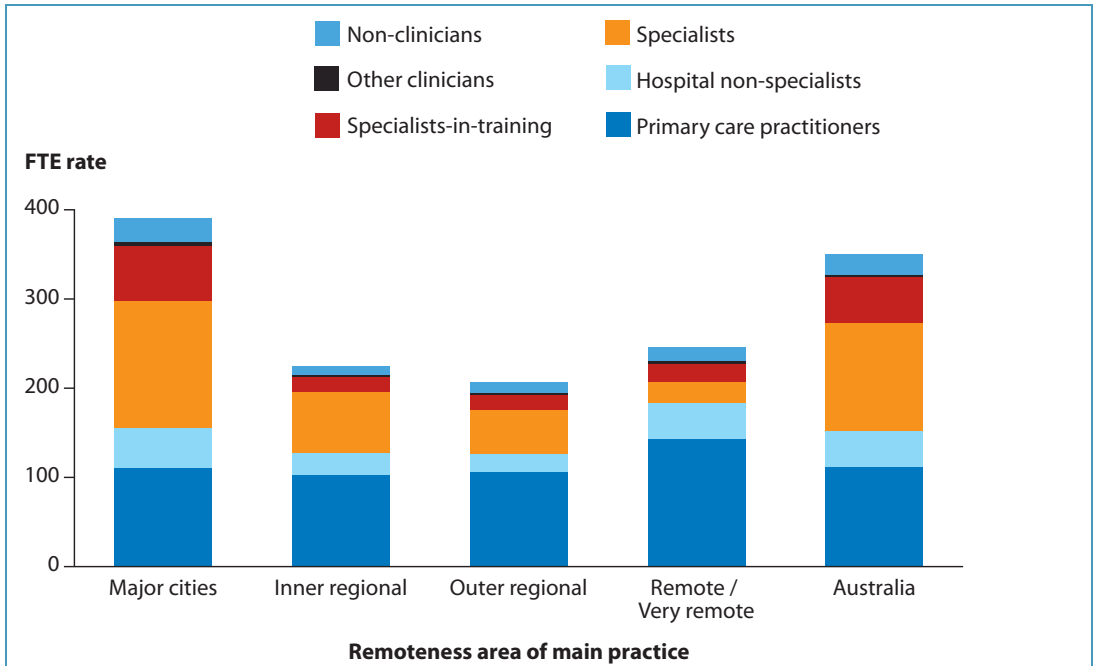
(c) FTE number per 100,000 population.

(d) Based on the ABS Remoteness Area classification. Other areas include *Inner regional*, *Outer regional*, *Remote*, *Very remote* and *Migratory* areas of Australia.

Source: AIHW Medical Labour Force Survey, 1999 and 2009.

Figure 9.3: Employed medical practitioners, selected characteristics, 2009





Note: FTE rate (number of FTE medical practitioners per 100,000 population) is based on a standard full-time working week of 40 hours.
 Source: AIHW Medical Labour Force Survey 2009.

Figure 9.4: Employed medical practitioners, FTE rate by remoteness area and occupation, 2009

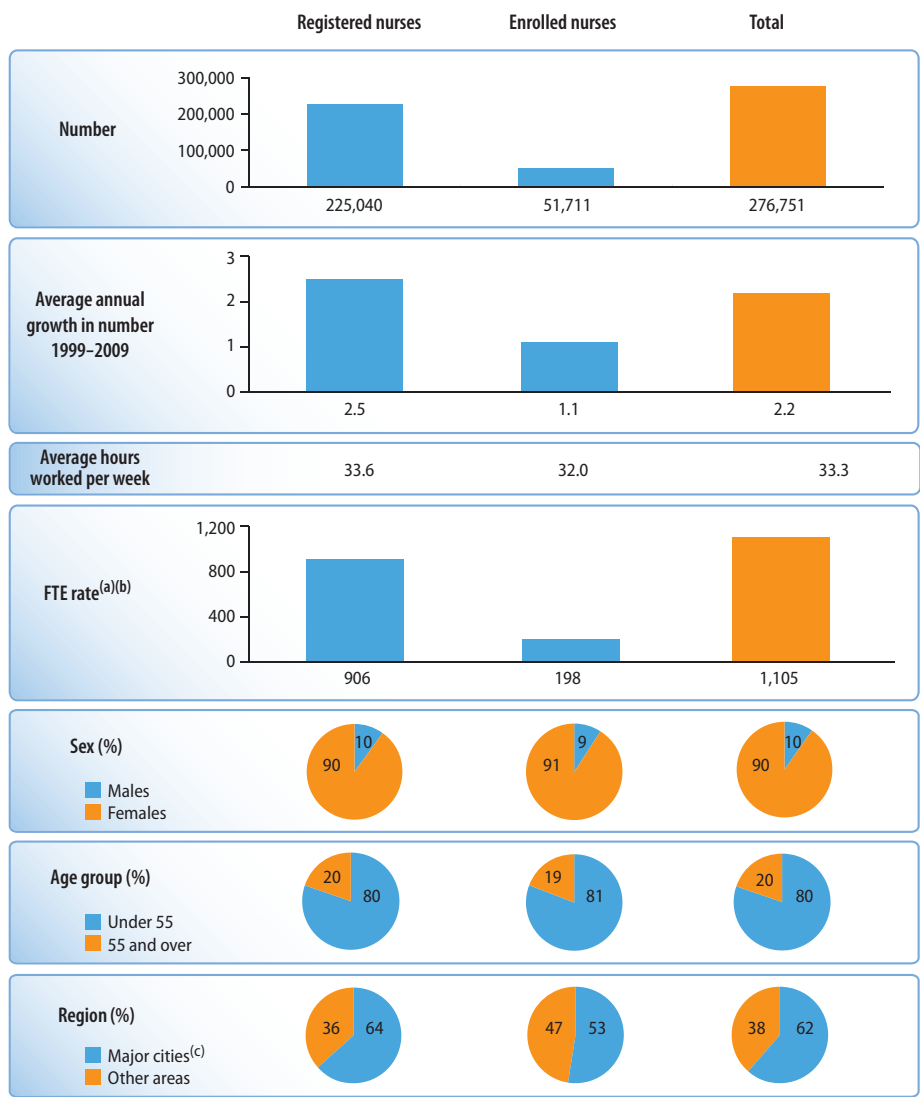
Nursing and midwifery workforce

There are two main types of nurses: registered and enrolled. In 2009, registered nurses made up 81% of the nursing labour force. Enrolled nurses typically work alongside registered nurses to provide basic nursing care, undertaking less complex tasks.

In 2009 there were 321,000 nurses registered or enrolled to practise, of whom 86% were employed in nursing (AIHW 2011b). The supply of employed nurses was highest in *Very Remote* areas (1,240 FTE nurses per 100,000 population) and lowest in *Major cities* (997).

Between 1999 and 2009, the number of employed nurses increased by 23%, which equates to an average annual change of 2.2% (Figure 9.5). Over this period, there was a 25% increase in the number of employed registered nurses and a 14% increase in the number of employed enrolled nurses. Nationally, the supply of employed nurses increased 15% between 1999 and 2009, rising from 957 FTE nurses per 100,000 population to 1,105 (Figure 9.5).





(a) Based on a full-time working week of 38 hours.

(b) FTE number per 100,000 population.

(c) Based on the ABS Remoteness Area classification. Other areas include *Inner regional, Outer regional, Remote, Very remote* and *Migratory* areas of Australia.

Source: AIHW Nursing and Midwifery Labour Force Survey, 1999 and 2009.

Figure 9.5: Employed registered and enrolled nurses, selected characteristics, 2009



Dental workforce

The dental workforce comprises dentists, dental therapists, hygienists and prosthetists. There are increasing numbers of dental hygienists and therapists who are eligible to practise in either role and are referred to as dual-registered practitioners or oral health therapists.

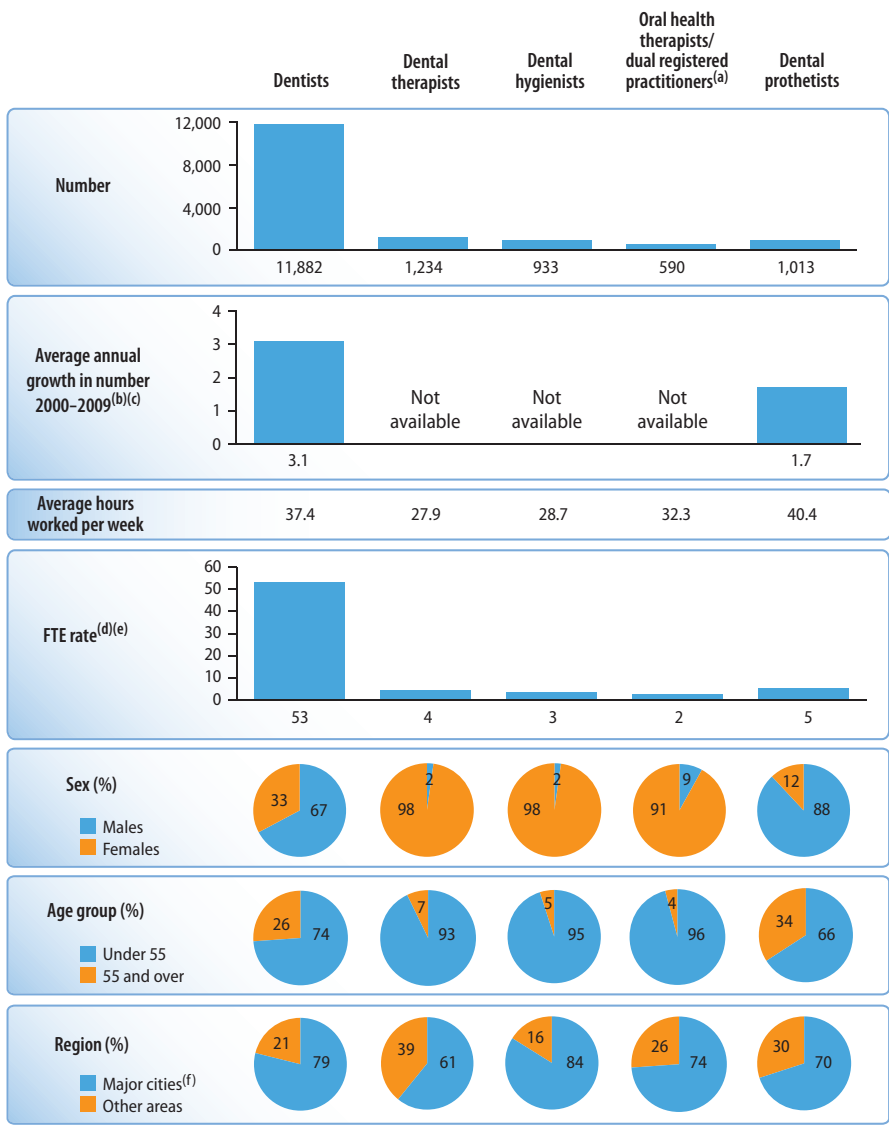
In 2009, about 11,900 dentists were employed in Australia, a 32% increase since 2000, which represents a 3% average annual change (Figure 9.6). On the other hand, average hours worked has dropped from 39.3 per week in 2000 to 37.4 in 2009. This resulted in a small increase in the supply, from 49 to 53 FTE dentists per 100,000 population over the same period (Chrisopolous & Nguyen 2012).

Between 2000 and 2009, the number of employed dental prosthetists increased by 16%, while supply remained steady at 5 FTE prosthetists per 100,000 population due to a decrease in average weekly hours worked (from 42.6 to 40.4).

In 2009, 33% of employed dentists were female; dentists were on average 45.2 years old and worked 37.4 hours per week (Figure 9.6). Dental therapists, dental hygienists and oral health therapists/dual-registered practitioners were overwhelmingly female (98%, 98% and 91% respectively). Dental therapists and dental hygienists worked similar average hours per week (27.9 and 28.7 hours respectively), while oral health therapists/dual registered practitioners worked a longer week on average (32.3 hours).

The distribution of the dental labour force varied with geographic remoteness: in 2009, dentists were concentrated in *Major cities*, where the supply (62 FTE dentists per 100,000 population) was more than twice the rate in *Remote/Very remote* areas (24 per 100,000). Dental hygienists had a similar distribution to dentists. In contrast, dental therapists were more evenly spread across remoteness area categories.





(a) From 2006 dual-registered therapists and hygienists were reported as a separate labour force group. Dual-registered practitioners may practise in both clinical capacities or may be working principally as a hygienist or as a therapist. A dual-qualified allied practitioner, if not working in both clinical capacities, may choose not to register as both a hygienist and therapist in their state or territory of practice. Therefore, estimates do not include allied practitioners who were dual-qualified but only maintained one registration type.

(b) Average annual rate of change cannot be calculated for oral health therapists/dual-registered practitioners due to no data being available for 2000. Dual-registered practitioners were reported in both dental therapist and dental hygienist labour force groups.

(c) Average annual rate of change cannot be calculated for dental therapists and dental hygienists due to dual-registered practitioners being reported in both groups in 2000.

(d) Based on a standard full-time working week of 38 hours.

(e) FTE number per 100,000 population.

(f) Based on the ABS Remoteness Area classification. Other areas include *Inner regional, Outer regional, Remote, Very remote* and *Migratory* areas of Australia.

Source: AIHW DSRU Dental Labour Force data collection, 2000 and 2009.

Figure 9.6: Employed dental workforce, selected characteristics, 2009



Allied health workforce

The allied health workforce in this section includes chiropractors, optometrists, osteopaths, pharmacists, physiotherapists, podiatrists and psychologists, to align with the health professions covered by the NRAS. There were 91,300 people registered as allied health practitioners at 30 June 2011. They represented 17% of the total number of health professionals registered under the NRAS.

Given the lack of AIHW health labour force survey data for these professions, data have been drawn from the ABS Labour Force Survey and the NRAS data, where available (see Box 9.2).

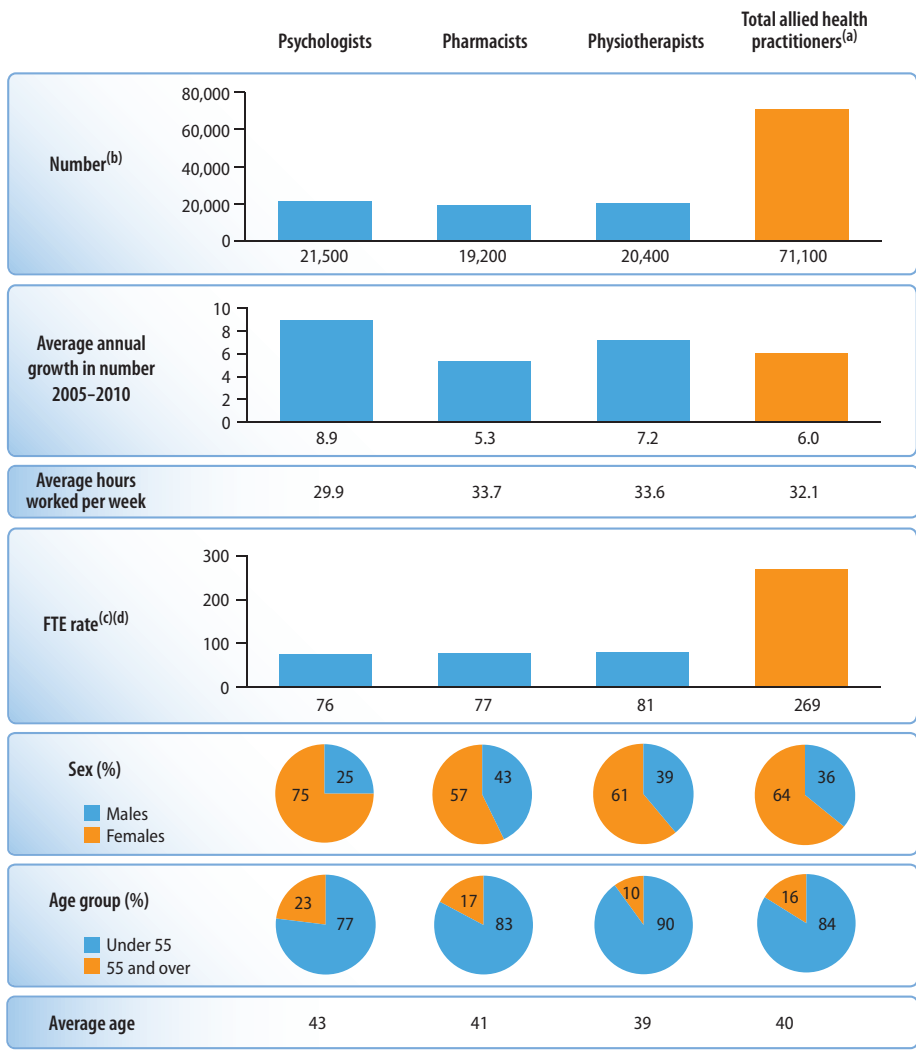
Pharmacists and psychologists were the largest groups of registered allied health practitioners at 30 June 2011, each accounting for 5% of all registered practitioners, followed by physiotherapists (4%) (AHPRA 2011).

In 2010, there were 71,100 employed allied health practitioners in Australia, working on average 32.1 hours a week. The female share of the workforce was 64% and the average age was 40 in 2010 (Figure 9.7). Between 2005 and 2010, the supply of employed allied health practitioners increased by almost 16%, from 233 to 269 FTE practitioners per 100,000 population.

Employed psychologists grew in number by 53% between 2005 and 2010, from 14,100 to 21,500, which equates to an average annual growth of 9%. This large increase contributed to the rise in supply from 59 to 76 FTE employed psychologists per 100,000 population. The proportion of employed psychologists who were female decreased from 79% in 2005 to 75% in 2010; over the same period the share of employed psychologists aged 55 or older increased from 17% to 23% (Table 9.3 in 'Section 9.1 About the health workforce').

