Australian Government

Australian Institute of
Health and Welfare

Australia's health 2010

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

Australian Institute of Health and Welfare
Canberra

The Australian Institute of Health and Welfare is Australia's national health and welfare statistics and information agency. The Institute's mission is *better information and statistics for better health and wellbeing.*

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Australian Government
Australian Institute of
Health and Welfare

*Better information and statistics
for better health and wellbeing*

The Hon Nicola Roxon MP
Minister for Health and Ageing
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 2010*, 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

Hon. Peter Collins, AM, QC
Chairperson of the Board

12 May 2010

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Contents

Preface

Ten years into the new century and I'm delighted to present you with the latest version of *Australia's health*—the twelfth edition of the AIHW's report card on health to the nation. Every two years the AIHW must report to Parliament on Australia's progress and each time we can draw on new and enhanced information.

Australia's health has become an indispensible resource for those who need a comprehensive picture of the health of Australians and their health services. The report supplies many statistics about the health landscape. If decision makers want to review national priorities for health, or to see how current priority areas are tracking, here is the report to help them.

Let me point out two important themes in this edition. The first is a continuing and evolving theme in the history of *Australia's health*—that of the interaction of socioeconomic factors and illness prevention. Over the years this discussion has grown considerably, with the chapter on determinants in this edition covering environmental health, health literacy and health promotion. Also, special population groups are covered in another chapter, with particular attention being paid to the health of Indigenous Australians. Public policy is showing more and more interest in prevention of ill health and this report strongly supports that focus.

The other theme is a special indicator-based discussion of Australia's performance (Chapter 9). It follows the inaugural performance chapter in *Australia's health 2008* and this year it uses 42 indicators approved by Australia's health ministers. It is no small challenge to assess the performance of such a complex system using a relatively small set of indicators. The chapter shows that progress is certainly being made although, as it concludes, better data and more years of observation are needed before we can get a more complete picture of Australia's health system performance.

While governments discuss reforms to the funding and responsibility matrix of the Australian health system, the overall health of the population responds slowly, reflecting the variety of determinants and the changing service system. The information in this report provides an objective measure of accountability for the health of Australians; a touchstone for effectiveness.

This edition of *Australia's health* represents the work of 85 contributors within the Institute and beyond—an effort ably and tirelessly led by Susan Killion and Paul Magnus. This is the fourth and final *Australia's health* to be edited by Paul Magnus. His unique combination of subject knowledge and a deep commitment to getting the messages out better will be sorely missed at the AIHW.

And finally, I take this opportunity to recognise the invaluable contribution of Susan Killion, who left the AIHW this year after almost 4 years of service. As Head of the AIHW's Health Group, Susan has led major enhancements of health data, information and analysis.

Thank you Susan and Paul and good luck for your future ventures.

Dr Penny Allbon
Director, Australian Institute of Health and Welfare

Key points—*Australia's health 2010*

This section presents selected key findings from the report. Also, each chapter from 2 to 8 begins with its own list of key points. Please refer to the index at the back to help you find more detail on these topics.

General

Life expectancy and death

- Australia's life expectancy at birth continues to rise and is among the highest in the world—almost 84 years for females and 79 years for males.
- Death rates are falling for many of our major health problems such as cancer, cardiovascular disease, chronic obstructive pulmonary disease, asthma and injuries.
- Coronary heart disease causes the largest number of 'lost years' through death among males aged under 75 years, and breast cancer causes the most among females.

Diseases

- Cancer is Australia's leading broad cause of disease burden (19% of the total), followed by cardiovascular disease (16%) and mental disorders (13%).
- The rate of heart attacks continues to fall, and survival from them continues to improve.
- Around 1 in 5 Australians aged 16–85 years has a mental disorder at some time in a 12-month period, including 1 in 4 of those aged 16–24 years.
- The burden of Type 2 diabetes is increasing and it is expected to become the leading cause of disease burden by 2023.
- The incidence of treated end-stage kidney disease is increasing, with diabetes as the main cause.

Health risks

- Risk factors contribute to over 30% of Australia's total burden of death, disease and disability.
- Tobacco smoking is the single most preventable cause of ill health and death in Australia.
- However, Australia's level of smoking continues to fall and is among the lowest for OECD countries, with a daily smoking rate of about 1 in 6 adults in 2007.
- Three in 5 adults (61%) were either overweight or obese in 2007–08.
- One in 4 children (25%) aged 5–17 years were overweight or obese in 2007–08.
- Of Australians aged 15–74 years in 2006–2007, less than half (41%) had an adequate or better level of health literacy.
- Rates of sexually transmissible infections continue to increase, particularly among young people.
- Use of illicit drugs has generally declined in Australia, including the use of methamphetamines (the drug group that includes 'ice').

Life stages

Mothers and babies

- The proportion of females having caesarean sections has continued to increase over the latest decade, from 21% in 1998 to 31% in 2007.
- The perinatal death rate of babies born to Indigenous mothers in 2007 was twice that of other babies.

Children and young Australians

- Death rates among children and young people halved in the two decades to 2007, largely due to fewer deaths from transport accidents.
- More children are being vaccinated against major preventable childhood diseases, with 91% (the target level) being fully vaccinated at 2 years of age—but only 82% of 5 year olds are covered.
- Land transport accidents and intentional self-harm accounted for 2 in every 5 deaths (42%) among young Australians (aged 15–24 years) in 2007.

People aged 25–64 years

- The main causes of death in this age group in 2007 were coronary heart disease for males (14% of their deaths) and breast cancer for females (12%).

Older Australians

- For older people, the main causes of death are heart disease, stroke and cancer.
- At age 65, Australian males can now expect to live a further 19 years to almost 84 years of age, and females a further 22 years to almost 87.

Groups of special interest

- **People with disability** are more likely than others to have poor physical and mental health, and higher rates of risk factors such as smoking and overweight.
- Compared with those who have social and economic advantages, **disadvantaged Australians** are more likely to have shorter lives.
- **Indigenous people** are generally less healthy than other Australians, die at much younger ages, and have more disability and a lower quality of life.
- **People living in rural and remote areas** tend to have higher levels of disease risk factors and illness than those in major cities.
- Compared with the general community, **prisoners** have significantly worse health, with generally higher levels of diseases, mental illness and illicit drug use than Australians overall.
- Most **migrants** enjoy health that is equal to or better than that of the Australian-born population—often with lower rates of death, mental illness and disease risk factors.
- Compared with those in the general community, **Defence Force members** have better health, although their work can place them at higher risk of injury.
- The **veteran community** is less likely than the general community to report being in very good or excellent health.

Health services

- In 2007–08, just over 2% of total health expenditure was for preventive services or health promotion.
- Between 1998–99 and 2008–09, there was an increase in general practitioners' management of some chronic diseases, including hypertension, diabetes and depression.
- Ambulances attended 2.9 million incidents in 2008–09, of which 39% were emergencies.
- The number of hospital admissions rose by 37% in the decade to 2007–08.
- Over half of the hospital admissions (56%) in 2007–08 were same-day admissions, compared with 48% in 1998–99.
- In 2008–09, about 1 in 9 of all prescriptions under the Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme were for a mental health-related medication.

Health workforce

- Employment in health occupations is still growing—23% growth between 2003 and 2008, almost double that across all occupations (13%).
- Between 2002 and 2007, there was a 26% increase in people completing health occupation university courses.
- The mix of the medical workforce changed between 1997 and 2007
  - the supply of primary care doctors (in 'full-time equivalent' numbers per 100,000 population) has decreased
  - the supply of specialists, specialists-in-training and hospital-based non-specialists has increased.

Health expenditure

- Health expenditure during 2007–08 was $103.6 billion, exceeding $100 billion for the first time.
- Health expenditure in 2007–08 equalled 9.1% of gross domestic product (GDP).
- As a share of its GDP, Australia spent more than the United Kingdom in 2007–08 (8.4%), a similar amount to the OECD median (8.9%) and much less than the United States (16%).
- Governments funded almost 70% of health expenditure in 2007–08.
- For Indigenous Australians in 2006–07, spending per person on health and high-level residential aged care was 25% higher than for other Australians.

1

Introduction

How good is Australia's health?

How does it vary between groups?

What things influence it?

What is being done to improve it and how well is that working?

These are the big questions behind *Australia's health 2010*, the 12th biennial report from the Australian Institute of Health and Welfare (AIHW). As a report card to the nation, *Australia's health 2010* brings together the latest available national statistics compiled by the AIHW from many data sources. Its target readers are interested members of the public, clinicians, researchers, students, policy makers and government. Many of the topics it covers are more fully treated in separate AIHW publications, all of which are available on the AIHW website.

We can see from this edition of *Australia's health* and its recent predecessors that there are indeed some answers to these questions. The health of Australians is generally good, it is improving on many fronts and it compares well with other countries.

But the 'simple' big-picture answers have a complex background. They depend on many statistics that are in turn derived from a vast array of data (see Box 1.1) compiled by many people throughout Australia and its extended health system. Those Australia-wide contributors include people working in public and private hospitals, in research agencies, in government health departments, in special health registries such as those for cancer, and in state- and territory-based registries of births, deaths and marriages.

Ultimately, it is all Australians who contribute because there would be no data without them. Through them we also learn about the exceptions, some of them disturbing, to the generally good news. These exceptions include the rising levels of diabetes and obesity, the poorer health of those in lower socioeconomic areas, and especially the health problems that affect so many of Australia's Indigenous people. The aim of *Australia's health*, therefore, is to present all the key parts of the national picture, positive or not.

Box 1.1: Data sources and why some statistics appear old

Each of the many data sources used in *Australia's health 2010* has strengths and limitations that affect how they can be used and what we can infer from the results. The Australian Institute of Health and Welfare (AIHW) takes great care to ensure that data used here 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 derived from major data sources.

Although this report is published in 2010, nearly all of the statistics refer to 2008 or earlier. Why is this? First, some data, such as population-based surveys, are collected every 3 or 5 years, or even less often. Second, whether data are collected recently or not, it can often take a year or more before they are fully processed and released to the AIHW. Finally, the AIHW in turn often needs some months to ensure the quality and accuracy of statistics and their analysis before they are released.

Australians place great value on health, and their expectations of the health system are high. This places demands on the system—and notably on governments—to keep doing better. This means minimising mistakes and improving how the system deals with a growing range of challenges. How can it meet the complex needs in dealing with chronic diseases, for example, which continue to become more common as the population ages? Can services to rural areas be improved and how can they attract enough doctors to work there? If public hospitals are in crisis, how can this be avoided? And so on.

Indeed, at the policy level, recent initiatives suggest a mood for reform. Commissioned by the Australian Government, three far-reaching national reports were issued in 2009. They cover health promotion and prevention, primary and hospital care: a roadmap for action by the Preventative Health Taskforce, the draft National Primary Health Care Strategy, and the final report of the National Health and Hospitals Reform Commission. If these reports lead to changes, data will be needed to help drive and guide them, just as data continue to be needed with the vast range of usual business. *Australia's health 2010* and its successors can be part of the process.

This first chapter begins by discussing what health is and presenting a brief picture of Australia today. It then describes some of the broad practical and social factors that Australia needs to consider in its efforts to improve health. Next, it outlines the Australian health system and how its performance is being measured, and follows with a summary of some recent developments in the national health information arena. The chapter concludes by summarising the structure of the rest of the report.

1.1 Understanding health

What is health?

Ideas continue to evolve about what it is to be healthy or unhealthy. One view focuses mostly on the individual and emphasises the presence or absence of disease and of medically measured risk factors. A broader and more widely accepted view includes a wide range of social and economic risk and protective factors along with various aspects of wellbeing. Taking 'health' at its simplest, the World Health Organization (WHO) defines 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 has long encouraged health researchers to take a more all-round view of health.

This report is based on the ideas that health is an important part of wellbeing, of how people feel and function; that it contributes to social and economic wellbeing; that it is not simply the absence of illness or injury, and there are degrees of good health as well as of bad health; and that health should be seen in a broad social context. It can be useful to take a longer range view as well. Factors such as smoking, heavy alcohol use and high blood pressure—to mention just a few—are known to pose serious long-term risks to our health; and disease processes can develop over many years before they show themselves through symptoms. Taking account of this, and of the social factors that influence our health in various ways, it could be said that *healthy people feel and function well in body and mind and are in a condition to do so for as long as possible.*

The development of health statistics is influenced by this evolution in thinking. Although most health statistics are still about ill health (mortality and diseases), there are now serious efforts in Australia and many other countries to develop statistics on the broader aspects of health. The International Classification of Diseases and Related Health Problems (now in its 10th revision), which is mainly used to measure ill health, is now complemented by the International Classification of Functioning, Disability and Health (adopted in 2001), which is used for measuring levels of functioning and health. Along with these advances, it is now accepted that physical, mental and social wellbeing are inextricably linked to our environment and social values.

A framework

This book is based on the conceptual framework presented in Figure 1.1. It shows that levels of health and wellbeing ('how good is Australia's health?') depend on two broad forces: determinants ('what things influence health?') and interventions and their resources ('what is being done to improve it?'). This closely matches the framework used in our companion publication, *Australia's welfare 2009* (AIHW 2009).

There are many determinants and they interact in complex ways. They include behaviours such as smoking, diet and physical activity, and much broader factors such as our social and environmental background—and all of these interacting with our genetic makeup (see Chapter 3). Interventions can range from personal services to treat us when we are sick through to broad preventive campaigns aimed at determinants such as obesity or physical inactivity.

Two further things should be taken into account in using this framework and its parts. The first is to consider the features and needs of certain groups—not just of individuals or the population as a whole—in terms of their health, their determinants and the care they receive. The second is to remember that Australia's health can be viewed as reflecting the performance of society as a whole, not just of the health system.