Between 2005 and 2010, employed pharmacists increased in number by 30%, from 14,800 to 19,200. The supply increased from 67 to 77 FTE employed pharmacists per 100,000 population, despite a decrease in average weekly hours worked (35.1 to 33.7 hours) over the same period. The proportion of the workforce aged 55 or older halved from 34% in 2005 to 17% in 2010 (Table 9.3 in 'Section 9.1 About the health workforce').





(a) Total allied health practitioners also includes chiropractors, optometrists, osteopaths and podiatrists.

(b) Figures shown are averages of the number employed in February, May, August and November.

(c) Based on a standard full-time working week of 38 hours.

(d) FTE number per 100,000 population.

Source: Unpublished data from ABS Labour Force Survey, 2010; AHPRA 2011.

Figure 9.7: Selected employed allied health practitioners, selected characteristics, 2010

Aboriginal and Torres Strait Islander health workers

National registration of Aboriginal and Torres Strait Islander health workers is scheduled to begin on 1 July 2012.

The ABS Census of Population and Housing is the primary source of information about people who work in the occupation of Aboriginal and Torres Strait Islander health worker; that is, a person whose job is to liaise with patients, clients and visitors to hospitals and health clinics and to work as a team member to arrange, coordinate and provide health-care delivery in Aboriginal and Torres Strait Islander community health clinics. Information presented here is based on the 2006 Census, the most recent Census data available (see Box 9.2).

There were 1,012 Aboriginal and Torres Strait Islander health workers in 2006, representing 0.2% of the total health workforce. This was equivalent to 5 workers per 100,000 population, which remained unchanged from 2001 (AIHW 2009).

Seven in 10 (70%) Aboriginal and Torres Strait Islander health workers were female and the average age was 40. About half (45%) of these workers live in Queensland or the Northern Territory, with near equal numbers in both jurisdictions (234 and 226 respectively) (AIHW 2009). Fewer than 1 in 10 (9%) workers held a bachelor or higher degree. Nearly half (45%) had an advanced diploma, diploma or certificate as their highest level of qualification, with the majority of these holding a certificate-level qualification (AIHW 2009).

What is missing from the picture?

Detailed information for many health professions, particularly the smaller professions like the allied health practitioners and Aboriginal and Torres Strait Islander health workers, has not been available on a regular basis. One source of information that includes these smaller professions is the ABS Census of Population and Housing; however, these data are only available for Census years (see Box 9.2), with data from the 2011 Census expected to be available from the ABS from late 2012.

The AIHW health labour force surveys have traditionally focused on the medical, nursing and dental workforces (see Box 9.2). However, with the introduction of the NRAS, data on all registered professions will become available annually in future years.

Where do I go for more information?

For more information on key professions in the health workforce, see the AIHW's workforce publications on the AIHW website < www.aihw.gov.au/workforce-publications >.

AHPRA is an independent statutory agency that administers the receipt and processing of applications for registrations and maintains a public register of registered health practitioners. AHPRA supports the national health practitioner boards that are responsible for regulating the health professions in the NRAS, see <www.ahpra.gov.au>.



9.3 Who is joining the health workforce? Who is leaving?

At a glance

- Between 2005 and 2010, there was a 37% increase in the number of people completing health occupation university courses.
- The profile of the health workforce continues to age—in 2010, 19% of the workforce was aged 55 and over compared with 15% in 2005, and the health workforce is ageing faster than the non-health workforce.
- In 2009, 25% of medical practitioners and 15% of nurses employed in Australia reported being trained in another country.



Introduction

The health workforce is a dynamic pool of workers with large numbers of individuals entering, leaving and returning over time. These flows can have major implications for planning and need to be monitored and adjusted to ensure there is an adequate workforce to sustain health-care delivery.

New entrants to the workforce are mainly from the education system and skilled immigration.

Departures include resignations, retirements, migration and deaths. Three aspects of supply are examined here in further detail: the number of students completing health-related higher education and vocational training, the number of health workers who are likely to retire soon from the workforce, and the number of health workers joining the workforce from overseas or leaving Australia.

What do we know about changes to Australia's health workforce supply?

How many people are completing health courses?

For most health professions, graduation from a relevant university course is a requirement to practise. Accordingly, Australian residents completing health-related higher education courses each year are an important source of entrants into these occupations.

Between 2005 and 2010, there was an overall increase of 37% in those completing such courses (Table 9.4). Increases were recorded for all health fields, except speech pathology/audiology (a decrease of 2%). The largest growth occurred in the fields of dental studies (up 91%), and medical studies (66%). The smallest increases were for occupational therapy and complementary therapies (both 9%).



Table 9.4: Completions of selected health-related higher education courses^(a) by Australian citizens and permanent residents, 2005 and 2010

Field	2005			2010			Change in number 2005–2010 (per cent)
	Number	Female (per cent)	Under-graduate ^(b) (per cent)	Number	Female (per cent)	Under-graduate ^(b) (per cent)	
Medical studies ^(c)	2,158	56.8	62.8	3,579	54.8	72.6	65.8
Nursing	8,822	89.4	67.5	12,159	89.2	63.4	37.8
Pharmacy	1,009	66.1	85.0	1,427	64.2	76.7	41.4
Dental studies	383	58.5	80.2	731	66.6	80.3	90.9
Optometry	156	59.6	55.1	191	59.7	53.9	22.4
Public health ^(d)	2,113	69.9	34.9	2,513	69.7	35.3	18.9
Radiography	814	66.5	77.0	942	68.2	58.5	15.7
Physiotherapy	896	67.2	72.4	1,267	60.9	66.1	41.4
Occupational therapy	833	91.4	83.2	908	90.2	86.1	9.0
Speech pathology/audiology	529	93.8	73.3	519	90.8	69.2	-1.9
Podiatry	138	64.5	94.2	205	59.5	92.7	48.6
Rehabilitation therapies ^(e)	839	68.8	52.4	1,017	62.7	43.3	21.2
Complementary therapies ^(f)	458	72.5	81.0	498	79.3	82.1	8.7
Nutrition and dietetics	448	90.6	68.1	701	90.4	67.9	56.5
Other health ^(g)	2,440	56.4	81.3	3,620	59.9	80.7	48.4
Total	21,810	76.0	67.2	29,824	75.2	65.4	36.7

(a) Health-related courses are defined as those in the Field of Education Classification of Health (06), excluding veterinary science.

(b) Includes bachelors (graduate entry, honours, pass), associate degree, advanced diploma, diploma, other undergraduate award.

(c) Includes general medicine, surgery, psychiatry, obstetrics and gynaecology, paediatrics, anaesthesiology, pathology, radiology, internal medicine, general practice and medical studies not elsewhere classified.

(d) Includes public health, occupational health and safety, environmental health, Indigenous health, health promotion, community health, epidemiology and public health not elsewhere classified.

(e) Includes chiropractic and osteopathy, massage therapy and rehabilitation therapies not elsewhere classified.

(f) Includes naturopathy, acupuncture, traditional Chinese medicine and complementary therapies not elsewhere classified.

(g) Includes human movement, paramedical studies, first aid and health not elsewhere classified.

Source: DEEWR Higher Education Student Data Collection.



For the health trades—such as enrolled nurse, dental assistant, medical technician—completion of a relevant vocational training course is a requirement before beginning work in the area. Accordingly, Australian residents completing health-related vocational education and training (VET) courses each year are an important source of entrants into these occupations.

In 2009, there were 12,815 completed health-related VET courses (Table 9.5). Most completions were in the fields of nursing support and personal care (47%) and enrolled and mothercraft nursing (30%). Data for 2005 for the VET courses are not available, so it is not possible to highlight recent trends.

Table 9.5: Completions and number of students in selected health-related VET courses, by field of study^(a), 2009 and 2010

Field of study	2009 completions	2010 students		
		Number	Female (per cent)	Rural/remote localities ^(b) (per cent)
Counsellors	180	1,130	66.7	24.8
Dental assistants	1,477	2,997	98.0	1.7
Dental hygienists, technicians and therapists	321	1,238	44.3	8.5
Enrolled and mothercraft nurses	3,875	17,911	86.6	18.3
Indigenous health workers	326	1,386	67.2	69.1
Medical technicians	636	1,753	82.8	4.4
Nursing support and personal care workers	5,999	16,353	79.8	26.5
Psychologists	—	25	84.0	—
Social workers	1	86	67.4	19.8
Total	12,815	42,879	82.2	22.6

(a) Field of study describes the intended occupational outcome after course completion. Fields are classified using the Australian and New Zealand Standard Classification of Occupations (ABS 2006a).

(b) Based on the combined Remoteness Area classifications *Outer regional, Remote and Very remote*.

Source: AIHW analysis of NCVER National VET Provider Collection data, 2009 and 2010.

How many health workers will be retiring from the workforce?

The main reason for permanent loss from the health workforce is the retirement of older workers (although considerable ‘churn’ among younger age groups is also likely to occur). Older people do not leave the workforce in a steady stream—the pattern of exits depends on the age profile of the workforce and other factors, such as the desire for early retirement and whether or not the worker can afford to retire.



As with the Australian population and the overall labour force, the health workforce has been ageing; that is, larger proportions of the workforce are in older age groups than previously because of the progression of the large post-war 'baby boom' cohort through the age groups. For example, in 2010, 19% of the health workforce was aged 55 or older, compared with 15% in 2005, and the proportion is expected to rise over the next few years. The health workforce is ageing faster than the non-health workforce, for which the proportion aged 55 or older rose from 14% in 2005 to 16% in 2010 (see 'Section 9.1 About the health workforce').

While many health workers are replaced by new entrants, the rate of workforce replacement is not keeping up with the increased demand for health-care services as a result of the ageing population (see 'Section 9.4 Does Australia have enough health workers?').

What is the effect of international migration on the health workforce?

Migration to Australia has contributed greatly to the Australian health workforce, with 1 in 3 (32%) health workers in 2006 born outside Australia (AIHW 2009). Further, in 2009, 25% of medical practitioners and 15% of nurses and midwives employed in Australia were trained outside Australia (AIHW 2011a, 2011b).

Overseas-trained practitioners typically obtain their registration to practise in Australia via a temporary visa that allows supervised practise and formal assessment. Temporary visas (categories 422, 442 and 457) granted to overseas-trained medical practitioners peaked at 4,930 in 2007–08 before falling to 3,190 in 2009–10 (HWA 2011c).

A small proportion of Australian-registered health practitioners work overseas. In 2009, an estimated 4% of medical practitioners and 1% of nurses and midwives registered in Australia worked overseas (AIHW 2011a, 2011b).

What is missing from the picture?

Not all elements of workforce supply can be accurately measured. For example, the data on temporary visas for health workers cannot show what proportion of visa holders work as health workers. Similarly, data on those aged 55 and over are presented as a proxy for likely retirements, when data on actual retirements would be more accurate. The introduction of the National Registration and Accreditation Scheme in 2010 means that these data will be able to be sourced with greater accuracy in future years.

Where do I go for more information?

The AIHW publication *Health and community services labour force 2006* provides an overview of the entire health workforce, including information on age, qualifications and country of birth (AIHW 2009), see <www.aihw.gov.au/publication-detail/?id=10737420243>.

The DoHA publication *Medical Training Review Panel: fourteenth report* (DoHA 2011) contains detailed information and analyses of medical practitioner migration and training in Australia, see <www.health.gov.au/internet/main/publishing.nsf/Content/work-pubs-mtrp-14>.

The HWA publication *Australian health workforce series—doctors in focus 2011* (HWA 2011c) presents a broad range of education and migration statistics on medical practitioners.



9.4 Does Australia have enough health workers?

At a glance

- The supply of health workers in Australia increased by 14% between 2005 and 2010; rising from 2,453 to 2,794 full-time equivalent workers per 100,000 population.
- Compared with countries with similar economies, Australia has a high number of medical practitioners and nurses and a similar number of dentists relative to population.
- Employers of health workers across Australia report workforce shortages and recruitment difficulties for many health professions.



Introduction

Access to timely and appropriate health care is essential to a healthy life. Due to its nature, health care depends heavily on access to a skilled workforce. The challenge for the health sector is to attract, train and retain a supply of suitably skilled health workers that is sufficient to respond to the demand for health care.

Assessing the underlying level of demand for health care and determining the necessary supply of health workers is not straightforward and requires monitoring of many factors, including the introduction of new treatment approaches, changes in disease prevalence, and shifts in work patterns. Australia's planned approach for tracking health workforce demand and supply and the associated reform agenda to ensure sustainability are outlined in the National Health Workforce Innovation and Reform Strategic Framework for Action 2011–2015 (HWA 2011d).

This section examines available data that give an indication of the adequacy of Australia's supply of health workers.

What do we know about the adequacy of Australia's supply of health workers?

Is supply increasing?

Between 2005 and 2010, average hours worked in health occupations reduced from 31.3 to 30.9. In terms of FTEs (see Box 9.3 in 'Section 9.2 Key health professions'), the rate of the health workforce overall increased by 14% between 2005 and 2010 (from 2,453 to 2,794 per 100,000 population). The greatest increases in FTE rates between 2005 and 2010 were for podiatrists (44%), social workers (41%), other health workers (35%) and physiotherapists (32%) (Table 9.6).



Change over time in the number of nurses and midwives and medical practitioners is a national performance indicator, and is presented here as 'Net growth in health workforce'.

Net growth in health workforce. The change over time in the full-time equivalent number of people employed in selected health workforce professions.



- There were about 76,700 medical practitioners (FTE) and 242,500 nurses and midwives (FTE) in 2009.
- The medical practitioner workforce grew by 1.3% from 2007 to 2008, and 4.7% from 2008 to 2009—overall, by 6.0% from 2007 to 2009.
- The nursing and midwifery workforce grew by 5.1% between 2007 and 2009.
- Net growth in both professions exceeded the population growth rate between 2007 and 2009 (4.1%).

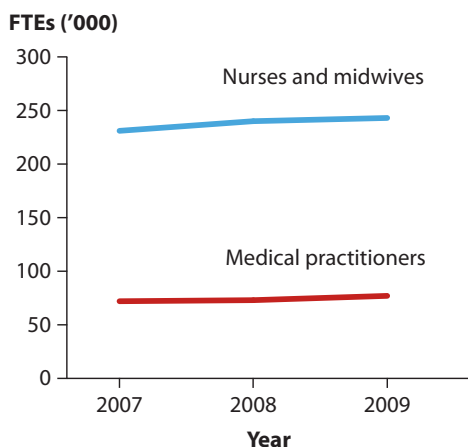


Table 9.6: People employed in health occupations: average hours worked per week and FTE rate^(a), 2005 and 2010

Occupation	2005		2010		Change in FTE rate 2005–2010 (per cent)
	Average hours worked per week	FTE rate ^(b)	Average hours worked per week	FTE rate ^(b)	
Generalist medical practitioners ^(c)	39.9	181.8	38.2	190.9	9.1
Specialist medical practitioners ^(d)	42.7	114.6	41.9	137.5	22.8
Medical imaging professionals	33.9	46.9	34.6	58.6	11.7
Dental practitioners	38.3	48.7	34.0	46.0	-2.6
Dental associate professionals and assistants ^(e)	30.2	89.8	30.4	96.9	7.1
Midwifery and nursing professionals ^(f)	28.5	723.4	28.2	786.2	62.8
Enrolled and mothercraft nurses	27.6	115.1	28.8	102.5	-12.6
Nursing and personal care assistants ^(g)	27.3	252.2	26.8	258.8	6.6

(continued)



Table 9.6 (continued): People employed in health occupations: average hours worked per week and FTE rate^(a), 2005 and 2010

Occupation	2005		2010		Change in FTE rate 2005–2010 (per cent)
	Average hours worked per week	FTE rate ^(b)	Average hours worked per week	FTE rate ^(b)	
Nursing and personal care assistants ^(g)	27.3	252.2	26.8	258.8	6.6
Allied health workers					
Optometrists ^(h)	34.1	16.2	30.1	7.8	-8.4
Pharmacists ⁽ⁱ⁾	35.1	67.2	33.7	76.5	9.3
Chiropractors and osteopaths	37.9	20.7	26.5	15.4	-5.2
Chiropractors	n.a.	n.a.	27.3	12.2	..
Osteopaths	n.a.	n.a.	23.6	3.3	..
Physiotherapists	32.9	61.1	33.6	80.8	19.7
Podiatrists	32.9	8.8	38.0	12.7	4.0
Psychologists	32.4	58.8	29.9	75.8	17.1
<i>Total allied health workers</i>	<i>33.9</i>	<i>232.7</i>	<i>32.1</i>	<i>269.1</i>	<i>36.4</i>
Complementary therapists ^(j)	26.0	71.1	21.8	68.9	-2.2
Social workers	31.8	53.9	31.6	76.1	22.2
Other health workers ^(k)	33.9	507.6	33.4	685.1	177.6
<i>Total health workers</i>	<i>31.3</i>	<i>2,453.3</i>	<i>30.9</i>	<i>2,793.9</i>	<i>340.7</i>
Other occupations	34.9	42,120.5	34.3	42,311.9	191.4
Total occupations	34.7	44,572.8	34.1	45,104.0	531.2

(a) Based on a full-time working week of 38 hours for all occupations except generalist medical practitioners and specialist medical practitioners, which are based on a full-time working week of 40 hours.

(b) FTE number per 100,000 population.

(c) Includes medical practitioners not further defined (nfd).

(d) Includes anaesthetists, internal medicine specialists, psychiatrists, surgeons, other specialist medical practitioners.

(e) Includes dental hygienists, technicians and therapists, dental assistants.

(f) Includes midwifery and nursing professionals nfd, midwives, nurse educators and researchers, registered nurses.

(g) Includes personal carers and assistants nfd, nursing support and personal care workers.

(h) In 2005, optometrists could not be identified separately. Data reported for 2005 include orthoptists. Data for 2010 exclude orthoptists, which are included in 'Other health workers'.

(i) Includes retail pharmacists.

(j) Includes health therapy professionals nfd, complementary health therapists, massage therapists, personal care consultants.