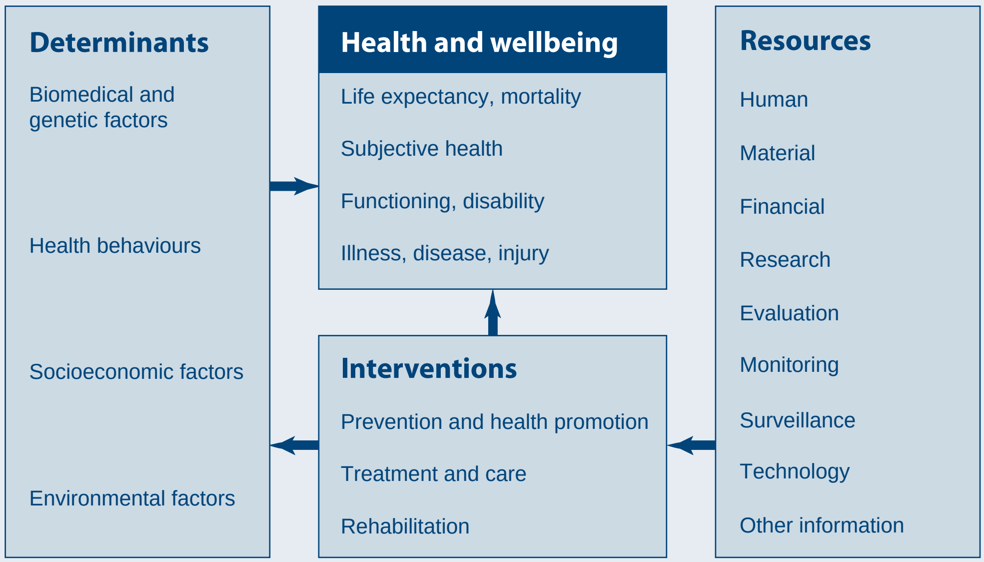


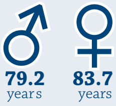
Figure 1.1: Conceptual framework for *Australia's health 2010*

Australia at a glance

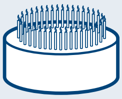
21.9 million people lived in Australia in June 2009.

Indigenous people were estimated at about 550,000 in June 2009, about 2.5% of the total population.

Fertility rate was 1.97 in 2008, the highest since 1977.

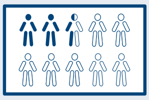


Life expectancy continues to increase, so an Australian male born today can expect to live to 79.2 years and a female to 83.7 years.

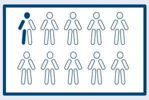


Australians aged 80 years or over now number about 800,000 (3.7% of the total population); nearly two-thirds of them are female.

64% of people live in capital cities, numbering 14 million in June 2009.

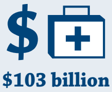


25% of Australians were born overseas, especially the United Kingdom, New Zealand and Asia.



Unemployment was 5.5% in December 2009.

Australia was 12th wealthiest among OECD countries, based on gross domestic product (GDP) per person in 2007.



Expenditure on health was 9.1% of GDP in 2007–08, amounting to over $103 billion or $4,874 per person.

1.2 Australia at a glance

Australia is a vast continent with a relatively small population: 21.9 million people as at June 2009. The population is highly urbanised, with over 64% living in capital cities and mostly along the eastern seaboard and the south-eastern corner of the continent.

The Australian population is ageing, and this affects requirements for health and aged care services, the economy, and income support structures. Population ageing is marked by an upwards shift in the age structure, so the proportion of younger people declines as the proportion of older people increases. The median age of the population has increased from 31.6 years in 1989 (ABS 2008a) to 36.9 years in 2008, and is projected to increase to between 38.7 and 40.7 years in 2026 (ABS 2008b).

1.3 Improving health and measuring performance

Many things influence health—as further described in Chapter 3—including preventive and treatment interventions. Living in a country that is socially and economically prosperous is arguably the most important factor in ensuring a good average level of health for a population. A prosperous country can afford to spend more on education and health care, thereby improving the health of its population. This can lead to improved employment that in turn can lead to more economic and social prosperity, and so maintain the healthy cycle.

However, these influences are not experienced to the same degree by all groups. There are differences among groups, such as their education and income levels, their choices about healthy living, and so forth.

Action on broad social risk and protective factors can be seen as the widest and most far-reaching form of 'health intervention'. Such action is among the great aims of society for reasons that include health, in its narrower sense, but which go well beyond it. It follows that this involves much more than the health system. However, that system can do much in its own right. Its activities range from clinical and preventive services and programs through to efforts to help improve the physical, social and economic environment for groups or individuals at special risk.

Given the great range of influences on health, major improvements depend on strong partnerships between components of the system—such as public and private health and clinical care—and require that the health sector works with other sectors to make the best use of available resources. Partnerships are also vital between the health system and others involved in the lives of those using the system, such as family and friends, teachers and employers.

As in other areas of public policy, pursuing the best health for a society involves value judgments and includes political processes with competing interests. Along with limited resources, the challenge of providing improved health requires choices, priority setting and trade-offs between the health sector and other sectors, between prevention and treatment services, between improving health overall and reducing inequalities, and between short-term and longer term objectives.

National health performance

In 2001, Australia's National Health Performance Committee adopted a conceptual framework designed for measuring health system performance, the National Health Performance Framework (NHPF). It was revised in 2008 and the result is shown in Figure 1.2 in a shorter form. It can be seen that some of the NHPF's major features are consistent with the conceptual framework for this report (Figure 1.1), through two of the NHPF's three 'domains', namely 'health status and outcomes' and 'determinants of health'. In particular, however, the NHPF offers a structure for considering the performance of the health system. The framework's 'dimensions' include:

- availability and accessibility of services and programs
- safety of care
- effectiveness of interventions in achieving the desired outcome
- responsiveness of the health system to individual or population needs
- the degree to which care is integrated and coordinated.

Based on the NHPF, Australia's health ministers have agreed on a series of performance indicators. Chapter 9 describes those indicators and discusses the latest related statistics.

<table>
<tr><th colspan="4">Health status and outcomes</th></tr>
<tr><td>Health conditions</td><td>Human function</td><td>Wellbeing</td><td>Deaths</td></tr>
<tr><th colspan="4">Determinants of health</th></tr>
<tr><td>Environmental factors</td><td>Community and socioeconomic factors</td><td>Health behaviours</td><td>Biomedical factors</td></tr>
<tr><th colspan="4">Health system performance</th></tr>
<tr><td>Effectiveness</td><td colspan="2">Safety</td><td>Responsiveness</td></tr>
<tr><td>Continuity of care</td><td colspan="2">Accessibility</td><td>Efficiency and sustainability</td></tr>
</table>

Figure 1.2: The National Health Performance Framework

1.4 The Australian health system: an outline

The Australian health system is complex, with many types of public and private service providers, and a variety of funding and regulatory mechanisms.

Those who provide health services include medical practitioners, nurses, other health professionals, hospitals, clinics, and government and non-government agencies. Funding is provided by all levels of governments, health insurers and individual Australians. Health services and funding are covered in depth in chapters 7 and 8, but an overview is provided here to acquaint the reader with major elements of Australia's health system.

Overall coordination of the public health-care delivery system is the responsibility of federal, state and territory health ministers. 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. AHMAC advises Australian health ministers on policy, resources and financial issues.

Box 1.2: Is this description of the health system accurate?

As already specified, the Australian Government has before it three major reports issued in 2009 and they contain many recommendations. Some of those recommendations, if taken up, may lead to significant changes to Australia's health system. However, this section describes the system at the time that *Australia's health* goes to print in the first half of 2010.