(k) In 2010, other health workers include health professionals nfd, health and welfare services managers, nurse managers, medical laboratory scientists, occupational and environmental health professionals, other health diagnostic and promotion professionals, medical technicians, ambulance officers and paramedics, diversional therapists, counsellors, Aboriginal and Torres Strait Islander health workers, dietitians, occupational therapists, speech professionals and audiologists, and orthoptists. In 2005, orthoptists are included with 'Optometrists'.

Note: Data shown are averages over four quarters in the calendar year (February, May, August, November).

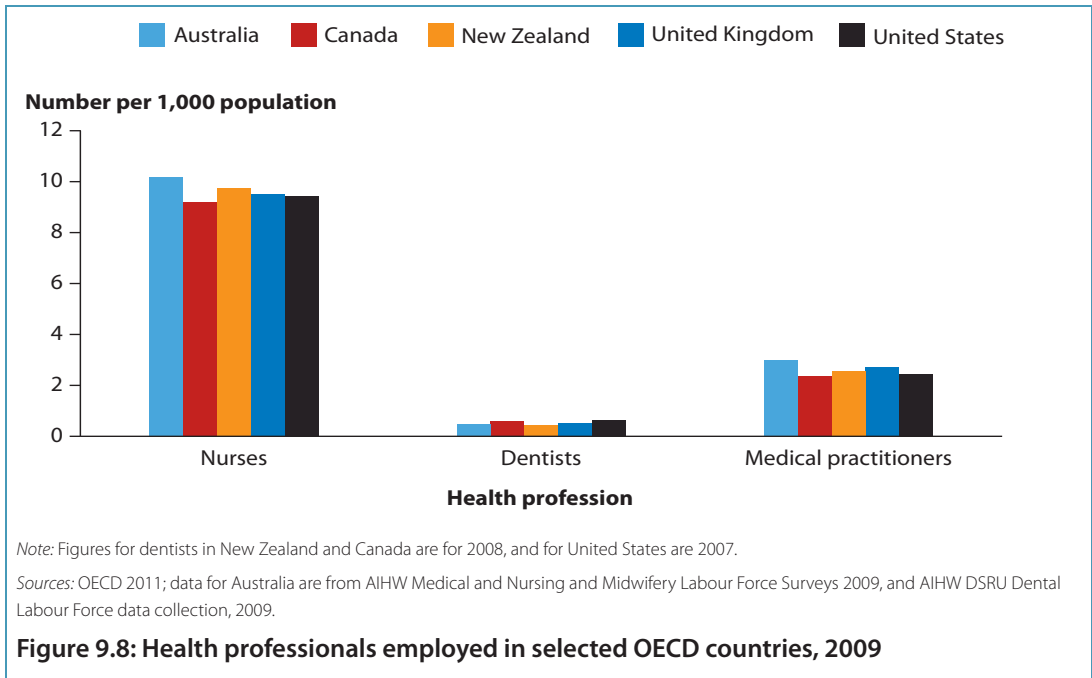
Source: Unpublished data from ABS Labour Force Survey, 2005 and 2010.



How does Australia's health workforce compare with other OECD countries?

The OECD health database includes information on the supply of key health professions in member countries, including those with economies and health systems most similar to Australia—New Zealand, Canada, the United States and the United Kingdom. In 2009, relative to population, Australia had higher numbers of medical practitioners and nurses, but similar numbers of dentists, compared with the other four countries (Figure 9.8).

Of all OECD countries with comparable data, Australia ranked 7th for medical practitioners, 13th for nurses and 18th for dentists (out of 24, 23 and 21 countries, respectively).



Identified health workforce shortages

For each state and territory, the Department of Education, Employment and Workplace Relations produces a list of occupations where skill shortage or recruitment difficulties exist, based on labour market research (DEEWR 2011).

Skill shortages or difficulties with recruitment were identified in most states and territories for all the health occupations included in the labour market research program in 2010–11, except for medical diagnostic radiographers and medical radiation therapists (Table 9.7). For midwives and physiotherapists, a shortage or recruitment difficulty was reported for all states and territories.

Several smaller health occupations were included in the research, but were only presented at the national level. Optometrists, podiatrists and psychologists were found to be in shortage nationally and social workers were in shortage in regional areas nationally.

Medical practitioners were not included in the research, although studies have shown a continuing overall shortage in Australia (AMWAC 2005; Joyce et al. 2006; National Health Workforce Planning and Research Collaboration 2010).



Table 9.7: Skills in demand, health occupations, states and territories, 2010–11

Occupation ^(a)	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Enrolled nurse	S	S	SR	S	*	*	S	S
Medical diagnostic radiographer	*	S	*	*	*	D	S	*
Medical radiation therapist	*	*	*	*	*	*	S	*
Midwife	S	S	S	R;D-M	R	S	S	S
Occupational therapist	R	D	S	*	*	S	S	*
Physiotherapist	S	D	R	S	S	S	S	D
Registered nurse	S	D	S	R;D-M	*	S	S	S
Sonographer	S	S	S	S	*	*	S	*
Speech pathologist	R;D-M	D	S	S	*	S	*	S

(a) Occupation is based on the Australian and New Zealand Standard Classification of Occupations.

Notes

- Only occupations that attract 60 points on the Department of Immigration and Citizenship Skilled Occupations List and have more than 1,500 workers employed nationally (based on 2006 Census data) are assessed (DEEWR 2011).
- S state-wide shortage
 - R shortage in regional areas
 - D state-wide recruitment difficulty
 - D-M recruitment difficulty in metropolitan (capital city) areas
 - * no shortage assessed.

Source: DEEWR 2011.

What is missing from the picture?

This section presents several measures of health workforce adequacy focusing on the supply of workers. A full assessment of the adequacy of the Australian health workforce requires a comparison between the supply of health workers and the demand for health care. The demand for health care in Australia is understood to be increasing due to the growth and ageing of the population, changes in the patterns of disease, growing focus on preventive care, and changing consumer expectations (NHWT 2009).

HWA is currently modelling the demand for different types of health care and projecting the workforce required to meet this demand under the National Training Plan (HWA 2011b).

Where do I go for more information?

The National Health Workforce Taskforce publication *Health workforce in Australia and factors for current shortages* provides an overview of the Australian health workforce and the drivers behind shortages (NHWT 2009), see <www.ahwo.gov.au/publications.asp>.

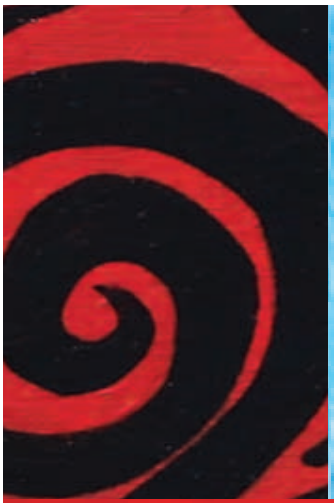
The WHO publication *World health report 2006—working together for health* contains detailed information and analyses of international health practitioner supply (WHO 2006), see <www.who.int/whr/2006>.



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Australia's health is supported by a vast collection of research activities, information and data developments and technological improvements. These are essential to help understand and improve health among Australians.

This chapter examines health and medical research, health information development, and the information needs associated with health reform. New to the 2012 edition, e-health is discussed in terms of its potential to change the collection of health information and the delivery of health care.

CHAPTER 10

SUPPORTING AUSTRALIA'S HEALTH: RESEARCH AND INFORMATION



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10.1 Health and medical research

At a glance

- Over the past 70 years, six Australians have been awarded Nobel Prizes for their achievements in health and medical research.
- Health research expenditure comprises 14% of all research and development (R&D) expenditure in Australia, and this figure has been climbing over the past two decades.
- The AIHW contributes to the health and medical research effort by analysing and reporting on data, making data holdings available to other researchers, and developing and promoting information standards for the health sector.

Introduction

Health and medical research strives to build our knowledge about health and disease and use this knowledge to improve people's health throughout their lives. It aims to answer questions such as:

- What goes wrong when ill health and other medical problems occur?
- How can we effectively prevent, treat and manage health conditions?
- What is the most effective and efficient way to plan, resource and deliver health services and programs?
- How do health problems affect communities or particular population groups?

These questions may be tackled from a number of angles, ranging from basic science to evaluation of health promotion programs (see Box 10.1). Research may be conducted by medical research institutes, universities, hospitals and health services (including individual clinical practices), pharmaceutical and biotechnology companies, government agencies and health interest groups. It is frequently a collaborative endeavour, with national and international networks working together or sharing facilities and expertise.

To be useful, research findings need to be translated into action and applied to real life, for example, by creating a new medicine that is safe and effective, or by devising a way to help people change a risky behaviour. Many of the funding and infrastructure programs outlined in this section focus on such 'translational' research, and the research also has implications for service planning and support.

Health and medical research is conducted in the context of a wider R&D program in Australia, and aligns with one of four National Research Priorities (DIISR 2011a) introduced by the Australian Government in 2002. These are:

- an environmentally sustainable Australia
- promoting and maintaining good health
- frontier technologies for building and transforming Australian industries
- safeguarding Australia.

A fifth area of research—understanding cultures and communities—was suggested in the *Exposure draft of the 2011 strategic roadmap for Australian research infrastructure* (DIISR 2011b).



Box 10.1: Types of health and medical research

Researchers may work on **basic scientific research**, studying molecules and cells in the laboratory to understand the essence of living organisms.

Applied clinical research may convert laboratory discoveries to direct patient care or may develop and trial new patient care procedures and treatments. Note that clinical trials of new diagnostic tools and treatments must comply with government regulation and medical review and approval processes.

Development of new pharmaceuticals and therapeutic devices and interventions is a process with a long lead time (taking on average 15 years), and also subject to regulation and approval processes.

Health services research is a multi-disciplinary research activity that aims to improve the health services patients receive. It uses theories of human behaviour from other disciplines, along with evidence from the medical sciences, to generate and test hypotheses about the delivery of health care. A subset of this, **public health research**, is the development, implementation and evaluation of new public health programs or population-based interventions. This may apply discoveries from basic science, clinical studies or epidemiological research.

Source: Adapted from Research Australia 2011a and Health Services Research Association 2009.

What do we know about health and medical research in Australia?

A significant global contribution

To date, major achievements have been made in health and medical research in Australia, including important medical developments such as penicillin, cochlear implants (also referred to as the bionic ear), and 'spray-on' skin (see Box 10.2). Access Economics (2008) estimates that Australia produces about 3% of global health research, despite comprising only 0.3% of the world population.

How much is spent on research?

In 2008–09, health and medical research expenditure was \$4.0 billion, or 14% of the overall R&D expenditure in Australia (ABS 2010). Spending on health R&D increased nearly sevenfold from 1992–93 to 2008–09, or an annual average of 12% (Figure 10.1). As a proportion of GDP, it rose from 0.3% in 1992–93 to 1.3% in 2008–09.

Most of the growth occurred in the higher education sector, which spent \$0.3 billion in 1992–93 and \$2.3 billion in 2008–09. Health R&D expenditure as a proportion of total R&D expenditure has grown at an annual rate of 3% over the same period.

Health and medical research accounted for 92% of overall R&D expenditure in the private non-profit sector in 2008–09. Health was also the single largest area of research expenditure in the higher education sector, at 35% (ABS 2010).



Box 10.2: Selected Australian health and medical research achievements

(♦ denotes Nobel Prize awarded)

- 1915–17 Aspro, a tablet form of aspirin, invented by the chemist George Nicholas.
- 1926 Electronic heart pacemaker developed at Sydney's Crown Street Women's Hospital.
- 1930s Humidicrib invented by Edward and Don Both.
- 1945 ♦ Sir Howard Florey awarded the Nobel Prize for his work on the life-saving application of penicillin.
- 1948 Use of lithium in the treatment of bipolar disorder and similar mental disorders discovered by John Cade
- 1960 ♦ Sir Frank MacFarlane Burnet awarded the Nobel Prize for his work on immunity.
- 1963 ♦ Sir John Carew Eccles awarded the Nobel Prize for his work on nerve cell physiology.
- 1978 First cochlear implant implanted, led by Graeme Clark.
- 1982 ♦ The role of the bacterium *Helicobacter pylori* in causing stomach ulcers and gastritis discovered by Barry Marshall and Robin Warren.
- 1996 ♦ Peter Doherty awarded the Nobel Prize for his work on immunity.
- 1999 Zanamivir (marketed as Relenza) released as first anti-influenza drug—developed in 1989 by scientists led by Mark von Itzstein.
- 2002 Spray-on skin used for burns victims of the Bali terrorist bombings—developed by Fiona Wood.
- 2006 Vaccine to prevent cervical cancer released under the name Gardasil—developed by Ian Frazer during the 1990s.
- 2009 ♦ Elizabeth Blackburn awarded the Nobel Prize for her work on chromosomes.

Sources: NHMRC 2011a; White Hat 2011.

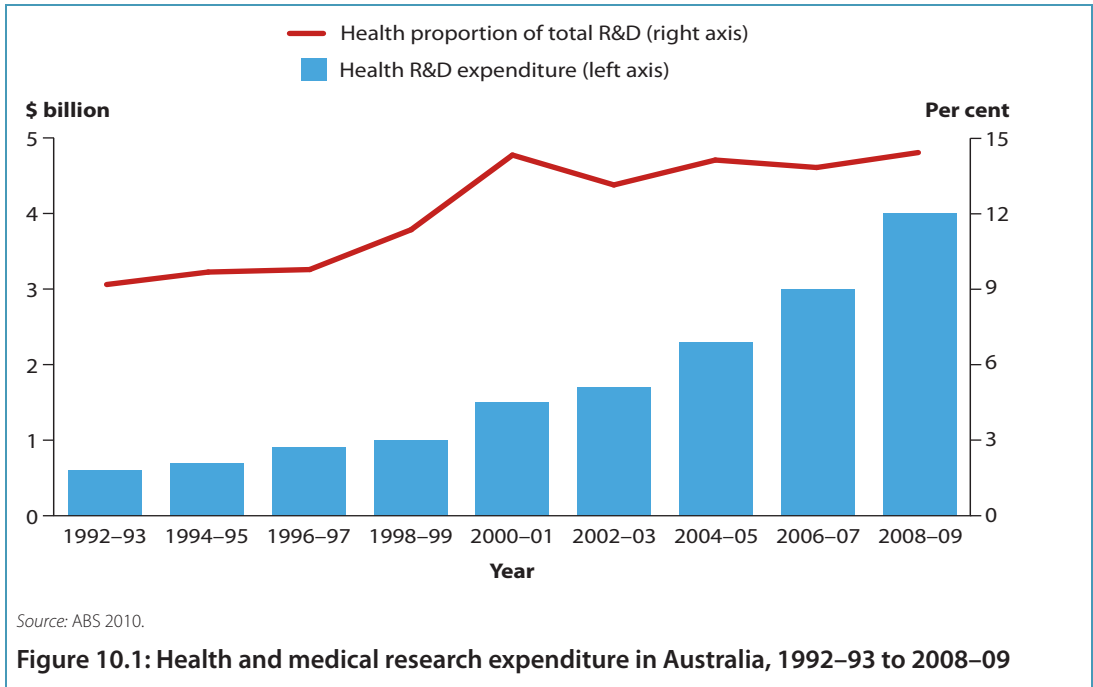


Figure 10.1: Health and medical research expenditure in Australia, 1992–93 to 2008–09

How is health and medical research funded?

Health and medical research in Australia is funded by governments, businesses, and private non-profit organisations, with 4% funded from overseas sources (Access Economics 2008).

Governments collectively provide three-quarters of the funds (excluding commercially oriented research funded by businesses), which are channelled through grant programs administered by several departments and agencies, principally the NHMRC, DoHA, the Department of Industry, Innovation, Science, Research and Tertiary Education, the Commonwealth Science and Industrial Research Organisation (CSIRO), and DEEWR (which provides general funding to higher education institutions).

The Australian Research Council does not fund medical and dental research, but does support research into human health topics, including psychology, immunology and pharmacology, as well as basic biological sciences with potential applications in health, and some nursing and allied health research (ARC 2011; Research Australia 2011b).

Also worth noting, but not readily quantifiable, is the ‘in-kind’ support for researchers provided by government agencies, health services, university departments and other organisations. This can include providing office space, information technology resources, administrative support, and so on.

What are the priority areas for health and medical research?

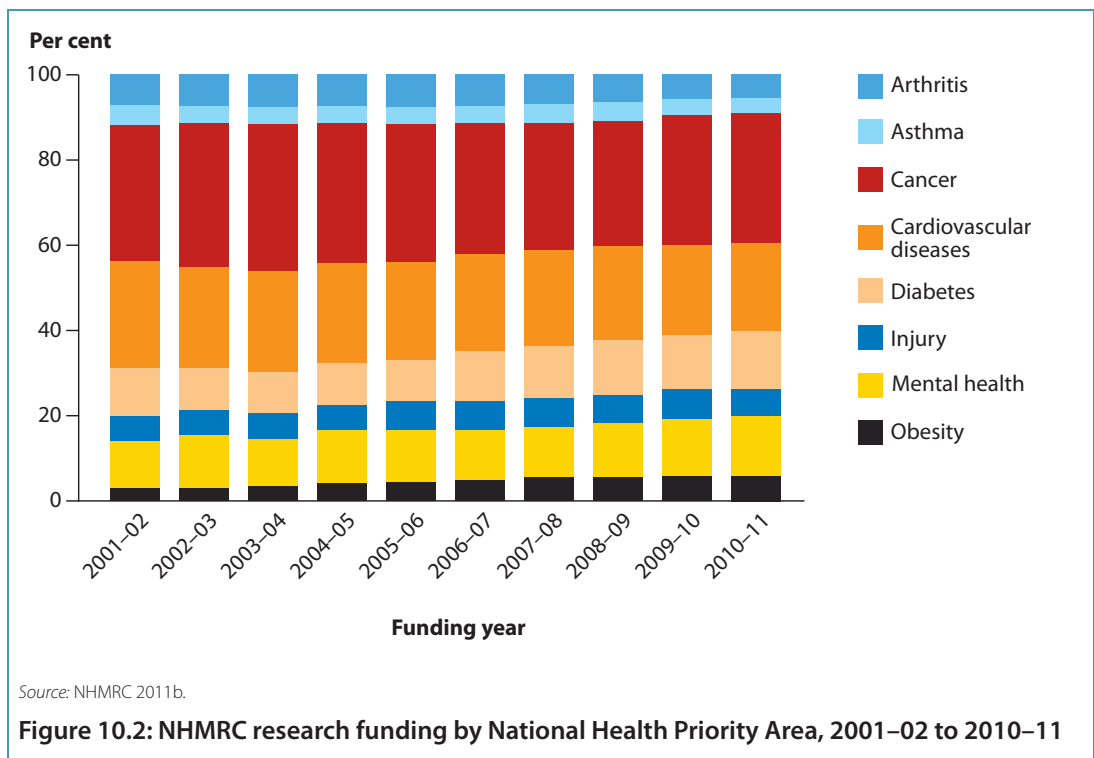
The NHMRC nominates major health issues for each of its 3-year strategic plans. The current plan lists 10 issues, including building a self-improving health system, genomic medicine and frontier technologies, and health consequences of climate change (NHMRC 2010). Although the NHMRC issues are not the only view of research priorities, they are influential in directing funding, and reflect both current and emerging issues in health and medical research.