Given the complex funding arrangements and multi-faceted nature of the health system, it is no wonder that the public can find it difficult to understand who is responsible for their services and how to effect change. Figure 1.3 represents the main groups of health services, their funding sources and who has responsibility for providing them. It provides an at-a-glance picture to help answer the question, 'Who funds and who runs the health system in Australia?' More complete information about service provision and funding is found in chapters 7 and 8.

The (white) middle ring shows the major groups of services; the outer ring shows who funds each group and in what proportion; and the inner ring shows who actually delivers the service—the public sector, the private sector or both. Starting with the outer ring, the proportion of different funding sources for each service group is colour-coded. Funding is provided by the Australian Government or state, territory and local governments, as well as by private health insurance and out-of-pocket payments by individuals. Where Australian Government funding is provided indirectly in the form of subsidies or rebates, this is indicated by a broken arrow.

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 and medical imaging. *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. Examples are not exhaustive and each group of services consists of many types of activities.

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

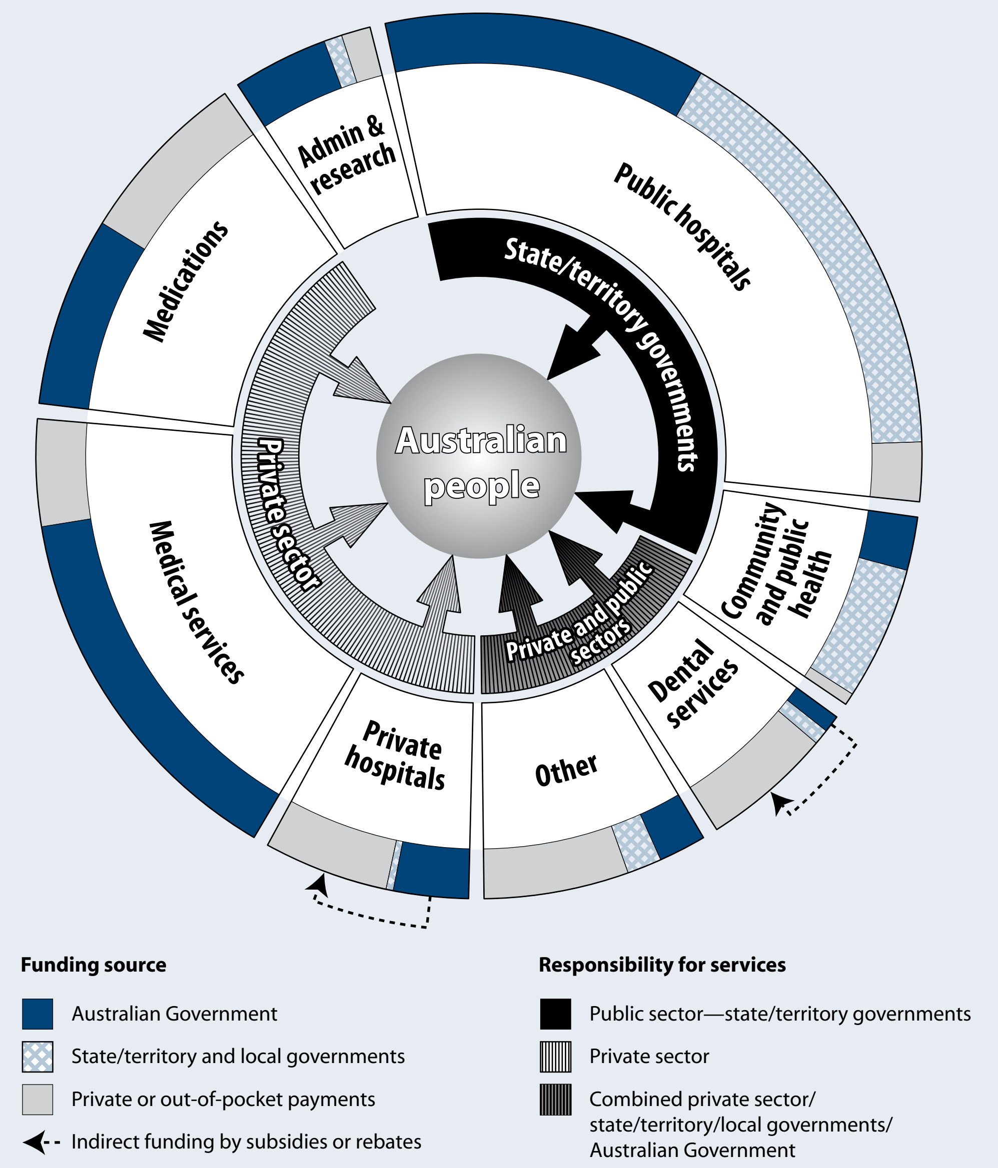


Figure 1.3: Health services—funding and responsibility

Who pays for health services?

Over two-thirds of total health expenditure in Australia is 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, Medicare and the Pharmaceutical Benefits Scheme (PBS). Medicare subsidises payments for services provided by doctors, optometrists and other allied health professionals such as clinical psychologists. The PBS subsidises payments for a high proportion of prescription medications bought from pharmacies, with individuals contributing out-of-pocket payments for these services as well. 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 further subsidised by social welfare arrangements, with larger rebates provided for individuals or families who receive certain income support payments (such as for unemployment or disability). There are also special health-care arrangements for members of the Australian Defence Force, and for war veterans and their dependants.

Services and subsidies

Most people's first contact with the health system is through a general medical practitioner (GP). Patients can choose their own GP and are reimbursed for all or part of the GP's fee by Medicare. For specialised care, patients can be referred by GPs to specialist medical practitioners, other health professionals, hospitals or community-based health-care organisations. Community-based services—a range 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, and family planning.

Patients can access public hospitals through emergency departments, where they may present on their own initiative, through the ambulance services, or after referral from a medical practitioner. Public hospital emergency and outpatient services are provided free of charge, 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. Those admitted to public hospitals can choose to be treated there as private patients, and others can choose to be admitted to a private hospital.

Private patients treated in a private hospital 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.

Australians also visit dentists and other private sector health professionals such as physiotherapists, chiropractors and natural therapists. Costs are usually met by the patients themselves or with the support of private health insurance.

Several state and territory governments and the Australian Government have established free 24-hour telephone-based health advice services in recent years. These are staffed by health professionals who answer queries from callers about health problems, assisted by specialised reference software. The service aims to become nationwide and at the time of writing this report in the first half of 2010 it covers the Australian Capital Territory and the Northern Territory, New South Wales, South Australia and Western Australia.

Health insurance

In addition to coverage by Medicare and the PBS, Australians have a choice of a variety of private health insurance schemes. At the end of December 2009, 44.7% of the population was covered by basic private health insurance (PHIAC 2010). Participation in private health insurance membership is encouraged by a federal government tax rebate scheme. Hospital insurance schemes cover services in private hospitals as well as those provided in public hospitals for private patients. These are supplemented by additional schemes that cover a wide range of allied health and other professional services, including some alternative or complementary health services.