Eight National Health Priority Areas (listed in Figure 10.2) were nominated by all Australian health ministers between 1996 and 2008. They contribute substantially to the burden of illness and injury in Australia, and are a focus for NHMRC grant reporting. In 2010–11, these areas accounted for nearly two-thirds of total NHMRC research funding. Over the past decade, the relative share across the areas has been reasonably steady, with cancer and cardiovascular diseases together accounting for about half.

Another insight into priority areas comes from the Australian Government's National Research Priorities mentioned previously. Within the 'Promoting and maintaining good health' priority are more specific directions (DIISR 2011a):

- a healthy start to life: counteracting the impact of genetic, social and environmental factors that predispose infants and children to ill health and reduce their wellbeing and life potential
- ageing well, ageing productively: developing better social, medical and population health strategies to improve the mental and physical capacities of ageing people
- preventive health care: new ethical, evidence-based strategies to promote health and prevent disease through the adoption of healthier lifestyles and diet, and the development of health-promoting products
- strengthening Australia's social and economic fabric: understanding and strengthening key elements of Australia's social and economic fabric to help families and individuals live healthy, productive, and fulfilling lives.



Globally, diverse patterns of disease and varying challenges in implementing the gains made from health and medical research—particularly in developing countries—call for distinct research and development priorities. The international Grand Challenges in Global Health initiative aims to remove some of the obstacles to more rapid progress against diseases that disproportionately affect the developing world (Varmus et al. 2003). Priority areas—selected by an international panel—include improving vaccines, improving nutrition to promote health, curing infectious diseases and improving techniques to measure disease status. Up to the beginning of 2012, Australian researchers had received 32 grants from the initiative, covering topics such as vaccines, contraceptives and diagnostic tests.

What is the role of the AIHW in health and medical research?

The AIHW contributes to the health and medical research effort in Australia by analysing data on health and health services, making data holdings available to other researchers, supporting other researchers with data integration services, and developing and promoting information standards for the health sector.

The AIHW is supported by strong privacy policies and processes, which are underpinned by the *Australian Institute of Health and Welfare Act 1987* (Commonwealth) and the *Privacy Act 1988* (Commonwealth). Accordingly, the AIHW does not release any information that could potentially identify an individual or organisation, except with the permission of the data provider, or for research purposes that have been approved by the independent AIHW Ethics Committee.

Within the provisions of the AIHW Act, the AIHW undertakes population health surveys, collates administrative data from health services, and uses data collected by other agencies (such as the ABS). It analyses the data and publishes statistical reports, web pages and other products on the status of Australians' health and their health services.

Much of the AIHW data holdings are available to other researchers, usually in a de-identified form. In some cases, data can only be released after the application is assessed by the AIHW Ethics Committee. The AIHW supports researchers by advising on the fitness of the data for the proposed purpose and the study methodology, and provides guidance on how to interpret findings.

The AIHW supports other researchers by providing data integration services. Also known as data linkage, this involves bringing together information about people, places and events in a way that protects individual privacy and the confidentiality of personal information. The resulting data sets are used for statistical and research purposes only and are managed and disposed of according to approved study protocols. Data integration projects undertaken by the AIHW or using AIHW data can only proceed with AIHW Ethics Committee approval.

Research based on integrated data sets has been used to examine a range of health issues and provide a picture of the health and wellbeing of our community. The results from these studies have provided valuable information on the causes of disease and associated risk factors; the evaluation of new approaches to prevention, early intervention and treatment; and the assessment of new and more effective ways of delivering health services.



The AIHW has strengthened its data integration governance and technical capability with the creation of a Data Integration Services Centre. This will increase its capacity to undertake innovative data linkage projects involving large health data sets for both the AIHW and external research, and enable it to operate as an Integrating Authority under the new principles for the integration of national data for statistical or research purposes. The AIHW is also a member of the Population Health Research Network—an Australian Government initiative established as part of the National Collaborative Research Infrastructure Strategy.

The AIHW manages Australia's national health metadata items and standards. Metadata is structured information that makes it easier to understand information, and includes definitions, data specifications and collection methods. Using data standards ensures comparability and consistency of the data collected and produced. The Institute is involved in developing metadata standards for a range of program and policy areas.

The AIHW's metadata online registry, METeOR, supports this data development work. METeOR is Australia's repository for national metadata standards for the health, community services and housing assistance sectors. It provides users with online access to nationally endorsed data definitions and tools for creating new definitions based on existing already-endorsed components.

What is missing from the picture?

Despite the impressive health and medical research successes in Australia, there is still a virtually endless and changing list of questions that engages researchers.

The priority areas discussed previously indicate the short- to medium-term research agenda for Australia. The NHMRC has recognised several challenges that need to be overcome for this agenda to be advanced, including:

- reducing the time and knowledge gap in translating research from the laboratory to practice
- dealing with the increasing complexity of research and the need for multi-disciplinary approaches
- retaining Australian researchers who may be attracted to other countries with stronger investment in research (NHMRC 2010).

A further challenge in translating the research into clinical practice is the nature of the day-to-day clinical environment, where clinicians are primarily focused on delivering patient care (and funded for such).

The *Exposure draft of the 2011 strategic roadmap for Australian research infrastructure* (DIISR 2011b) also highlights particular challenges at a whole-of-system level, such as:

- managing and interpreting the vast volumes of data being generated by new biotechnology systems—the so-called 'omics' (that is, genomics, proteomics, metabolomics and phenomics—see Glossary)
- securely storing and allowing researcher access to individual health records and biological tissue samples, and related information management (including record linkage).

Finally, there is also the underlying challenge of reserving capacity in the research system to respond to emerging or urgent issues, such as the need to develop, test, produce and distribute population-level amounts of the 'swine flu' vaccine in 2009.

In September 2011, the Australian Government announced a review of health and medical research in Australia. The review, to be completed by the end of 2012, will focus on optimising Australia's capacity to produce world-class health and medical research to 2020.

Where do I go for more information?

The AIHW website includes all published reports available for download, as well as access to more detailed data. METeOR and related information development material is also accessible from the website.

The NHMRC website has detailed information on the various grant programs, including descriptions of funded research and reports of research findings; see <www.nhmrc.gov.au>.

The Research Australia website has general information on health and medical research in Australia; see <www.researchaustralia.org>.

The Department of Industry, Innovation, Science, Research and Tertiary Education website has information on the National Research Priorities and the *Exposure draft of the 2011 strategic roadmap for Australian research infrastructure*; see <www.innovation.gov.au>.

The Grand Challenges in Global Health website has information on the Grand Challenges initiative, including details on funded research and research findings; see <www.grandchallenges.org>.



10.2 Improving health information—process and progress

At a glance

- Information about the health of individuals and populations plays a crucial role in formulating, delivering and assessing health programs and policies.
- Better quality and more timely data means more useful data, including for purposes beyond which it was originally collected.
- Many data development achievements have occurred in the past 2 years, including new collections and new ways of reporting, such as the MyHospitals website.

Introduction

Health information is a fundamental component of the evidence base for developing, delivering and evaluating health policies and programs. It is described in the National Health Information Agreement (NHIA) as data concerned with:

- the health status and risks of individuals and populations
- the provision of health-care services, health promotion and disease prevention programs, including information on the uses, costs and outcomes of services and programs, and the resources required to provide them.

In any 1 year in Australia there are hundreds of millions of health ‘transactions’ or ‘events’: visiting a doctor, having a prescription filled at the pharmacy, having a tooth filled at the dentist, going to hospital, being treated by a physiotherapist, and so on. Each event typically generates several pieces of data that, when understood in context, become health information.

As described in ‘Section 1.5 Sources of health data’, health information is also collected in circumstances other than the provision of health services, such as through population surveys, vital statistics (births and deaths), and surveillance systems.

Apart from its use in directly supporting the planning and delivery of health care to individuals, health information is used to:

- assess the level and distribution of the health of populations
- measure the level, distribution and influence of health determinants
- quantify the inputs to the health system
- monitor and evaluate health interventions
- assess the performance of the health system overall
- understand the interrelationships of all of the above.

Across any field, better quality data (including attributes of timeliness and consistency) means more useful data; in the case of health data, that means more useful for the purposes listed above.



Data may be collected in many different service delivery locations and, for national data, it is important that this is done in a consistent, standardised manner. This includes having agreement about the:

- scope of the collections (which types of services are to be included, for example, those provided by public sector services)
- definition of the service events about which data are to be collected (for example, hospital admissions, episodes of alcohol and other drug treatment)
- terminology, labels and classifications (if appropriate)
- specification of a standard set of data elements (for example, age, sex, date of event, type of intervention) using common representations of the pieces of data.

These aspects are the focus of health data development in Australia. Pursuing agreement on these elements is also consistent with the AIHW's mission: to provide authoritative information and statistics to promote health and wellbeing.

Improving health information: the process

Who has responsibility for health information?

The AIHW operates as an independent statutory authority with legislative authority to collect, analyse and report national health information, including information provided by the states and territories and, in some cases, information collected from individual service providers.

Similarly, the ABS has legislative authority to collect, analyse and report health information, and conducts major national health surveys in addition to some administrative collections (such as the Private Health Establishments Collection).

Supporting the legislative bases for national collection is the NHIA—an agreement between the state and territory health authorities, the ABS, AIHW, DoHA, DVA, DHS, and Australian Commission on Safety and Quality in Health Care.

The NHIA was established to coordinate the development, collection and dissemination of health information in Australia, and helps to improve access to uniform health information by community groups, health professionals, and government and non-government organisations.

It operates under the auspices of the Standing Council on Health (the group of Australian Government, state and territory health ministers) and the Australian Health Ministers Advisory Council (the group of chief executive officers of Australian Government, state and territory health departments). The National Health Information and Performance Principal Committee (NHIPPC), which is a principal committee of AHMAC, and relevant subcommittees, have particular functions under the agreement.

The National Health Information Standards and Statistics Committee (NHISSC)—a standing committee of NHIPPC—has the role of overseeing the development of data standards for inclusion in the *National health data dictionary* (AIHW 2010). This dictionary is the biennial publication of all the standardised and accepted terms and protocols used for the collection of health information, which is also on the AIHW's metadata repository, METeOR.



How is health information developed?

Information development is the process of building a data set for a specific purpose, and requires a clear understanding of what data are needed and why. In developing a data set, the practicalities and cost of collecting the data need to be considered, as the data may come from multiple sources across different governance arrangements.

Data development is a methodological process requiring consultation and collaboration. A project manager, or data developer, undertakes the data development work, usually with expert subject matter advice from key stakeholders.

A critical step in the development process is the defining of concepts to be collected, which are referred to as metadata. Metadata is the information about data, such as what the data mean and how the data are represented, that assists in understanding and interpreting information. Metadata transforms data, which on their own are numbers or just text, into meaningful information that is unambiguous.

Metadata standards are important to ensure that health data are defined and collected in a consistent manner within a collection and across collections. Metadata standards, where possible, should be reusable and not collection-specific. For data standards proposed for inclusion on METeOR, the AIHW works with the data developer to ensure metadata standards comply with the requirements of the International Standards Organisation's framework for representing metadata in a metadata registry, referred to as ISO 11179.

The standards finalised for a particular data collection are collated into a data set specification, which is a formal description of the data items for collection and their associated metadata. Where the data collection is mandated, say under the National Healthcare Agreement, then the specification is termed a national minimum data set (NMDS). Box 10.3 has more information on these sets of standards.

Box 10.3: Sets of data standards

A data set specification (DSS) contains the set of data items detailing the standardised output of data that has been agreed upon by stakeholders. An example of a DSS is the National Diabetes Data Set Specification. It comprises a set of data items developed by the National Diabetes Data Working Group and is intended to guide providers involved in the treatment of patients diagnosed with diabetes about what data should be collected and how they should be recorded in a standardised way. The specification provides agreed definitions for data items related to the data set, and aims to ensure standardised methodology for data collection.

A minimum data set is the name given to a selective core set of data that have been agreed by users and stakeholders as the minimum for collection for a specific purpose. A minimum data set still allows additional data to be collected to meet individual agency or local needs.

In Australia, an NMDS is a mandated national data collection for all states and territories. An NMDS agreement includes data standards that are specified using data elements, as well as the scope for the application of those data elements.

An example of an NMDS is the Admitted Patient Care NMDS. It specifies what information needs to be collected nationally about episodes of care for admitted patients in all public and private hospitals in Australia.

Improving health information: progress since *Australia's health 2010*

Data development in Australia is an ongoing process involving consultation, technical review, drafting of standards, endorsement of the standards, and implementation into data collections. The AIHW, in collaboration with the other signatories to the NHIA and a range of other stakeholders, has made considerable progress in data development since the previous edition of *Australia's health*.

New or improved standards

Significant achievements in the area of data standards include:

- review of the Alcohol and Other Drug Treatment Services NMDS, including introduction of a statistical linkage key that will enable analysis of the data about the people using the services, rather than just about the episodes of care provided
- enhancements to three mental health NMDSs: Mental health establishments, Community mental health care and Residential mental health care
- enhancement of the perinatal NMDS to capture Indigenous status of the baby, smoking during pregnancy, and antenatal visits
- development of a DSS for medical indemnity to support the Medical Indemnity National Collection
- development of a DSS for Indigenous primary health care
- development of a DSS for public dentistry waiting times
- development of a DSS for prisoner health
- development of a DSS for radiotherapy waiting times.

New or enhanced information collections

Major achievements in the area of information collections include:

- the establishment of a nationally consistent data collection and set of reporting tools for Dementia Behaviour Management Advisory Services
- expansion of the national prisoner census to include information on prisoners as they are released. This information will be used to complement and compare the health status of prison entrants with prisoners being prepared for release, and will include information relating to the plans of current prisoners when they are discharged
- production of the first analysis of information on patients with dementia from the new Aged Care Funding Instrument, and also on older people leaving hospital assisted by the Transition Care Program
- pilot testing of the draft Mental Health Interventions Classification using a range of data collection methods, including iPads
- a new national registration system for registered health professionals (administered by the Australian Health Practitioner Regulation Agency). This has resulted in a more consistent national workforce survey that is completed annually at the time of renewal, and the use of a unique identifier for each professional means that, over time, the data collected will be able to show changes for an individual's registration status and workforce participation.



New or improved performance indicators

Major achievements in the area of performance indicators include:

- development of national key performance indicators for Indigenous primary care services (collection starting July 2012)
- development of new monitoring indicators for the National Cervical Screening Program
- supply of performance indicator data and associated data quality statements, and development of new and improved performance indicators, required for reporting under the National Healthcare Agreement.

New products and services

Significant achievements in the area of information products and services include:

- launch of the MyHospitals website (see Box 10.4)
- launch of the biennial Indigenous report and web observatory
- development of an online hospitals data validation tool, Validata®, to improve timeliness and quality of national hospital statistics products
- release of the National Indicator Catalogue containing all COAG performance indicators and their specifications
- further progress on enabling the use of METeOR for managing jurisdictional metadata purposes—Tasmania and New Zealand are now actively developing their own standards within METeOR.

Other achievements

Other achievements relevant to health information development include:

- strengthening of the AIHW's data integration governance and technical capability with the creation of a Data Integration Services Centre—this will increase AIHW's capacity to undertake innovative data linkage projects involving large health data sets for both the AIHW and external research, and enable it to operate as an Integrating Authority under the new principles for the integration of Commonwealth data for statistical or research purposes
- redevelopment of the AIHW's health expenditure database—a number of processes have been automated and streamlined, including data loading and checking and editing procedures, which will improve the efficiency and timeliness of the collation, processing, editing and output of expenditure data
- completion of an independent stakeholder review of the *Australian hospital statistics* suite of products to inform their further development to suit stakeholder needs.

Box 10.4: MyHospitals—nationally consistent, locally relevant

The MyHospitals website is an Australian Government initiative that makes it easier for people to access information about the performance of their local hospitals. It is a major initiative of the NHRA.

The clear and transparent reporting on the MyHospitals website will assist Australians make more informed choices about their health services and help ensure the standard of care patients receive continues to improve.

The website includes information on all public hospitals and more than 240 private hospitals in Australia. It is based on the latest available information provided by state and territory health departments and private hospitals.

MyHospitals enables the performance of individual hospitals to be compared with national figures on waiting times for elective surgery procedures and emergency department treatment. It also contains information about patient admissions and hospital accreditation, the types of specialised services—including cancer treatment services—provided by each hospital, and safety and quality information, including *Staphylococcus aureus* bacteraemia infection rates and hand hygiene rates compared with a national benchmark. Regular updates are made to MyHospitals to ensure accuracy, and to include new and updated data.

The AIHW manages the site and has worked with consumers and other stakeholders to ensure that the website contains relevant and robust information, and is simple, clear and easy to use.

MyHospitals can be accessed at <www.myhospitals.gov.au>.

Where do I go for more information?

The AIHW report *A guide to data development* (AIHW 2007) provides advice on the principles and processes for good data development.