Other health services

The services above are complemented by public health preventive services such as:

- 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 ensure food 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 cancer, cervical cancer and bowel cancer.

Who regulates health services?

Health services are regulated in various ways. State and territory governments are responsible for licensing or registering private hospitals (including free-standing day hospital facilities); and each state and territory has legislation relevant to the operation of public hospitals. State and territory governments are also largely responsible for industry regulations, such as the sale and supply of alcohol and tobacco products. Profession-specific registration boards established by each state and territory government are responsible for registering medical practitioners and other health professionals until July 2010, when the Australian Health Practitioner Regulatory Authority is scheduled to assume this responsibility as part of a national scheme.

The Australian Government's regulatory roles include overseeing the safety and quality of pharmaceutical and therapeutic goods and appliances, managing international quarantine arrangements, ensuring an adequate and safe supply of blood products, and regulating the private health insurance industry. There is also an established role for governments in the regulation of food safety and product labelling.

Other parts of the system

Health services are supported by many other agencies. Research and statistical agencies provide the information needed for disease prevention, detection, diagnosis, treatment, care 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, and coordinating voluntary care.

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. Departments of transport and the environment, liquor licensing authorities, the education sector and the media are just a few examples.

1.5 National health information

Health information is a fundamental component of the evidence base for developing and evaluating health policies and programs. In this report 'national health information' refers mainly to statistical information derived from surveys or administrative data. (More broadly, health information includes research into the nature, causes and mechanisms of disease as well as clinical trials and other research into diagnosis and treatments.)

Since 1993, the collection of national health information in Australia has been governed under the National Health Information Agreement (NHIA), whose signatories are the Australian Government Department of Health and Ageing, state and territory health authorities, the Australian Bureau of Statistics, the AIHW, the Department of Veterans' Affairs and Medicare Australia. The NHIA provides for a cooperative approach to developing, collecting and exchanging national health information, and helps to improve access by community groups, health professionals, and government and non-government organisations. A major product of the NHIA is the *National health data dictionary*, which is updated annually to provide standards for national health information and is used as a guide for gathering health data.

What is health information?

Health information is described in the 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 the context of the conceptual framework outlined in Figure 1.1, the health information collected under the NHIA is about:

- assessing the level and distribution of the health of populations
- measuring the level, distribution and influence of health determinants (see Section 3.1 for definition)
- quantifying the inputs to the health system
- monitoring and appraising health interventions
- furthering knowledge through research and statistics
- evaluating the performance of the health system
- understanding the interrelationships of all of the above.

How national health information is governed

The NHIA is governed under AHMAC; its principal committee, the National e-Health and Information Principal Committee (NEHIPC); and the National Health Information Standards and Statistics Committee (NHISSC), which is a standing committee of NEHIPC. The various major bodies and their reporting relationships are shown in Figure 1.4.

Important activities for the NHISSC include performance reporting for the Council of Australian Governments (COAG) National Healthcare Agreement and dealing with new and emerging information issues related to the development of e-Health systems.

The NHISSC also has responsibility for the endorsement of metadata standards for inclusion in the national health metadata registry, and provides stewardship of the national health performance framework on behalf of AHMAC. It provides advice to NEHIPC on national statistical protocols and standards for data linkage, geocoding and data anonymisation and, in conjunction with the Australian Collaborating Centre for the WHO Family of International Classifications, provides advice on the classification needs for health information.

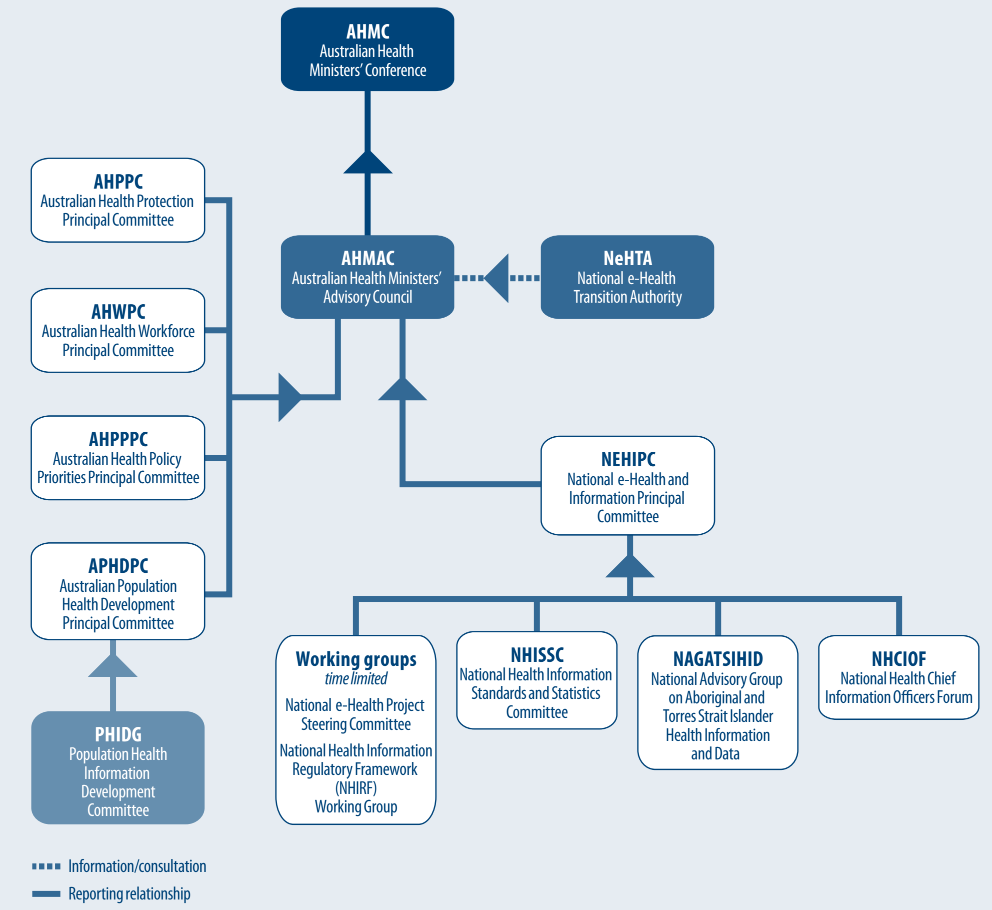


Figure 1.4: Health sector: national reporting relationships

Developments and achievements

The AIHW acts as the Committee Secretariat to the NHISSC and works closely with it to promote health information development. A particular focus of its work over the past 2 years has been the new national performance reporting regime introduced by COAG to support its reform directions. The development of indicators, informed by nationally consistent data from the jurisdictions, has been a key focus during this period. Notably, COAG's emphasis on timely reporting is driving the refinement of data supply and validation processes. In working to deliver more timely data, the AIHW and NHISSC are continuing to ensure that data are nationally consistent and of sufficient quality for their purpose.