The AIHW metadata online registry, METeOR, is at <meteor.aihw.gov.au>.



10.3 Health reform—new information challenges and opportunities

At a glance

- The health system faces a number of opportunities and challenges regarding the information needs of the new health reform environment that broadly relate to infrastructure, expertise and relationships.
- The overarching information priority under health reform is to provide community access to transparent and nationally comparable performance data and information on health services.
- E-health—the use of computing and communications technology in health service delivery—has the potential to generate new national health information as a foundation for better public health.

Introduction

Australian governments have embarked on a series of health reforms that aim to give Australians equitable access to the best health care into the future (Box 10.5). These reforms focus on improved transparency, governance and financing of the health system.

This section provides an overview of the principles, opportunities and challenges for health information that stem from these reform initiatives. Some of the terms associated with health reform are defined in Box 10.6.

The overarching information priority under the reform arrangements is to provide community access to transparent and nationally comparable performance data and information on hospitals, GPs and primary health care, aged care services and other health services (COAG 2011a).

Australia has worked for some time to collect and report nationally consistent health data (see 'Section 10.2 Improving health information—process and progress'), to make data more timely, and to present comparable and meaningful performance data for the health sector (see 'Section 1.6 Measuring Australia's health performance').

The NHRA introduces a new element to this existing system: a requirement to have nationally consistent information at the local level, including individual hospitals, Local Hospital Networks and Medicare Locals.

The data collected and reported at this level have the potential to drive informed decision-making and efficient resource allocation, highlight best practice, and provide accountability in service provision (COAG 2011a).



Box 10.5: Overview of health reforms

The NHRA was signed by the Australian Government and state and territory governments on 2 August 2011. The agreement signifies the commitment of Australian governments to work together to improve the efficiency, effectiveness and transparency of health funding and ensure improved access and health outcomes for all Australians.

As reported on the yourHealth website, there are eight streams of health reform, covering: hospitals, GP and primary health care, aged care, mental health, national standards and performance, workforce, prevention, and e-health.

The reforms are designed to improve:

- public hospital efficiency, with the new national efficient price and Local Hospital Networks
- GP and primary care services, through the establishment of Medicare Locals
- emergency department and elective surgery waiting times
- transparency and accountability for performance across the health and aged care system, with Hospital Performance Reports, Healthy Communities Reports and the MyHospitals website
- accessibility and equitability of clinical care, through Lead Clinicians Groups and quality and safety standards.

The Australian Government and state and territory governments also signed the National Healthcare Agreement 2011. This updated agreement, originally signed in 2008, defines the objectives, outcomes, outputs and performance measures, and clarifies the roles and responsibilities that will guide the Australian Government and states and territories in delivery of services across the health sector.

Sources: Australian Government 2011; COAG 2011b; SCFRR 2011.

To achieve these benefits, the data need to be timely, locally relevant, consistent, meaningful and not overly burdensome to collect. There also needs to be clear reporting channels, coordination between local, state and territory and national agencies, and mutually beneficial outcomes from data collection and reporting (COAG 2011a).

A Performance and Accountability Framework underpins the information collection and reporting elements of the NHRA. This framework, to be developed by governments, will include:

- a subset of the national performance indicators already agreed by COAG through the National Healthcare Agreement
- reference to national clinical quality and safety standards developed by the Australian Commission on Safety and Quality in Health Care, as approved by the Standing Council on Health
- design principles for the new Hospital Performance Reports and Healthy Communities Reports that will provide clear and transparent reporting on the performance of every Local Hospital Network, the hospitals within it, every private hospital and every Medicare Local (COAG 2011a).

The National Health Performance Authority, established as an independent statutory authority in late 2011, will develop and produce the Hospital Performance Reports and Healthy Communities Reports.



Box 10.6: Health reform terminology

Local Hospital Networks are groups of hospitals linked by geography or specialised care that will improve access to coordinated health care. The 124 geographically-based networks and 13 state-wide networks will promote efficient use of hospital resources and improved patient experience in navigating tertiary health care services and providers.

Medicare Locals are primary health care organisations that coordinate and tailor service delivery to meet the needs of their local community. They will link patients and service providers—including GPs, nurses, allied health, hospitals, aged care, and Aboriginal and Torres Strait Islander health organisations—to minimise duplication of service delivery and improve continuity of care for patients. See also 'Section 7.2 Primary health care in Australia' for more information on Medicare Locals and associated performance reporting.

Hospital Performance Reports are quarterly reports, to be produced by the National Health Performance Authority, on the performance of each Local Hospital Network, every public hospital in each Local Hospital Network, and every private hospital.

Healthy Communities Reports are quarterly reports, to be produced by the National Health Performance Authority, on the performance of GP and primary health care services and outcomes in the local community and region of each Medicare Local, including on local demography and health status, local services and health outcomes.

MyHospitals website is an Australian Government initiative to inform the community about hospitals by making it easier for people to access information about how individual hospitals are performing on issues such as bed numbers, patient admissions, hospital accreditation, specialised services, waiting times for elective surgery and emergency department care, and safety and quality.

Lead Clinicians Groups will improve patient-centred care by providing evidence-based advice on issues relating to service integration, safety, quality, efficiency, sustainability and improvement within Medicare Locals and Local Hospital Networks. The groups will also promote collaboration and cooperation between Medicare Locals and Local Hospital Networks.

Sources: Australian Government 2011; COAG 2011a.

The Independent Hospital Pricing Authority, established as an independent statutory authority in 2011, will be responsible for determining the national efficient price of public hospital services under the new activity-based funding model of hospital funding.

Some of the expected benefits of the activity-based funding of public hospitals and greater performance reporting for hospitals and primary care services are that richer information is likely to become available, and some information will be available more quickly than currently (for example, quarterly rather than annually).



Some of the principles that guide the collection of information to support the new service delivery arrangements are:

- using existing national data collections to meet data and reporting requirements
- adhering to existing national data development principles
- maximising the efficiency of data provision and validation through a 'single provision, multiple use' strategy
- balancing the benefits of collecting national data with the associated costs at the state and local levels
- adhering to privacy and ethics guidelines in the collection and use of patient-level data (COAG 2011a).

What are the opportunities and challenges of the new information environment?

The information priorities of the new health reform environment present a number of opportunities and challenges for the health system. These broadly relate to infrastructure, expertise and relationships, and are discussed further below.

Infrastructure

In this section, infrastructure describes data collection and reporting mechanisms, including the use of data standards.

The infrastructure opportunities and challenges include:

- improving data quality and more scrutiny of data at the provider level
- using data to explore the impact that changes in one sector may have on another, for example, better management of chronic conditions at the primary care level may reduce condition-related acute hospitalisations
- improving the timeliness, relevance and purpose of the data
- capitalising on the ability to integrate data and data collection systems
- developing standards and a common language that meet multiple information needs
- finding a balance between 'fit for purpose' (measuring what should be measured) and 'reporting burden' when collecting data
- informing the proposed review of the NHRA, scheduled for 2015–16.

Expertise

Expertise in data development ensures that the process of collection is streamlined, duplication is minimised, data standards are relevant and meaningful, there is a balance between disaggregation and simplicity of reporting, and that the data are fit for purpose. Expertise is also valuable in the return of information derived from the data collected, ensuring data analysis, benchmarking and comparison is accurate and that data dissemination is meaningful, relevant and actionable.



The expertise, opportunities and challenges include:

- the ability to accurately and meaningfully inform the community
- the ability to develop data that are meaningful and measureable, appropriate to the reporting requirements, easily reportable, have multiple uses and are standardised for consistency between services, jurisdictions and over time
- streamlining the process of data collection to minimise duplication
- using existing expertise and avoiding duplication of effort, while identifying and filling gaps in knowledge.

Relationships and partnerships

Managing relationships and expectations is essential to maintaining the accuracy, consistency and timeliness of data collections. The success of these relationships will be somewhat contingent on the strength of the infrastructure and expertise components.

The relationships opportunities and challenges include:

- promoting mutually beneficial information exchange to allow accurate, consistent and timely data collection and the return of relevant and actionable information
- involving clinicians in health reform to improve data quality at the service delivery level
- managing and fostering partnerships that facilitate effective information exchange.

What is the role of e-health?

E-health encompasses the use of information and communications technology for health and health care (WHO 2011). The National Health and Hospital Reform Commission has identified e-health as playing a major role in transforming and enhancing the way health care is delivered (NHHRC 2009). Similar initiatives are being implemented in Canada, Denmark, England, Germany, Hong Kong, New Zealand and the United States (DoHA 2011).

E-health in Australia aims to provide individuals, health-care providers and health-care managers with a reliable and secure environment to access and share health information (DoHA 2011). A component of this environment will be a personally controlled electronic health record (PCEHR), for which individuals can register from 1 July 2012.

Health records held at general practices, community health centres or hospitals will not be replaced by the PCEHR. With an individual's consent, relevant clinical information contained in such local records will be used to assemble clinical documents in an individual's PCEHR (NEHTA 2011). Some key information will be recorded in a consistent way, using an agreed clinical language, and will also need to comply with Australian standards for information sharing and security.

A national document repository will be available for health-care providers and individuals to view summaries of the clinical documents. An internet portal (similar to those used for secure internet banking) will also be available to those who have registered to view and access these summaries (DoHA 2011).

Implemented as a patient-centred, agile, flexible and secure system that continuously improves (NEHTA 2011), e-health is expected to make a difference to how individuals interact with health services and contribute to their own health care (Box 10.7).

Box 10.7: E-health contributing to coordinated care

The commitment to organise and collaborate to treat individuals with complex care needs is often described as 'coordinated care' (Minkman 2011). As described earlier, the Australian Government and state and territory governments are improving health data and national information infrastructure for the integration of care around the needs of the individual. A PCEHR will be a centrepiece for sharing information and for coordinating care (DoHA 2011).

For each visit to a health-care provider, a record of information is kept by the provider. Where an individual has registered for a PCEHR, information from a record kept by a health-care provider may be re-assembled and posted to this record, and re-used for different purposes. Some examples of how this may be used include:

- sending an electronic prescription to a patient's local pharmacy, allowing collection of a prescription to be faster and easier
- making an electronic referral to a specialist
- using detailed information collected by another health-care provider (for example, medical history and existing conditions) so that the patient does not have to provide this information again.

Each of these documents, which may be held in one or more places, will form a longitudinal record about critical health events that affect the individual. By sharing this up-to-date and relevant information with all the health-care providers involved in a patient's care plan, services can be better coordinated and more appropriately targeted to that patient's needs.

The coded and structured data arising from the e-health environment has potential beyond direct clinical care. By making it available as de-identified data and analysing and publishing it, the data have value in discovering better ways of providing services and delivering benefits to citizens. The amount of potentially relevant data available from the e-health system for these purposes will be much larger than can be delivered now. Realising these benefits by allowing for such uses is one of the greatest challenges this new information environment presents.

What is missing from the picture?

As health reform takes shape over the coming years, the practical aspects of data collection, provision and reporting will become clearer. Areas in which the information and reporting priorities for health reform are in a process of development include:

- detailed specification and collection of new performance indicators
- content of the Hospital Performance Reports and the Healthy Communities Reports
- accurate and complete baseline data at the regional and national level.

Where do I go for more information?

For more information on health reform and the associated information requirements, visit <www.yourhealth.gov.au>.

For a simple explanation of how the PCEHR system is intended to operate, see the set of videos at <www.yourhealth.gov.au/internet/yourhealth/publishing.nsf/Content/pcehr>.



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Methods and conventions

Details of methods used in particular sections of the report are in the text and boxes, and in footnotes to figures and tables. Some general methods and conventions are described here.

Age standardisation

This is a method of removing the influence of age when comparing populations with different age structures—either different populations at one time or the same population at different times. For this report, as for the previous four editions, the Australian estimated resident population as at 30 June 2001 has been used as the standard population. The same population was used for males and females to allow valid comparison of age-standardised rates between the sexes. For some international comparisons, the OECD 1980 standard population has been used. These two populations are summarised in Table A1.

Two different methods of age standardisation can be used: direct and indirect. These are described in more detail below.

Direct age standardisation

This is the most common method, and is used in this report for prevalence, hospitalisations and most deaths data. This method is generally used when the populations under study are large and the age-specific rates are reliable. The calculation of direct age-standardised rates has 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 rate by the corresponding standard population for each age 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.

Indirect age standardisation

In situations where populations are small or where there is some uncertainty about the stability of age-specific rates, indirect standardisation is used. This effectively removes the influence of different age structures, but does not provide a measure of prevalence or mortality in terms of a rate. Rather, the summary measure is a ratio of the number of observed cases compared with the number that would be expected if the age-specific rates of the standard population applied in the population under study. Indirect standardisation is sometimes used in this report for prevalence and mortality by area of residence or socioeconomic status. Calculation of these ratios has the following steps:

Step 1: Calculate the age-specific rates for each age group in the standard population.

Step 2: Apply these age-specific rates to the number of people in each age group of the population under study, and sum these to derive the total expected number of cases in that population.



Step 3: Sum the observed cases in the population under study and divide this number by the expected number derived in step 2. This is the standardised mortality/prevalence ratio (SMR or SPR).

An SMR/SPR of 1 indicates the same number of observed cases as was expected, suggesting rates in the two populations are similar. An SMR/SPR greater than 1 indicates more cases were observed than expected, suggesting rates in the population under study are higher than in the standard population.

Table A1: Age composition of the Australian population at 30 June 2001, and of OECD standard population 1980

Age group (years)	Australia, 30 June 2001	OECD standard 1980
0	253,031	1,620
1–4	1,029,326	6,320
5–9	1,351,664	8,090
10–14	1,353,177	8,300
15–19	1,352,745	8,560
20–24	1,302,412	8,200
25–29	1,407,081	7,810
30–34	1,466,615	7,630
35–39	1,492,204	6,310
40–44	1,479,257	5,830
45–49	1,358,594	5,560
50–54	1,300,777	5,460
55–59	1,008,799	5,080
60–64	822,024	3,890
65–69	682,513	3,880
70–74	638,380	3,180
75–79	519,356	2,260
80–84	330,050	1,230
85 and over	265,235	770
Total	19,413,240	100,000

Note: The OECD standard population has been scaled to total 100,000.

Sources: ABS 2003; OECD.stat.



Average annual rates of change

Average annual rates of change or growth rates have been calculated as geometric rates:

$$\text{Average rate of change} = \left(\left(\frac{P_n}{P_o} \right)^{\frac{1}{N}} - 1 \right) \times 100$$

where P_n = value in later time period

P_o = value in earlier time period

N = number of years between the two time periods.

Classification of diseases

The classification of deaths follows the 10th revision of the ICD (WHO 1992). Diseases treated in hospitals and the procedures performed during a hospital stay are classified using the 6th edition of the ICD-10-AM (NCCH 2004).

Presenting dates and time spans

Periods based on full calendar years (1 January to 31 December) are written as, for example, 2001 for 1 year. When there are 2 or more calendar years in the period, the first and final years are written in full. For example, 2010–2011 is a 2 calendar-year span and 2009–2011 covers 3 calendar years.

Periods based on financial years (1 July to 30 June, as with hospital statistics) are written with a second number that is abbreviated, for example, 2010–11 for 1 financial year, 2009–11 for 2 and 2008–11 for 3. A longer span of financial years is written as 'In the 10 years from 2000–01 to 2010–11...'

Some surveys may be based on other 12-month spans; for example, the general practice BEACH survey is based on collection periods from 1 April to 30 March. These are presented as for financial years, for example, 2010–11 would be a 'year' or 12-month period.

Effects of rounding

Entries in columns and rows of tables may not add to the totals shown because of rounding. Unless otherwise stated, derived values are calculated using unrounded numbers.

Data subject to revision

This report draws data from a range of administrative and survey datasets, all of which are subject to change. Such changes may arise from the:

- nature of the data collection; for example, notifiable diseases are based on a 'real-time' collection of reported cases, and the counts and rates could change daily
- data being updated on a regular cycle; for example, childhood immunisation rates are calculated each quarter
- data being revised as part of a program of maintenance and updates; for example, from 2007 data onwards the ABS will be revising cause of death data using information pertaining to coroners' cases that was not available at the time of original processing
- data being revised because of discovered errors or anomalies.

Wherever possible, the latest version of a dataset has been used; in cases where the data change frequently, the date of the release is noted in the text or table.

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Symbols

\$	Australian dollars, unless otherwise specified
—	nil or rounded to zero
%	per cent
g	gram
kg	kilogram (1,000 grams)
'000	thousands
mm Hg	millimetres of mercury
mmol/L	millimoles per litre
n.a.	not available
..	not applicable
nec	not elsewhere classified
nfd	not further defined
n.p.	not published by the data source
µg	microgram (1 millionth of a gram)
>	more than
<	less than
≥	more than or equal to
≤	less than or equal to



Abbreviations

ABS	Australian Bureau of Statistics
ACFI	Aged Care Funding Instrument
ACHI	Australian Classification of Health Interventions
ACIR	Australian Childhood Immunisation Register
ACS	Australian Coding Standards
AD	autistic disorder
AEDI	Australian Early Development Index
AHMAC	Australian Health Ministers' Advisory Council
AHMC	Australian Health Ministers' Conference
AHMPPPI	Australian Health Management Plan for Pandemic Influenza
AHPRA	Australian Health Practitioner Regulation Agency
AIDS	acquired immune deficiency syndrome
AIHW	Australian Institute of Health and Welfare
ALLS	Adult Literacy and Life Skills Survey
ALOS	average length of stay
AMI	acute myocardial infarction
ANIFS	Australian National Infant Feeding Survey
ANPHA	Australian National Preventive Health Agency
ANZARD	Australian and New Zealand Assisted Reproduction Database
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
AODTS-NMDS	Alcohol and Other Drug Treatment Services National Minimum Data Set
ARCBS	Australian Red Cross Blood Service
ARF	acute rheumatic fever
ART	assisted reproduction technology
AS	Asperger syndrome
ASD	autism spectrum disorder
ASHR	Australian Study of Health and Relationships
AusDiab	Australian Diabetes, Obesity and Lifestyle Study
BCC	basal cell carcinoma (of the skin)
BEACH	Bettering the Evaluation and Care of Health
BMI	body mass index
BPSD	behavioural and psychological symptoms of dementia
CABG	coronary artery bypass grafting

CAPS	Coding Atlas for Pharmaceutical Substances
CDD	childhood disintegrative disorder
CHD	coronary heart disease
CI	confidence interval
CKD	chronic kidney disease
COAG	Council of Australian Governments
COPD	chronic obstructive pulmonary disease
CSIRO	Commonwealth Science and Industrial Research Organisation
CT	computerised tomography
CVD	cardiovascular disease
DALY	disability-adjusted life year
DMARD	disease-modifying anti-rheumatic drug
DoHA	Australian Government Department of Health and Ageing
DTP	diphtheria, tetanus and pertussis
DVA	Australian Government Department of Veterans' Affairs
D2DL	Support for Day to Day Living in the Community
DSS	data set specification
eGFR	estimated glomerular filtration rate
ENT	ear, nose and throat
ESKD	end-stage kidney disease
FOBT	faecal occult blood test
FTE	full-time equivalent
GDM	gestational diabetes mellitus
GDP	gross domestic product
GFR	glomerular filtration rate
GP	general practitioner
HCQI	Health Care Quality Indicators
HDI	Human Development Index
HDL	high-density lipoprotein
Hib	<i>Haemophilus influenzae</i> type b
HIV	human immunodeficiency virus
HMR	Home Medicines Review
HPV	human papillomavirus
HWA	Health Workforce Australia
IBD	inflammatory bowel disease
IBS	irritable bowel syndrome



ICD	International Classification of Diseases
ICD-10	International Classification of Diseases, 10th revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification
IFG	impaired fasting glucose
IGR	impaired glucose regulation
IGT	impaired glucose tolerance
IRSD	Index of Relative Socio-economic Disadvantage
KPI	key performance indicator
K10	Kessler Psychological Distress Scale–10
LDL	low-density lipoprotein
LSAC	Longitudinal Study of Australian Children
LHC	Lifetime Health Cover
MBS	Medicare Benefits Scheme or Medicare Benefits Schedule
MRI	magnetic resonance imaging
NBA	National Blood Authority
NBCSP	National Bowel Cancer Screening Program
NCSCH	National Cancer Statistics Clearing House
NCSP	National Cervical Screening Program
NDR	National Diabetes Register
NDSHS	National Drug Strategy Household Survey
NDSS	National Diabetes Services Scheme
NESWTDC	National Elective Surgery Waiting Times Data Collection
NHA	National Healthcare Agreement
NHIA	National Health Information Agreement
NHIPPC	National Health Information and Performance Principal Committee
NHISSC	National Health Information Standards and Statistics Committee
NHMD	National Hospital Morbidity Database
NHMRC	National Health and Medical Research Council
NHPF	National Health Performance Framework
NHRA	National Health Reform Agreement
NHVP	National HPV Vaccination Program
NHVPR	National HPV Vaccination Program Register
NIPS	National Immunisation Program Schedule
NMDS	national minimum data set

NNAPEDCD	National Non-admitted Patient Emergency Department Care Database
NOPSAD	National Opioid Pharmacotherapy Statistical Annual Data
NPHEd	National Public Hospital Establishments Database
NRAS	National Registration and Accreditation Scheme
NSSSSH	National Survey of Secondary Students and Sexual Health
NTD	neural tube defect
OATSIH	Office for Aboriginal and Torres Strait Islander Health
OECD	Organisation for Economic Co-operation and Development
OGTT	oral glucose tolerance test
PAF	population attributable fraction
Pap	Papanicolaou (cervical smear test)
PBS	Pharmaceutical Benefits Scheme
PCEHR	personally controlled electronic health record
PCI	percutaneous coronary intervention(s)
PCOC	Palliative Care Outcomes Collaboration
PDD-NOS	pervasive developmental disorder—not otherwise specified
PHaMs	Personal Helpers and Mentors service
PHC RIS	Primary Health Care Research and Information Service
PNIP	Practice Nurse Incentive Program
PSA	prostate-specific antigen
PTCA	percutaneous transluminal coronary angioplasty
PTSD	post-traumatic stress disorder
PYLL	potential years of life lost
R&D	research and development
RFDS	Royal Flying Doctor Service
RFE	reason for encounter
RHD	rheumatic heart disease
RPBS	Repatriation Pharmaceutical Benefits Scheme
RMMR	Residential Medications Management Review
SAAP	Specialist Accommodation Assistance Program
SAB	<i>Staphylococcus aureus</i> bacteraemia
SAHS	self-assessed health status
SARS	severe acute respiratory syndrome
SCC	squamous cell carcinoma (of the skin)
SDAC	Survey of Disability, Ageing and Carers
SEIFA	Socio-Economic Indexes for Areas



SES	socioeconomic status
SIDS	sudden infant death syndrome
SMHWB	Survey of Mental Health and Wellbeing
SMR	standardised mortality ratio
SPR	standardised prevalence ratio
STI	sexually transmissible infection (sometimes referred to as sexually transmitted infection)
TB	tuberculosis
TFR	total fertility rate
TIA	transient ischaemic attack
URTI	upper respiratory tract infection
US	United States (of America)
VET	vocational education and training
WHO	World Health Organization

Glossary

Note that terms in bold type in the definitions are themselves glossary items.

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

acute Coming on sharply and often brief, intense and severe.

acute coronary syndrome Describes an **acute myocardial infarction (heart attack)** and **unstable angina** when they first present as clinical emergencies with chest pain or other features.

acute hospitals Public and private hospitals that provide services mainly to admitted patients with acute or temporary ailments. The average length of stay is relatively short.

acute myocardial infarction (AMI) Term still commonly used to mean a **heart attack**, but more correctly refers only to those heart attacks that have caused some death of heart muscle.

addiction/addictive behaviour When a person shows a very high dependence on something that is harmful or dangerous to them. It is marked by repeated and compulsive activity that the person finds (or would find) very difficult or impossible to stop. The term is most often applied to addictive drug use, such as with alcohol, tobacco or other drugs.

administrative data collection A dataset that results from the information collected for the purposes of delivering a service or paying the provider of the service. This type of collection is usually complete (that is, all in-scope events are collected), but it may not be fully suitable for population-level analysis because the data are collected primarily for an administrative purpose. Examples include the National Hospital Morbidity Database and the Alcohol and Other Drug Treatment Services collection.

admission An admission to hospital. In this report, the term **hospitalisation** is used to describe an episode of hospital care that starts with the formal admission process and ends with the formal **separation** process.

admitted patient A patient who undergoes a hospital's formal admission process.

adverse event Incidents involving harm to a person receiving health care. They include infections, falls and other injuries, and reactions or complications due to surgery and other procedures, medical devices or medication, some of which may be preventable. Adverse events in health care can occur inside or outside hospitals and can be the cause of hospitalisation as well. The rate of adverse events treated in hospital is currently used as an indicator of safety in Australia's health system.

affective disorders Mood disorders such as **depression, mania** and **bipolar affective disorder**. (The term does not include anxiety disorders, which are classified as a separate group.)

age-specific rate A rate for a specific age group. The numerator and denominator relate to the same age group.

age standardisation A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, then the disease rates that would have occurred with that structure are calculated and compared.

aids and appliances Durable medical goods dispensed to ambulatory patients that are used more than once for therapeutic purposes, such as glasses, hearing aids, wheelchairs, and orthopaedic appliances and prosthetics that are not implanted surgically but are external to the user of the appliance. Excludes prostheses fitted as part of admitted patient care in a hospital.

allied health professionals Defined as professionals working in audiology, dietetics and nutrition, hospital pharmacy, occupational therapy, orthoptics, orthotics and prosthetics, physiotherapy, podiatry, psychology, radiography, speech pathology and social work.

Alzheimer disease Condition marked by progressive loss of brain power shown by worsening short-term memory, confusion and disorientation. A form of **dementia**.

ambulatory care Describes care provided to hospital patients who are not admitted to the hospital, such as patients of emergency departments and outpatient clinics. The term is also used to refer to care provided to patients of community-based (non-hospital) health-care services. 'Ambulatory' in these medical contexts implies that the person is 'capable of walking' and is not confined to bed (or, more strictly, a hospital bed).

anaemia A reduced level of haemoglobin, the protein that carries oxygen in the red blood cells. It has many causes, including bleeding (loss of red blood cells), low production of red blood cells, and processes that damage those red blood cells. It can cause paleness, tiredness and even breathlessness.

angina Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs, as in exercise. See also **unstable angina** and **cardiovascular disease**.

angioplasty A method of reducing a blockage in an artery by opening out a balloon placed inside the artery at the point of narrowing. If the artery is a coronary artery the procedure is technically known as percutaneous transluminal coronary angioplasty (PTCA).

antenatal The period covering conception up to the time of birth. Synonymous with **prenatal**.

anxiety disorders A group of mental disorders marked by excessive feelings of apprehension, worry, nervousness and stress. Includes **panic disorder**, various **phobias**, **generalised anxiety disorder**, **obsessive-compulsive disorder** and **post-traumatic stress disorder**.

arrhythmia A disturbed rhythm of the heart beat—too fast, too slow or irregular.

arthritis A group of disorders in which there is inflammation of the joints, which can become stiff, painful, swollen or deformed. The two main types of arthritis are **osteoarthritis** and **rheumatoid arthritis**.

Asperger disorder (Asperger syndrome) A specific form of **pervasive developmental disorders** (autism spectrum disorders) characterised by significant difficulties in social interaction, along with restricted and repetitive patterns of behaviour and interests. It differs from other autism spectrum disorders in that language and cognitive development is relatively normal.

associated cause(s) of death Any condition(s), diseases and injuries—other than the **underlying cause**—considered to contribute to a death. See also **cause of death**.

asthma A common, chronic inflammatory disease of the air passages that presents as episodes of wheezing, breathlessness and chest tightness due to widespread narrowing of the airways and obstruction of airflow. The symptoms may reverse without treatment, but often treatment is required. Different medications can prevent the episodes or relieve them.

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**.

atrial fibrillation A condition marked by an irregular, rapid heartbeat. It arises because the heart's collecting chambers (atria) stop beating rhythmically and quiver uselessly (fibrillate).

autism (autism disorder) A specific form of **pervasive developmental disorders** (autism spectrum disorders) characterised by impaired social interaction and communication, and by restricted and repetitive behaviour, which signs all begin before a child is three years old. Compare with **Asperger syndrome**, which lacks delays in cognitive development and language, and pervasive developmental disorder-not otherwise specified (commonly abbreviated as PDD-NOS), which is diagnosed when the full set of criteria for autism or Asperger syndrome are not met.

auto-immune diseases Are conditions such as **rheumatoid arthritis** and **Type 1 diabetes**, in which the immune system reacts against body tissues and damages them.

available beds Are beds immediately available for use by admitted patients.

average length of stay (ALOS) The average of the length of stay for admitted patient episodes.

avoidable deaths See **potentially avoidable deaths**.

benchmark A standard or point of reference for measuring quality or performance. See also **benchmarking**.

benchmarking A continuous process of measuring quality or performance against the highest standards. See also **benchmark**.

bipolar affective disorder A mental disorder where the person may be depressed at one time and manic at another. Formerly known as **manic depression**.

blended family A couple family containing two or more children aged 0–17, of whom at least one is the biological or adopted child of both members of the couple, and at least one is the stepchild of either member of the couple. Blended families may also include other children who are not the biological or adopted children of either parent.

bloodborne virus Any of a group of viruses that are typically passed on to another person by direct contact between the two people's blood, such as through sharing drug injecting equipment. Notable examples are hepatitis B, hepatitis C and HIV.

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 normal weight, **underweight**, **overweight** or obese (see **obesity**). It is calculated by dividing the person's weight (in kilograms) by their height (in metres) squared; that is, $\text{kg} \div \text{m}^2$. For both men and women, underweight is a BMI below 18.5, acceptable weight is from 18.5 to less than 25, overweight is from 25 to less than 30, and obese is 30 and over. Sometimes overweight and obese is combined, and is defined as a BMI of 25 and over.

bronchiectasis An abnormal widening of the lungs' air passages (bronchi). This allows infections to start, and leads to coughing with pus and sometimes blood. It has a number of causes, including **cystic fibrosis**, low antibody levels and infections, such as **tuberculosis**, **whooping cough (pertussis)** and **measles**.

bronchitis Inflammation of the main air passages (bronchi). May be **acute** (because of infection) or **chronic** (most often because of tobacco smoking).

bulk-billing The process by which a medical practitioner or optometrist sends the bill for services direct to Medicare, so the patients concerned pay nothing. Also known as direct billing.

burden of disease and injury Term referring to the quantified impact of a disease or injury on an individual or population, using the **disability-adjusted life year (DALY)** measure.

caesarean birth (also caesarean section or c-section) A method of birth in which a surgical incision is made into the mother's womb via the abdomen to directly remove the baby.

campylobacteriosis A disease usually marked by diarrhoea, abdominal pain, fever, nausea and vomiting for a few days, caused by some types of *Campylobacter* bacteria and often foodborne.

cancer A large range of diseases whose common feature is that some of the body's cells become defective, begin to multiply out of control, can invade and damage the area around them, and can also spread to other parts of the body to cause further damage.

capital consumption The amount of fixed capital used up each year—otherwise known as depreciation.

capital spending Is spending (expenditure) on large-scale fixed assets (for example, new buildings and equipment with a useful life extending over a number of years).

cardiomyopathy A condition in which there is direct and widespread damage to the heart muscle, weakening it. The condition can be due to various causes, such as viral infections and severe alcohol abuse, and can lead to an enlarged, thickened and dilated heart as well as **heart failure**.

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

casemix The range and types of patients (the mix of cases) treated by a hospital or other health service. This provides a way of describing and comparing hospitals and other services for planning and managing health care. Casemix classifications put patients into manageable numbers of groups with similar conditions that use similar health-care resources, so that the activity and cost-efficiency of different hospitals can be compared. See **diagnosis related groups**.

cataract A cloudy or opaque area in the lens of the eye.

cause of death From information reported on the medical certificate of cause of death, each death is classified by the underlying cause of death according to rules and conventions of the 10th revision of the International Classification of Diseases. The underlying cause is defined as the disease that initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the fatal injury, rather than to the nature of the injury. See also **underlying cause of death**.

cerebrovascular disease Any disorder of the blood vessels supplying the brain or its covering membranes. A notable and major form of cerebrovascular disease is **stroke**.

chemotherapy The use of drugs (chemicals) to prevent or treat disease, with the term usually being applied to treatment for cancer rather than for other uses.

child For the purposes of this report, a person aged under 15.

child mortality rate The number of deaths in a given period among children aged 1–14 per 100,000 children of the same age.

chlamydia The most common **sexually transmissible infection** in Australia, caused by the bacterium *Chlamydia trachomatis*.

cholesterol See **blood cholesterol**.

chronic Persistent and long-lasting.

chronic bronchitis Long-term condition with inflammation of the lung's main air passages (bronchi), causing frequent coughing attacks and coughing up of mucus.

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

chronic obstructive pulmonary disease (COPD) Serious, progressive and disabling long-term lung disease where damage to the lungs, usually because of both **emphysema** and **chronic bronchitis**, obstructs oxygen intake and causes increasing shortness of breath. By far the greatest cause is cigarette smoking.

circulatory disease Alternative name for **cardiovascular disease**.

circulatory system Comprises the heart and the blood vessels, which circulate blood around the body to supply oxygen and nutrients to all body tissues and carry away waste products. Also known as the cardiovascular system.



cirrhosis Permanently damaged structure of the liver due to extensive death of its cells with resultant scarring. The main causes are chronic excessive alcohol use and hepatitis C.

cohort A group of individuals being studied who have experienced the same event at a specified period in time; for example, 'birth cohort' refers to people born in the same year, whereas those in a particular country who experienced the same war could be another cohort.

colonoscope See **colonoscopy**.

colonoscopy A procedure where the inside of the large bowel (colon) is viewed using a long flexible tube (**colonoscope**) inserted through the anus.

colorectal cancer Is cancer of the colon (the lower part of the intestine, usually 1.5 to 2 metres) or of the rectum (the final 15 centimetres of the colon, ending with the anus).

communicable diseases (infectious diseases) Diseases or illnesses due to infectious organisms or their toxic products. Communication may occur directly or indirectly through contact with other humans, animals or other environments that harbour the organism.

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

complication A secondary problem that arises from a disease, injury or treatment (such as surgery) that makes the patient's condition worse and treatment more complicated.

condition (health condition) A broad term that can be applied to any health problem, including symptoms, diseases, and various risk factors, such as high blood cholesterol and obesity. Often used synonymously with **disorder** or **problem**.

confidence interval (CI) A statistical term describing a range (interval) of values within which we can be 'confident' that the true value lies, usually because it has a 95% or higher chance of doing so.

congenital A condition that is recognised at birth, or that is believed to have been present since birth, including conditions that are inherited or caused by environmental factors.

constant prices Dollar amounts for different years that are adjusted to reflect the prices in a chosen reference year. This provides a way of comparing spending over time on an equal value-for-value basis without the distorting effects of inflation. The comparison will reflect only the changes in the amount of goods and services purchased—changes in the 'buying power'—not the changes in prices of these goods and services caused by inflation. Compare with **current prices**.

core activity Term used in discussions of disability, referring to the basic activities of daily living, namely self-care, mobility and communication.

coronary artery bypass graft (CABG) Surgical procedure using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood flow to the heart muscle.

coronary artery disease Describes disease of the coronary arteries, typically meaning **atherosclerosis**. When this leads to symptoms such as chest pain the result is known as **coronary heart disease**.