Significant achievements since the publication of the last *Australia's health* in 2008 include:

- developing and specifying the technical detail of COAG performance indicators, and the beginning of the data development work needed to ensure the COAG performance reporting regime is well-supported; this work being done under the auspices of the inter-jurisdictional NHISSC
- work on the statistical underpinnings of the national e-Health agenda, including analyses of the future data supply chain and collaboration with the National e-Health Transition Authority (NEHTA) to understand implications for key elements of the AIHW's statistical collections, such as terminologies, the individual e-Health record and the discharge summary
- the AIHW's data and analysis contributions to the National Health and Hospitals Reform Commission 2009 report
- work involving the Australian Commission on Safety and Quality in Health Care and the AIHW in developing a draft set of national health-care safety and quality indicators
- improvement in the monitoring of the safety and quality of maternity care, and maternal and perinatal outcomes in line with recommendations in the Australian Government report, *Improving maternity services in Australia, the report of the Maternity Services Review 2009*. The report recommended the implementation of arrangements for consistent, comprehensive national data collection, monitoring and review for maternal and perinatal mortality and morbidity
- work involving Cancer Australia, other peak bodies responsible for cancer control and the AIHW to provide improved data on cancer prevalence, outcomes and screening programs
- development of a data set specification to underpin the collation of health workforce statistics from the new National Registration and Accreditation Scheme that will replace state-based registration of health practitioners
- development of metadata associated with new or refined national data sets, registries and suites of indicators.

1.6 How this report is presented

This report generally follows the framework depicted in Figure 1.1 and the structure of its predecessor, *Australia's health 2008*. The main features of the chapters are described below. Chapters 2 to 8 provide key facts at the beginning of each chapter to summarise important messages that follow. Boxes and figures within the chapters provide extra information that may be useful to the reader and 'user friendly' language has been used as much as possible.

Chapter 2 provides an overview of the health status of Australians and answers questions such as 'Which diseases and conditions impose the greatest burden on our population?' and 'Is our health improving overall?'.

Chapter 3 focuses on determinants, the complex mix that influences our health: biomedical and genetic factors, health behaviours, socioeconomic factors and environmental factors. The chapter discusses why some diseases happen in the first place and which preventable risk factors contribute to them.

Chapter 4 covers the main diseases and injuries seen in Australians and tracks changes in their levels, as well as their effects on health system use.

Chapter 5 describes the health of a range of population groups and shows that some, especially Aboriginal and Torres Strait Islander people, do not share in Australia's generally good health.

Chapter 6 takes a view across people's life span, summarising the health of babies, children and young people, working-age people and older people.

Chapter 7 presents extensive information on health services and their use in Australia, including public health services, hospital services, and services provided by doctors and other health professionals.

Chapter 8 examines health system expenditure and funding, and describes statistics on the health workforce. It outlines some of the complexities of resourcing the health system.

Chapter 9 focuses on the performance of the health system, using indicators that were designed to summarise that performance.

Supplementary tables covering a range of topics are included online at <www.aihw.gov.au>. Many of the tables provide time series information. Throughout the text, these tables are indicated using an 'S' and the following symbol 🖱: for example, 'See Table S27 🖱'.

A list of abbreviations and a glossary are at the end of the report.

References

ABS (Australian Bureau of Statistics) 2008a. Australian historical population statistics 2006. ABS cat. no. 3105.0.65.001. Canberra: ABS. Viewed 22 January 2010, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3105.0.65.0012006?OpenDocument>.

ABS 2008b. Population projections Australia 2006–2010. ABS cat. no. 3222.0. Canberra: ABS.

AIHW (Australian Institute of Health and Welfare) 2009. Australia's welfare 2009. Australia's welfare series no. 9. Cat. no. AUS 117. Canberra: AIHW.

NHISSC (National Health Information Standards and Statistics Committee) 2009. The National Health Performance Framework. 2nd edn. Canberra: NHISSC. Viewed 26 March 2010, <http://www.aihw.gov.au/committees/nhissc/changes_national_health_performance_framework.doc>.

PHIAC (Private Health Insurance Administration Council) 2010. Quarterly statistics December 2009. Canberra: PHIAC. Viewed 25 March 2010, <http://www.phiac.gov.au/resources/file/qsdec09.pdf>.

WHO (World Health Organization) 1946. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June. New York: WHO. Viewed 23 January 2007, <www.who.int/governance/eb/who_constitution_en.pdf>.

The health of Australians —an overview

2

KEY POINTS

- Australia’s life expectancy at birth remains among the highest in the world—almost 84 years for females and 79 years for males.
- Australia’s health compares well with that of other OECD countries, ranking in the best third on 17 of 31 comparable indicators.
- Our total fertility rate continues to increase, reaching 1.97 births per female in 2008—the highest rate since 1977, but still below the ‘replacement rate’ of 2.1.
- Males are as likely as females to rate their general health as good or better, despite doing more poorly on many other indicators of health status.
- Almost one-third of people aged 16–85 years with disability in 2007 had symptoms of a mental disorder in the previous 12 months.
- Coronary heart disease causes the most ‘lost years’ through death in males aged under 75 years; breast cancer causes the most among females.
- Type 2 diabetes is projected to become the leading cause of disease burden by 2023.

How healthy are Australians?

How does Australia compare with other countries?

How is this changing over time?

This chapter describes Australia's health using general measures of health status, for example life expectancy, birth and death rates, chronic disease prevalence, disability status and self-perceived health. The population is considered as a whole, with some key differences highlighted for Aboriginal and Torres Strait Islander people. More detailed discussions of Indigenous health and the health of other groups is in Chapter 5, and the health of various age groups is discussed in Chapter 6. Individual diseases and conditions are considered in detail in Chapter 4.

2.1 Australia's changing population

To understand a population's health, it is useful to start with its demographic features: the size of the population, the ratio of males to females, its age composition, and how these characteristics are changing. These features are an important aspect of health monitoring, as they not only reflect past health events but also provide insights into the current and future health of the population.

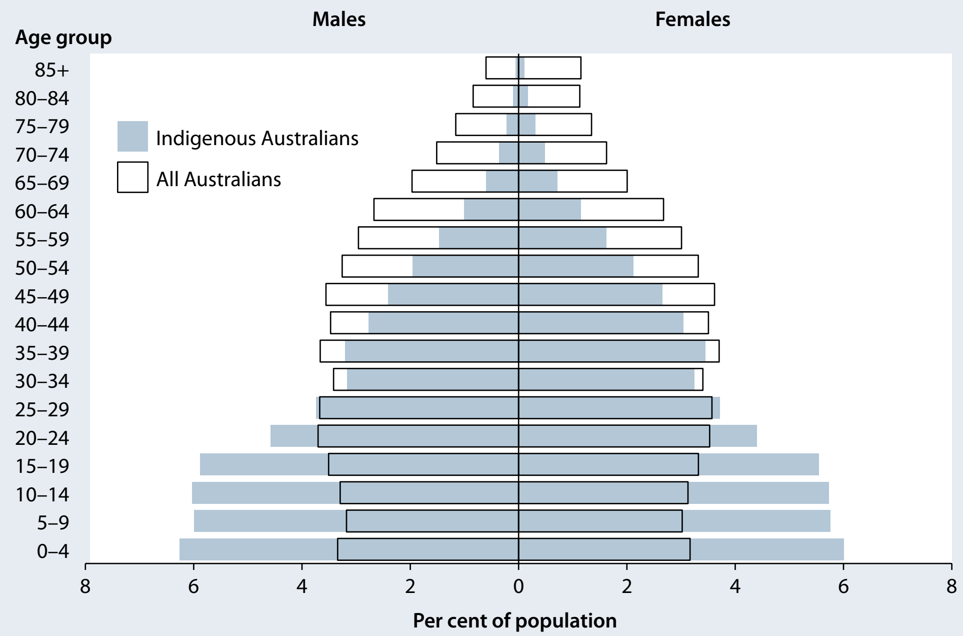
An ageing population, for example, is more than just a demographic trend. Simply because there are more older people there can over time be more cases of ill health in the population, and more deaths—even if older people are healthier than their counterparts in earlier times. An increasingly older population also places extra demands on health services.

Other helpful insights come from statistics about fertility, mortality and life expectancy. Birth and death rates are major drivers of a population's age structure, whereas life expectancy summarises the outlook on life based on current mortality patterns. Migration also contributes to changes in the size, structure and health of the population. These factors are discussed below.

Age and sex structure

The estimated resident population of Australia in June 2009 was 21.9 million, having grown by 2.1% over the preceding 12 months (ABS 2009a). Since Federation in 1901, the Australian population has increased by over 18 million, with almost 3 million added in the last decade. Overall, natural increase (that is, the number of births exceeding the number of deaths) has contributed more to this growth than immigration, accounting for around two-thirds of the total increase in the past 50 years. In the last decade, however, immigration has become a more important component, accounting for up to 60% of Australia's population growth each year.

Since 1901, Australia has seen some significant demographic changes. Two of these have been declining fertility and declining mortality. A decline in fertility since the 1950s has led to slow growth of the population at younger ages, whereas declining mortality has led to large growth in the number of people in older age groups. This has resulted in a shift away from the traditional 'population pyramid' structure to more of a 'population column' shape. But this pattern is not seen for the Aboriginal and Torres Strait Islander population, which has the more traditional pyramid shape of relatively large numbers of younger people and fewer elderly (Figure 2.1). More about Australia's Indigenous population can be found in Chapter 5.



Note: The age group 85+ includes all ages 85 years and over, and is not directly comparable with other 5-year age groups.
Source: AIHW Population Database.

Figure 2.1: Age structure of the Australian population, by Indigenous status, 2009

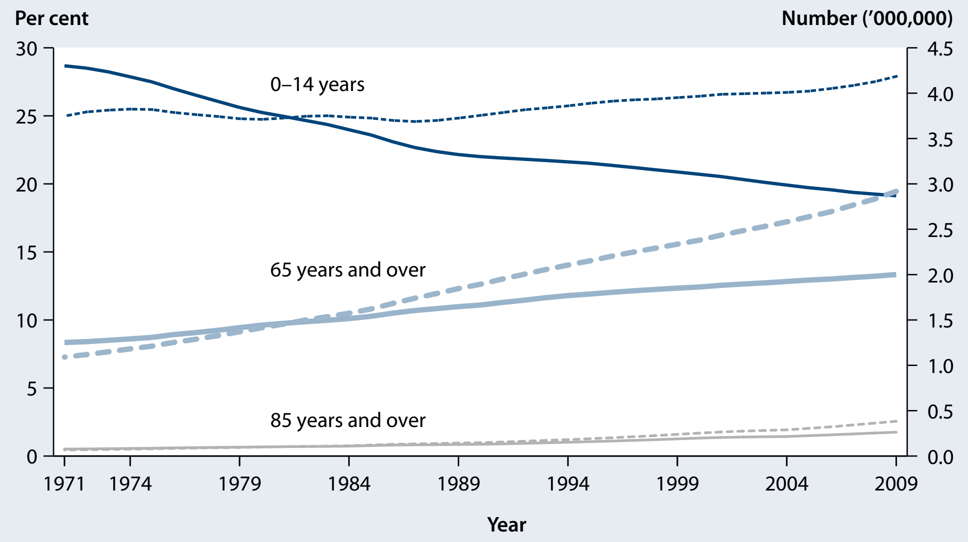
Median age

The median age of the population is the mark at which half is older and half is younger. It was estimated to be 36.9 years in June 2009, having increased by 5.1 years over the previous two decades (ABS 2009e). This increase results from Australia's long period of low fertility and rising life expectancy.

Some developed countries have an even higher median age than Australia's. In Japan and Italy, for example, the number of persons aged 65 years and over exceeds the number of children aged under 15, and the median ages are 42.9 and 42.3 years respectively.

The older population

During the past several decades, the number and proportion of the population aged 65 years and over have risen considerably (Figure 2.2). In 2009, more than 2.9 million Australians (13.3% of the population) were aged 65 years or over, compared with just under 1.1 million (8.3%) in 1971. The increase in the population aged 85 years and over has been even more marked, with the number of people increasing more than fivefold over the same period. The number of centenarians (people aged 100 years or more) has also risen substantially, from just 200 in 1971 to more than 3,700 in 2009: today around 1 in every 6,000 Australians is aged 100 years or older.



Note: For each age group, the dashed line shows the number of persons (right axis) and the solid line shows the proportion of the total population in that age group (left axis).

Source: ABS 2009e.

Figure 2.2: Number and proportion of population in selected age groups, 1971 to 2009

Consequences of population ageing

As shown above, while falling mortality rates have increased the proportion of older Australians, falling fertility rates have decreased the proportion of the population aged under 15 years (although the absolute number of people of this age has increased). The resulting change in age distribution, known as 'population ageing', has economic and social consequences for the future.

Children and the elderly are likely to depend on others for financial and physical support. For children and some older people this may be direct personal assistance; for others it may be indirect, in the form of income support funded through taxation. The segment of the population most likely to provide this support is people of working age, generally considered to be those aged 15–64 years. A common way of assessing demographic change is to calculate measures that compare the number of 'dependants' to the number of 'supporters'. These measures are called dependency ratios (Box 2.1).

Between 1971 and 2009 the Australian youth dependency ratio decreased significantly, from 45% to 28%. This means that in 2009 there were 3.5 working age adults to support each child aged under 15 years, compared with 2.2 in 1971. In contrast, the old-age dependency ratio significantly increased over the same period, from 13% to 20% (that is, from 7.5 working-age adults per person aged 65 years and over to 5). The age dependency ratio overall has shifted from 59% to 48%—a slight increase in the number of 'supporters' compared with 'dependants'.

Based on current population and employment projections the Treasury expects the youth dependency ratio to remain stable over the next few decades while the old-age dependency ratio continues to rise, reaching over 37% by 2050—that is, fewer than three persons in the labour force to support each person aged 65 years or over (Treasury 2010). The overall age dependency ratio is expected to rise to over 65% by 2050—1.5 working age adults for every 'dependent' person.

In countries such as Japan and Italy, where larger proportions of the population are elderly, the old-age dependency ratio is expected to exceed 70% by 2050 (OECD 2009a). In many countries this shift is being partly offset by people aged 65 or over staying in the workforce. Treasury suggests that increased productivity could also help to compensate for the increased health and social costs associated with Australia's ageing population (Treasury 2010).