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

creatinine A substance found in the bloodstream and whose blood levels can be used to help assess kidney function (for example, see **eGFR**). It is a breakdown product of a substance found in muscle.

crude death rate The number of deaths in a given period divided by the size of the corresponding population (typically expressed per 1,000 or per 100,000 population).

cryptosporidiosis A disease usually marked by diarrhoea with cramping abdominal pain and other symptoms, caused by *Cryptosporidium parvum* (a protozoan parasite) and transmitted directly from person to person, or foodborne.

cystic fibrosis A serious hereditary disease in which mucus from glands is too thick and sticky, affecting the lungs and other organs. The person is prone to frequent chest infections, with related problems such as severe **bronchiectasis**, and a much shortened life expectancy.

current prices Dollar amounts reported for a particular year, unadjusted for inflation. Changes in current price expenditures reflect changes in both price and volume. Compare with **constant prices**.

DALY See **disability-adjusted life year**.

data linkage The bringing together (linking) of information from two or more different data sources that are believed to relate to the same entity, for example, the same individual or the same institution. This can provide more information about the entity and in certain cases provide a time sequence, helping to 'tell a story', show 'pathways' and perhaps unravel cause and effect. The term is used synonymously with 'record linkage' and 'data integration'.

dementia A general and worsening loss of higher brain power, such as memory, understanding and reasoning.

dentate Having one or more natural teeth.

depression A mood disorder with prolonged feelings of being sad, hopeless, low and inadequate, with a loss of interest or pleasure in activities and often with suicidal thoughts or self-blame.

determinant Any factor that can increase the chances of ill health (risk factors) or good health (protective factors) in a population or individual. By convention, services or other programs that aim to improve health are usually not included in this definition.

diabetes (diabetes mellitus) A chronic condition in which the body cannot properly use its main energy source, the sugar glucose. This is due to a relative or absolute deficiency in insulin, a hormone that is produced by the pancreas and 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- and long-term effects. For the three main types of diabetes see **Type 1 diabetes**, **Type 2 diabetes** and **gestational diabetes**.

diabetic nephropathy Disease of the capillaries of the **glomeruli** in the kidneys, resulting from **diabetes**.

dialysis/haemodialysis A process used to treat kidney failure. A machine is connected to the patient's bloodstream and then filters the blood externally to the body, removing water, excess substances and waste from the blood as well as regulating the levels of circulating chemicals. In doing this the machine takes on the role normally played by the kidneys.

diphtheria A bacterial infection that usually starts with soreness of the throat and tonsils but which can also affect other parts of the body and become severe enough to block breathing. It is preventable by **vaccination**.

direct billing See **bulk-billing**.

disability Described by the International Classification of Functioning, Disability and Health as a concept of several dimensions relating to an impairment in body structure or function, a limitation in activities (such as mobility and communication), a restriction in participation (involvement in life situations, such as work, social interaction and education), and the affected person's physical and social environment. Described by the *Oxford concise colour medical dictionary* (1998) as 'a loss or restriction of functional ability or activity as a result of impairment of the body or mind'.

disability-adjusted life year (DALY) A year of healthy life lost, either through premature death or equivalently through living with disability due to illness or injury. It is the basic unit used in *burden of disease and injury* estimates.

disease A physical or mental disturbance involving **symptoms** (such as pain or feeling unwell), dysfunction or tissue damage, especially if these symptoms and **signs** form a recognisable clinical pattern.

disorder (health disorder) Used synonymously with **condition**.

DMARD (disease-modifying anti-rheumatic drug) a group of otherwise unrelated drugs that are used to slow down the progression of disease, particularly rheumatoid arthritis, by reducing the body's immune response and/or by reducing inflammation in the affected areas. Includes biologic DMARDs that are produced through genetic engineering.

donovanosis Infectious disease (previously called granuloma inguinale) caused by the bacteria *Chlamydia granulomatis*. It features painless genital ulcers with tissue destruction, and can result in secondary infection and scarring.

Down syndrome Condition caused by a genetic defect known as trisomy 21—an extra chromosome 21, making three instead of two. Produces a characteristic facial appearance and shortness, often with heart defects and usually reduced intelligence.

drug Any biologically active substance that is taken into the body for medicinal purposes or for performance enhancement, pleasure or stimulation. Excludes food.

eGFR A method of estimating the glomerular filtration rate—the amount of blood that the kidneys filter in one minute to clear waste products. The eGFR is based on the levels of **creatinine** in the blood, using a formula that takes into account age, sex and ethnicity.

emphysema A chronic lung disease where over-expansion or destruction of the lung tissue blocks oxygen intake, leading to shortness of breath and other problems.

endoscopy The viewing of internal parts of the body, such as the inside of the lower bowel (the colon) with a **colonoscope**.

epidemic An outbreak of a disease or its occurrence at a level that is clearly higher than usual, especially if it affects a large proportion of the population.

epidemiology The study of the patterns and causes of health and disease in populations, and the application of this study to improve health.

epilepsy A disturbance of brain function marked by recurrent fits and loss of consciousness.

epithelial Refers to the cells that form the covering of most internal and external surfaces of the body and its organs, including the skin and **mucosa**.

external cause The term used in disease classification to refer to an event or circumstance in a person's external environment that is regarded as a cause of injury or poisoning.

faecal occult blood test (FOBT) Blood in a person's faeces may be a sign of bowel cancer but if the blood is not obvious (that is, it is 'occult', meaning secret) it can be detected using the FOBT. The test is the central part of Australia's National Bowel Screening Program, in which testing kits are being sent out to Australians aged 50, 55 and 65, and free test results are later sent to the participants and to the general practitioner they have nominated.

fertility rate Number of live births per 1,000 females aged 15–49.

fetal death Birth of a fetus weighing at least 400 grams (or, where birthweight is unavailable, of at least 20 weeks gestation), which shows no signs of life. Commonly referred to as stillbirth.

fetal death rate Number of fetal deaths per 1,000 total births (fetal deaths plus live births).

FOBT See **faecal occult blood test**.

free-standing day hospital facility A private hospital where only minor operations and other procedures not requiring overnight stay are performed, and which does not form part of any private hospital providing overnight care.

full-time equivalent (FTE) workforce or workload A standard measure of the size of a workforce that takes into account both the number of workers and the hours that each works. For example, if a workforce comprises two people working full time 35 hours a week and two working half time, this is the same as three working full time—an FTE of three.

gastroscopy A procedure where the inside of the stomach is viewed using a flexible tube passed through the mouth.

generalised anxiety disorder A mental disorder where a person is overly and unrealistically anxious and worried about many things over a long period. One of the group of **anxiety disorders**.

genomics Field of study regarding the genome, that is the entire hereditary information encoded in the genes of an organism.

gestational diabetes A form of **diabetes** that is first diagnosed during pregnancy (gestation). It may disappear after pregnancy but signals a high risk of diabetes occurring later on.

glomeruli (singular glomerulus) Part of the basic filtering units of the kidney, the **nephrons**.

glomerulonephritis Inflammation of the **glomeruli**.

gonococcal infection A common **sexually transmissible infection** caused by the bacterium *Neisseria gonorrhoeae*.

gout Disease of excess uric acid in the blood causing attacks of joint pain (most often in the big toe) and other problems.

gross domestic product (GDP) A statistic commonly used to indicate national wealth. It is the total market value of goods and services produced within a given period after deducting the cost of goods and services used up in the process of production but before deducting allowances for the consumption of fixed capital.

haemodialysis See **dialysis**.

health Term relating to whether the body (which includes the mind) is in a good or bad state. With good health the state of the body and mind are such that a person feels and functions well, and can continue to do so for as long as possible.

health indicator See **indicator**.

health outcome A change in the health of an individual or population due wholly or partly to a preventive or clinical intervention.

health promotion Activities to improve health and prevent disease, often described as the process that helps individuals and communities to increase control over the **determinants** of health.

health register A type of data collection that is specifically designed to collect information about individuals, usually for a single health topic. Examples include the National Diabetes Register (for people with diabetes who are treated with insulin), the Australian Cancer Database (people diagnosed with cancer) and the Australian Childhood Immunisation Register (for children up to 7 who have received vaccinations). 'Health registry' refers to the office that manages the register.

health status An individual's or population's overall level of health, taking into account various aspects, such as **life expectancy**, amount of **disability**, levels of disease **risk factors** and so on.

heart attack 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 **myocardial infarction**. See also **cardiovascular disease**.

heart failure When the heart functions less effectively in pumping blood around the body. It can result from a wide variety of diseases and conditions that can impair or overload the heart, such as heart attack, other conditions that damage the heart muscle directly (see **cardiomyopathy**), **high blood pressure**, or a damaged heart valve.

hepatitis Inflammation of the liver, which can be due to certain viral infections, alcohol excess or a range of other causes.

Hib (*Haemophilus influenzae* type b) infection A bacterial infection of infants and children that can cause **meningitis**, **pneumonia** and other serious effects. It is preventable by **vaccination**.

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**.

highly specialised drugs Under Section 100 of the National Health Act, certain drugs (for example cyclosporin) can be supplied to community patients only through hospitals because only hospitals can provide the facilities or staff necessary for the appropriate use of the drugs. These drugs are funded by the Australian Government separately from the Pharmaceutical Benefits Scheme.

Hodgkin disease (Hodgkin lymphoma) A cancer marked by progressive painless enlargement of lymph nodes throughout the body. A form of **lymphoma**.

hospitalisation Synonymous with **admission** and **separation**, that is, an episode of hospital care that starts with the formal admission process and ends with the formal separation process.

hostel Establishment for people who cannot live independently but who do not need nursing care in a hospital or nursing home. Hostels provide board, lodging or accommodation and cater mostly for the aged, distressed or disabled. Residents are generally responsible for their own provisions but may be given domestic assistance, such as help with meals, laundry and personal care.

hypertension See **high blood pressure**.

hypertensive disease Occurs when **high blood pressure** (hypertension) is severe or prolonged enough to cause damage to the heart, brain or kidneys.

illness A state of feeling unwell, although the term is also often used synonymously with disease.

immunisation Inducing immunity against infection by the use of an antigen to stimulate the body to produce its own antibodies. See **vaccination**.

impaired glucose tolerance Condition in which blood glucose levels are higher than normal but less than required for a diagnosis of diabetes, and which signals an increased risk of developing **Type 2 diabetes**.

impairment Any loss or abnormality of psychological, physiological or anatomical structure or function.

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

Index of Relative Socio-economic Disadvantage One of the set of **Socio-Economic Indexes for Areas** for ranking the average socioeconomic conditions of the population in an area. It summarises attributes of the population such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations.

indicator A key statistical measure selected to help describe (indicate) a situation concisely, to track change, progress and performance, and to act as a guide to decision-making. It may have an indirect meaning as well as a direct one; for example, Australia's overall death rate is a direct measure of mortality but is often used as a major indicator of population health. Taking this point further, time spent watching TV may be used as one indicator of physical inactivity.

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

infant A child aged under 1 year.

infant mortality rate The number of deaths among children aged under 1 year in a given period, per 1,000 live births in the same period.

inflammation Local response to injury or infection, marked by local redness, heat, swelling and pain. Can also occur when there is no clear external cause and the body reacts against itself, as in **auto-immune diseases**.



inflammatory bowel disease Encompasses a range of diseases that involve inflammation and subsequent damage to the digestive tract. The most common forms are ulcerative colitis (chronic inflammation to the surface of the colon) and Crohn disease (deeper inflammation in any part of the digestive system from the mouth to anus).

influenza (flu) An acute contagious viral respiratory infection marked by fevers, muscle aches, headache, cough and sore throat.

informal carer A person of any age who provides any informal assistance, in terms of help or supervision, to people with disabilities or long-term conditions or people who are aged 60 and over. This assistance must be ongoing, or likely to be ongoing, for at least six months. See also **primary carer**.

insulin Hormone that is produced by the pancreas and regulates the body's energy sources, most notably the sugar glucose.

intact family A couple family containing at least one child aged 0–17 who is the natural or adopted child of both partners in the couple, and no child aged 0–17 who is the stepchild of either partner of the couple. Intact families may also include other children who are not the natural or adopted children of either parent.

International Classification of Diseases (International Statistical Classification of Diseases and Related Health Problems). The World Health Organization's internationally accepted classification of death and disease. The 10th revision (ICD-10) is currently in use. ICD-10-AM is the Australian modification of ICD-10, used for diagnoses and procedures recorded for patients admitted to hospitals.

intervention (for health) Any action taken by society or an individual which 'steps in' (intervenes) to improve health, such as medical treatment and preventive campaigns.

irritable bowel syndrome Chronically recurring disorder of the lower digestive system that will not show up as physical or blood test abnormalities; symptoms include diarrhoea, constipation, or a combination of both.

ischaemia Reduced or blocked blood supply. See also **ischaemic heart disease**.

ischaemic heart disease Also **heart attack** and **angina** (chest pain). Also known as **coronary heart disease**. See also **ischaemia**.

Kessler Psychological Distress Scale – 10 items (Kessler–10; K10) A survey device that is used to measure non-specific psychological distress in people. It uses 10 questions about negative emotional states that survey participants may have had in the 4 weeks leading up to their interview. The designers recommend only using for people aged 18 and over.

kidney replacement therapy Having a functional kidney transplant or receiving regular **dialysis**.

length of stay Duration of hospital stay, calculated by subtracting the date the patient is admitted from the day of separation. All leave days, including the day the patient went on leave, are excluded. A same-day patient is allocated a length of stay of 1 day.

life expectancy An indication of how long a person can expect to live, depending on the age they have already reached. Technically, it is the number of years of life remaining to a person at a particular age if death rates do not change. The most commonly used measure is life expectancy at birth.

listeriosis A disease which normally appears in otherwise healthy people as an acute, mild fever, sometimes with influenza-like symptoms, caused by the bacteria *Listeria monocytogenes* and usually foodborne. It can cause more severe symptoms in newborns, the elderly, people with poor immunity and pregnant women (in whom it can also cause abortion).

long-term condition A term used in the ABS National Health Surveys to describe a health condition that has lasted, or is expected to last, at least 6 months. See also **chronic diseases**.

low birthweight Weight of a baby at birth that is less than 2,500 grams.

lymphoma A cancer of the lymph nodes. Lymphomas are divided into two broad types, **Hodgkin disease** lymphomas and **non-Hodgkin lymphomas**.

malignancy See **cancer**.

mammogram X-ray of the breast. It may be used to assess a breast lump or as a screening test in women with no evidence of cancer.

mania A mental disorder where the person is overexcited, overactive and excessively and unrealistically happy and expansive. It is the opposite of depression and can alternate with it in the same person in what is known as **bipolar affective disorder** (formerly known as **manic depression**).

manic depression, manic depressive disorder See **bipolar affective disorder, mania** and **depression**.

measles A highly contagious infection, usually of children, that causes flu-like symptoms, fever, a typical rash and sometimes serious secondary problems such as brain damage. It is preventable by **vaccination**.

median The midpoint of a list of observations that have been ranked from the smallest to the largest.

Medicare A national, government-funded scheme that subsidises the cost of personal medical services for all Australians and aims to help them afford medical care.

melanoma A cancer of the body's cells that contain pigment (melanin), mainly affecting the skin. Survival rates are very high for those whose melanoma is detected and removed early, but low if not.

meningitis Inflammation of the brain's covering (the meninges), as can occur with some viral or bacterial infections.

mental illness Disturbances of mood or thought that can affect behaviour and distress the person or those around them, so the person has trouble functioning normally. They include **anxiety disorders, depression** and **schizophrenia**.

metabolomics Field of study regarding the chemical processes of metabolites. Metabolites are chemicals (usually small molecules) that are used during a chemical reaction or are produced by it. Metabolites important for the human body include some hormones and vitamins.

metastasis The spread of a cancer from its original site to other parts of the body.

meta-analysis Analysis of multiple datasets and/or published works, often by combining the results into a single dataset for analysis.

monitoring (of health) As used in this report, 'monitoring' refers to a process of keeping a continuous and close watch over important aspects of the public's health and health services through various measurements, and then regularly reporting on the situation, so the health system and society more generally can plan and respond accordingly. The term is often used interchangeably with **surveillance**, although surveillance may imply more urgent watching and reporting, such as the surveillance of infectious diseases and their epidemics. Monitoring can also be applied to individuals, such as hospital care where a person's condition is closely assessed over time.

morbidity Refers to ill health in an individual and to levels of ill health in a population or group.

mortality Death.

motor neurone disease A serious disease of the nervous system with progressive wasting of muscles, weakness and paralysis.

mucosa (mucous membrane) The layer of cells lining all body passages, such as the airways (from mouth and nose to lungs) and the intestines, and having cells and associated glands that secrete mucus.

multiple sclerosis One of the most common nervous system disorders, with serious and varied symptoms, such as poor coordination and loss of control of limbs, sudden vision problems and disturbed sensations.

mumps A contagious viral disease marked by acute and painful swelling of the saliva-producing glands, often similarly affecting the testicles and sometimes other parts.

musculoskeletal Relating to the muscles, joints and bones.

myocardial infarction See **acute myocardial infarction**.

neonatal death Is the death of an infant within 28 days of birth.

neonatal mortality rate Number of neonatal deaths per 1,000 live births.

neoplasm An abnormal ('neo', new) growth of tissue. Can be 'benign' (not a cancer) or 'malignant' (a cancer). Same as a **tumour**.

nephron The kidney's basic filtering unit.

nephropathy Any disease of the kidney.

neural tube defects Are defects such as spina bifida and anencephalus that have arisen in the neural tube, the part of the embryo that develops into the brain and spinal cord.

neurosis/neurotic disorders A broad category of mental disorders with anxiety as their main feature and whose symptoms are mostly exaggerations of normal emotions or behaviour. They include **anxiety disorders, obsessive-compulsive disorder, stress** reactions and other problems.

non-admitted patient A patient who receives care from a recognised non-admitted patient service/clinic of a hospital, including emergency departments and outpatient clinics.

non-Hodgkin lymphoma A range of cancers of the lymphatic system (lymph glands and the channels they are linked to) that are not of the Hodgkin variety.

non-Indigenous People who have declared they are not of Aboriginal or Torres Strait Islander descent. Compare with **other Australians**.

nursing homes See **residential aged care facilities**.

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

obsessive-compulsive disorder A form of **anxiety disorder** where repeated and unwanted thoughts and impulses disturb and dominate a person. Often involves rituals, such as excessive hand washing, checking and counting, which in turn cause anxiety if they are prevented or out of control.

occasion of service Occurs when a patient receives some form of service from a functional unit of a hospital, but is not admitted.

older person For the purposes of this report, a person aged 65 or over.

ophthalmology A medical specialty dealing with eye diseases.

Organisation for Economic Co-operation and Development (OECD) An organisation of 34 countries including Australia, mostly developed and some emerging (such as Mexico, Chile and Turkey); the organisation's aim is to promote policies that will improve the economic and social wellbeing of people around the world.

osteoarthritis A chronic and common form of **arthritis**, affecting mostly the spine, hips, knees and hands. It first appears from the age of about 30 and is more common and severe with increasing age.

osteoporosis Thinning and weakening of the bone substance, with a resulting risk of fracture.

Other Australians People who have declared they are not of Aboriginal or Torres Strait Islander descent, and those for whom their Indigenous status is unknown. Compare with **non-Indigenous**.

outcome (health outcome) A health-related change due to a preventive or clinical intervention or service. (The intervention may be single or multiple, and the outcome may relate to a person, group or population, or be partly or wholly due to the intervention.)

out-of-pocket costs The total costs incurred by individuals for health-care services over and above any refunds from Medicare and private health insurance funds.

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

P value The probability that an observed difference has arisen by chance alone. By convention, a P value of 0.05 or less is usually considered **statistically significant** because the difference it relates to would occur by chance alone only 1 in 20 times or less often.

palliative care Describes care designed for patients with a terminal illness. The emphasis is on relieving symptoms and achieving the best possible quality of life under the circumstances for the patient, their family and carers.

panic disorder Marked by panic attacks (episodes of intense fear or discomfort) that occur suddenly and often unpredictably.

Pap smear/Pap tests Papanicolaou smear, a procedure to detect cancer and pre-cancerous conditions of the female genital tract.

pathology General term for the study of disease, but often used more specifically for diagnostic services which examine specimens, such as samples of blood or tissue.

patient days The number of full or partial days of stay for patients who were admitted for an episode of care and who underwent separation during the reporting period. A patient who is admitted and separated on the same day is allocated one patient day.

patient transport services Organisations engaged mainly in providing transport of patients by ground or air, along with health (or medical) care. These services are often provided during a medical emergency but are not restricted to emergencies. The vehicles are equipped with life-saving equipment operated by medically trained personnel. Includes public ambulance services or flying doctor services, such as the Royal Flying Doctor Service and Care Flight. Also includes patient transport programs, such as patient transport vouchers or support programs to assist isolated patients with travel to obtain specialised health care.

performance indicators (of the health system) Measures (**indicators**) that can relate to the health system as a whole or to parts of it such as hospitals, health centres and so forth. The measures include accessibility, effectiveness, efficiency and sustainability, responsiveness, continuity of care and safety.

perinatal Pertaining to, or occurring in, the period shortly before or after birth (usually up to 28 days after).

perinatal death Fetal or neonatal death.

perinatal mortality rate Number of perinatal deaths per 1,000 total births (fetal deaths plus live births).

peripheral vascular disease Pain in the legs due to an inadequate blood supply to them.

peritoneal dialysis Treatment in which a solution is pumped into the abdominal cavity, where the body's own peritoneum—the lining of that cavity—acts as a dialysis filter to remove waste products and water.

pertussis (whooping cough) A highly infectious bacterial disease of the air passages marked by explosive fits of coughing and often a whooping sound on breathing in. It is preventable by **vaccination**.

pervasive developmental disorders Refers to a group of disorders characterised by delays in the development of multiple basic functions, including socialisation and communication (sometimes used synonymously with 'autism spectrum disorder'). Includes the disorders specifically diagnosed as **autism disorder**, **Asperger disorder** and pervasive development disorder—not otherwise specified (PDD-NOS).

Pharmaceutical Benefits Scheme (PBS) A national, government-funded scheme that subsidises the cost of a wide range of pharmaceutical drugs for all Australians to help them afford standard medications.

phenomics Field of study regarding the physical and biochemical characteristics of an organism. Whereas a genome describes the genes of an organism (species), a phenome is the actual expression of those genes in an individual.

phobia A form of **anxiety disorder** in which there is persistent, unrealistic fear of an object or situation and which interferes with the person's life as they seek to avoid the object of their fear. Phobias include fear of heights, flying, open spaces, social gatherings, and animals such as spiders and snakes.

plaque (atherosclerotic) A localised area of **atherosclerosis**, especially when raised or built up, and that may cause blockages in arteries.

pneumoconiosis A lung disease resulting from inhaling certain dusts, mostly in the workplace, such as silica, asbestos and coal dust. The dust particles settle deep in the lungs and the body responds by making scar tissue that leads to progressive shortness of breath.

pneumonia Inflammation of the lungs as a response to infection by bacteria or viruses, with the air sacs becoming flooded with fluid, and inflammatory cells and affected areas of the lung becoming solid. Pneumonia is often quite rapid in onset and marked by a high fever, headache, cough, chest pain and shortness of breath.

poliomyelitis (polio) Muscle paralysis, wasting and deformity of limbs after infection by a common virus (poliovirus) that can damage the motor nerves in the spinal cord. It is preventable by vaccination.

population attributable fraction (PAF) The proportion (fraction) of a disease, illness, disability or death in a population that can be attributed to a particular **risk factor** or combination of risk factors. For example, the PAF for cigarette smoking in contributing to lung cancer deaths has been consistently put at about 80% or more in Australia, meaning that if nobody smoked in Australia there would be 80% fewer deaths from lung cancer. Also known as an aetiological (causal) fraction.

population health Typically described as the organised response by society to protect and promote health, and to prevent illness, injury and disability. Population health activities generally focus on prevention, promotion and protection rather than on treatment; on populations rather than on individuals; and on the factors and behaviours that cause illness. In this sense, often used synonymously with **public health**. Can also refer to the health of particular subpopulations, and comparisons of the health of different populations.

population health survey Refers to a survey of a sample the population on aspects of health, typically using a questionnaire. The questionnaire may be completed on a computer (either by the respondent or by the interviewer), on paper, or over the telephone. Other information may be collected by taking measurements, and in some cases specimens of blood, urine or saliva are taken for analysis in a pathology laboratory.

post-traumatic stress disorder (PTSD) A form of **anxiety disorder** in which a person has a delayed and prolonged reaction after being in an extremely threatening or catastrophic situation, such as a war, natural disaster, terrorist attack, serious accident or witnessing violent deaths.

potential years of life lost (PYLL) Number of potential years of life lost in a population as a result of premature death.

potentially avoidable deaths Are deaths below the age of 75 from a specified range of conditions where death is considered to be largely avoidable today, given existing health and social systems. For example, such deaths due to HIV/AIDS, injuries and lung cancer could be avoided through prevention; those due to asthma, appendicitis and a range of other types of cancer could be avoided through treatment; and those through coronary heart disease, stroke and diabetes could be avoided through a combination of prevention and treatment. The rate of potentially avoidable deaths in Australia is currently being used as an indicator of the health system's effectiveness.



potentially preventable hospitalisations (PPHs) Hospital separations from a specified range of conditions where hospitalisation is considered to be largely preventable if timely and adequate care were provided through population health services, primary care and outpatient services. The PPH conditions are classified as vaccine-preventable, chronic and acute. Respective examples include **influenza** and **pneumonia, diabetes** complications and COPD, and dental and kidney conditions. The rate of PPHs is currently being used as an indicator of the effectiveness of a large part of the health system, other than hospital inpatient treatment.

prenatal The period covering conception up to the time of birth. Synonymous with **antenatal**.

prescription drugs Pharmaceutical drugs available only on the prescription of a registered medical or dental practitioner and available only from pharmacies.

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

prevention (of ill health or injury) Action to reduce or eliminate the onset, causes, complications or recurrence of ill health or injury.

primary carer A person who provides most of the informal assistance, in terms of help or supervision, to a person with one or more disabilities or aged 60 and over in one or more of the core activities (communication, mobility and self-care). The 2009 Survey of Disability, Ageing and Carers included as carers people aged 15 and over who identified themselves as carers or were nominated by a care recipient as a carer. See also **informal carer**.

principal diagnosis The diagnosis listed in hospital records to describe the problem that was chiefly responsible for **hospitalisation**.

private hospital A privately owned and operated institution, catering for patients who are treated by a doctor of their own choice. Patients are charged fees for accommodation and other services provided by the hospital and relevant medical and allied health practitioners. The term includes private **free-standing day hospital facilities**.

private patient (in hospital) Person admitted to a private hospital, or person admitted to a public hospital who decides to choose the doctor(s) who will treat them or to have private ward accommodation. This means they will be charged for medical services and accommodation.

problem (health problem) Term often used synonymously with **condition** or **disorder**. May also be used more specifically to refer to symptoms and other health factors that a person or the doctor perceives as a concern—a problem—that needs attention; and which, for example, the person may record in a survey or their doctor may list in clinical notes to form a 'problem list'.

prostate cancer Is cancer of the prostate, the male organ that sits next to the urinary bladder and contributes to the semen (sperm fluid).

proteomics Field of study regarding the structure and functions of proteins. Proteins are fundamental components of all living cells and include many substances, such as enzymes, hormones, and antibodies, which are necessary for the proper functioning of an organism.

psychiatric hospital Establishment devoted mainly to the treatment and care of admitted patients with mental illness.

psychosis a more severe degree of mental disturbance, often involving fixed, false beliefs known as delusions.

public health Activities aimed at benefiting a population, with an emphasis on prevention, protection and health promotion as distinct from treatment tailored to individuals with symptoms. Examples include provision of a clean water supply and good sewerage, conduct of anti-smoking education campaigns, and screening for diseases such as cancer of the breast and cervix. See also **population health**.

public hospital A hospital controlled by a state or territory health authority. In Australia public hospitals offer free diagnostic services, treatment, care and accommodation to all Australians who need them.

public patient A patient admitted to a public hospital who has agreed to be treated by doctors of the hospital's choice and to accept shared ward accommodation. This means that the patient is not charged.

quintile A group derived by ranking the population of people or elements according to specified criteria and dividing it into five equal parts. The term can also mean the cut-points that make these divisions—that is, the 20th, 40th, 60th and 80th percentiles—but the first use is the more common one.

radiology The use or study of X-rays and other rays to help view internal parts of the body as a guide to diagnosis as well as to treatment and its progress.

record linkage See **data linkage**.

recurrent spending Is spending (expenditure) on goods and services that are used during the year, for example, salaries. It may be contrasted with **capital spending**.

refraction The eye's ability to bend the light rays that enter it, to form an image at the back of the eye.

renal dialysis See **dialysis/haemodialysis**.

residential aged care facilities Establishments which provide long-term care involving regular basic nursing care to chronically ill, frail, disabled or convalescent people, or senile inpatients. Also known as nursing homes.

revascularisation (re-vesselling) Restoring adequate blood flow to the heart or other part of the body, usually after the supply has been reduced or blocked, as in angina or a **heart attack**. Revascularisation includes methods such as **angioplasty** and **coronary artery bypass graft** surgery.

rheumatic fever An acute, serious disease that affects mainly children and young adults and can damage the heart valves, the heart muscle and its lining, the joints and the brain. Is brought on by a reaction to a throat infection by a particular bacterium. Now very rare in the non-Indigenous population, it is still at unacceptably high levels among Indigenous Australians living in remote areas. See **rheumatic heart disease**.

rheumatic heart disease Chronic disease from damaged heart valves caused by earlier attack(s) of **rheumatic fever**.

rheumatoid arthritis A chronic, multisystem disease whose most prominent feature is joint inflammation and resulting damage, most often affecting the hand joints in symmetrical fashion. Can occur in all age groups but most commonly appears between ages 20 and 40. Its causes are not certain but involve **auto-immune** processes.



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**.

rubella (German measles) A communicable disease of children and young adults which has mild symptoms but which often causes serious birth defects if it occurs in a mother during the first 3 months of pregnancy. It is preventable by vaccination.

salmonellosis A disease commonly marked by sudden onset of headache, abdominal pain, fever, diarrhoea, nausea and sometimes vomiting, caused by some types of salmonella bacteria and often foodborne.

same-day patients Admitted patients who are admitted to hospital and separated on the same day.

schizophrenia A group of serious mental disorders where imagined and disordered thoughts are key features, often with problems of behaviour, mood and motivation, and a retreat from social life.

screening (for health) A systematic method of detecting **risk factors** or suspicious abnormalities among people who are symptom-free, so that health problems can be either prevented or followed up, diagnosed and treated as early as possible. Screening is usually done through special programs aimed at higher risk groups in the population. A variant of screening, often known as case-finding, is where clinicians opportunistically look for risk factors or abnormalities in people seeing them for other reasons, for example, when many doctors routinely measure blood pressure in all patients consulting them.

Section 100 drugs See **highly specialised drugs**.

separation The formal process where a hospital records the completion of an episode of treatment and/or care for an admitted patient. In this report, described by the term **hospitalisation**.

sexually transmissible infection An infectious disease that can be passed to another person by sexual contact. Notable examples include chlamydia and gonococcal disease.

shigellosis A communicable disease characterised by acute diarrhoea with fever, nausea and sometimes other symptoms, usually transmitted directly from person to person via the faecal–oral route. It is caused by *Shigella* species bacteria, including *Shigella dysenteriae 1*, the cause of dysentery.

SIDS Sudden infant death syndrome, also known as cot death. It refers to the sudden and unexpected death of an infant where the cause is unknown.

sign (clinical) An indication of a disorder that is detected by a clinician or other observer who examines the person affected. Unlike with **symptoms**, a patient does not necessarily notice or complain of a sign and many signs are detected only with special techniques used by the person doing the examination.

sleep apnoea When a person repeatedly stops breathing during sleep. It has the same cause as snoring—reduced airflow at the back of the mouth—but is more extreme. More common in males and the obese, it leads to poorer mental functioning during the day and a greater risk of accidents.

socioeconomic status An indication of how 'well off' a person or group is. In this report, socioeconomic status is mostly reported using the **Socio-Economic Indexes for Areas**, typically for five groups, from the most disadvantaged (worst off) to the least disadvantaged (best off).

Socio-Economic Indexes for Areas A set of indexes, created from Census data, that aim to represent the socioeconomic status of Australian communities and identify areas of advantage and disadvantage. The index value reflects the overall or average level of disadvantage of the population of an area; it does not show how individuals living in the same area differ from each other in their socioeconomic status. This report uses the **Index of Relative Socio-economic Disadvantage**.

statistical significance An indication from a statistical test that an observed difference or association may be significant or 'real' because it is unlikely to be due just to chance. A statistical result is usually said to be 'significant' if it would occur by chance less than once in 20 times.

statistics (health) Numerical description of a population's health and the factors affecting that health.

stent A metal mesh tube that is expanded within an artery at a point of narrowing and left there to hold the artery open.

step family A couple family containing one or more children aged 0–17, none of whom is the natural or adopted child of both members of the couple, and at least one of whom is the stepchild of either member of the couple. A step family may also include other children who are not the natural or adopted children of either parent.

STI See **sexually transmissible infection**.

stillbirth See **fetal death**.

stress Poorly defined term referring to when a person is under significant psychological or physical pressure—real or perceived, acute or chronic. Among the many examples are illness or injury, bereavement, family problems, work demands or job loss.

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.

substance use disorder A disorder of harmful use and/or dependence on illicit or licit drugs, including alcohol, tobacco and prescription drugs.

sudden infant death syndrome See **SIDS**.

suicide Deliberately ending one's own life.

surveillance (for health) See **monitoring**.

symptom Any indication of a disorder that is apparent to the person affected. Compare with **sign (clinical)**.

tetanus A serious infection in which a bacterial nerve poison causes spasm of the jaw muscles (lockjaw) and body muscles generally. It is caused by a bacterium entering through a wound. The disease is preventable by **vaccination**.

thrombolysis Emergency 'clot-busting' drug treatment for a **heart attack**.

thrombosis Clotting of blood, with the term usually applied to clotting within a blood vessel due to disease, as in a **heart attack** or **stroke**.

tinnitus The sensation of ringing or other sounds in the ears when there is no external source of sound.

Torres Strait Islander A person of Torres Strait Islander descent who identifies as a Torres Strait Islander and is accepted as such by the community in which he or she lives.

transient ischaemic attack (TIA) A mini **stroke**, with temporary problems in speech or paralysis that last for 24 hours or less, often only minutes. It is a strong warning sign of a more severe stroke.

tuberculosis (TB) A bacterial disease that affects the lungs especially, with serious fever-like symptoms and destruction of tissue. It can spread to other parts of the body, causing secondary problems and often death if not treated.

tumour See **neoplasm**.

Type 1 diabetes A form of **diabetes** mostly arising among children or younger adults, marked by a complete lack of insulin and needing insulin replacement for survival.

Type 2 diabetes The most common form of **diabetes**, occurring mostly in people aged 40 or over, and marked by reduced or less effective insulin.

underlying cause of death The condition, disease or injury initiating the sequence of events leading directly to death; that is, the primary or main cause. Compare with **associated cause(s) of death**.

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

unstable angina A form of **angina** that is more dangerous than normal angina but less so than a **heart attack**. It can feature chest pain that occurs at rest; and in someone who already has angina it can be marked by new patterns of onset with exertion or by pain that comes on more easily, more often or for longer than previously.

uraemia A marker of kidney failure, with a build-up in the blood of urea and related waste products which the kidneys would normally eliminate through the urine.

vaccination The process of administering a vaccine to a person to produce immunity against infection. See **immunisation**.

vector An insect or other organism that transmits infectious micro-organisms from animal to human or human to human.

ventricular septal defect A congenital defect of the heart that occurs as an opening in the wall that separates the left and right main pumping chambers (the ventricles).

whooping cough See **pertussis**.

yersiniosis A disease typically involving acute diarrhoea, fever and other abdominal symptoms, caused by the bacteria *Yersinia pseudotuberculosis* and *Yersinia enterocolitica* and often foodborne.

young person For the purposes of this report, a person aged 15–24.

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