Box 2.1: Dependency ratios

Dependency ratios compare the number of people likely to be 'dependent' (that is, not in the labour force) to the number of people likely to be providing support by being in the labour force. Three measures are commonly calculated:

- the youth dependency ratio, which compares the number of children (aged 0–14 years) to the number of working-age adults (aged 15–64 years)
- the old-age dependency ratio, which compares the number of people aged 65 years and over to the number aged 15–64 years
- the age dependency ratio, which compares the total number of people aged 0–14 years and 65 years and over to the number aged 15–64 years.

Each ratio is generally multiplied by 100 and expressed as a percentage. A higher dependency ratio suggests less support is available to meet the needs of dependants; a ratio greater than 100% implies there are more dependants than there are supporting persons.

Fertility

Two different measures are commonly used to describe trends and patterns in fertility: the number of children born to each female, and the age of mothers giving birth.

Total fertility rate

The total fertility rate (TFR) is a summary measure used to describe the number of children a female could expect to bear during her lifetime if she experienced current age-specific fertility rates throughout her childbearing life.

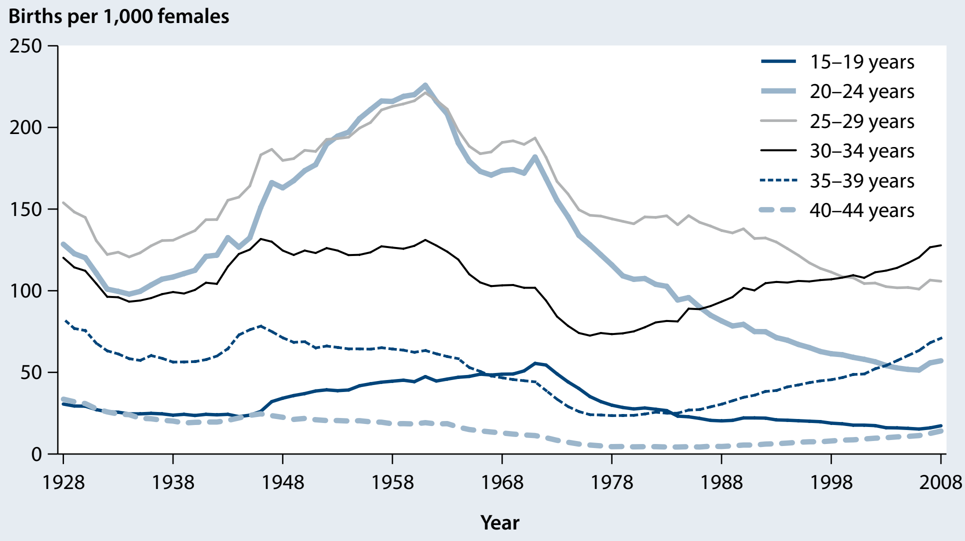
The TFR in Australia was 1.97 births per female in 2008 (ABS 2009b). It had been falling since the early 1960s until 2004, but since then it has been steadily rising. The 2008 TFR is the highest since 1977 (2.01) but is still below the replacement rate of 2.1—the rate needed to maintain the population size by 'replacing' the number of deaths.

The TFR is higher in Indigenous females compared with non-Indigenous females; in 2008 it was 2.52, but it has decreased substantially since the 1960s, when it was 5.8.

Age-specific fertility rates

Until the mid-1970s the distribution of fertility across all age groups was relatively stable, with 20–24 years and 25–29 years being the peak fertility age groups (Figure 2.3). Since then, fertility rates in these age groups have declined and fertility rates in the older age groups have risen.

In 2004, for the first time, the fertility of females aged 35–39 years exceeded that of females aged 20–24 years, with this trend continuing—and the difference increasing—since then. The age-specific fertility rates for all age groups, except for those aged 25–29 years, increased between 2007 and 2008.



Notes

1. The number of live births during the calendar year, according to the age of the mother, per 1,000 of the female resident population of the same age at 30 June.
2. In the calculation of these rates, births to females aged under 15 years are included in the 15–19 years age group.

Sources: ABS 2008a, 2009b.

Figure 2.3: Age-specific fertility rates, 1928 to 2008

Median age of mothers

The median age of females giving birth is another useful measure of the fertility patterns in a population. The median age has been increasing over the past few decades, reflecting the increase in fertility rates in the older age groups. The median age of all females who gave birth in 1997 was 29.4 years; by 2008 this had increased to 30.7 years (ABS 2009b).

A more specific form of this measure is the median age of females at the birth of their first child. The median age of first-time mothers in 2007 was 28.0 years (Laws & Sullivan 2009). This age, similarly to the median age of all females giving birth, has also been rising over the past few decades. This trend can be attributed to a number of factors including social, educational and economic influences, and increased access to assisted reproduction technology (Carolan 2003; Cleary-Goldman et al. 2005).

More about Australia's mothers and babies can be found in Chapter 6.

Migration

Inward and outward migration (immigration and emigration, respectively) also contribute to population change. Immigration has been a major factor in shaping Australian society, and today one-quarter of the population was born overseas.

A simple way to measure the effect of migration on the population is to consider the value of net overseas migration. This is calculated as the number of long-term or permanent arrivals minus the number of long-term or permanent departures. Australia's net overseas migration in 2008–09 was more than 285,000 persons, accounting for 64% of the country's net population growth over the 12 months to June 2009 (ABS 2009a).

In most countries, including Australia, immigrants who are not refugees are selected on various grounds, including their health status. For this reason, their health tends to be as good as or better than that of the general population—a phenomenon known as the 'healthy migrant effect'. On the other hand, socioeconomic, cultural and genetic factors mean that some risk factors and diseases are more common among certain immigrant groups. Information on the health of overseas-born Australians can be found in Chapter 5.

Mortality

Data on death and its causes are vital measures of a population's health. Examining trends and patterns in mortality can help to explain changes and differences in health status, evaluate health strategies, and guide planning and policy making. Cause-specific mortality (which is discussed in Section 2.6) provides further insight into the events contributing to deaths, and changes in the pattern of these causes reflect changes in behaviours, exposures, and social and environmental circumstances as well as the effects of medical and technological advances.

There were 137,854 deaths registered in Australia in 2007. Male deaths outnumbered female deaths (70,569 compared with 67,285), with a death rate ratio of 106 males to 100 females (Table 2.1). About 25% of male and 15% of female deaths in 2007 were of persons aged under 65. The median age at death was 77.5 years for males and 83.5 years for females (ABS 2008d).

Table 2.1: Deaths by age and sex, 2007

	Males		**Females**		**Sex ratio**	
Age (years)	**Number**	**Rate[a]**	**Number**	**Rate[a]**	**Crude[b]**	**Rate ratio[c]**
<1	655	460.8	548	407.9	120	113
1–14	294	15.1	212	11.4	139	132
15–24	928	61.2	372	25.8	249	237
25–44	3,467	115.3	1,810	60.0	192	192
45–64	12,244	469.4	7,453	282.6	164	166
65–84	35,938	3,158.8	27,109	2,110.1	133	150
85 and over	17,034	15,107.5	29,779	12,999.4	57	116
Unknown age	9	. .	2	. .	. .	. .
Total	**70,569**	**673.7**	**67,285**	**634.9**	**105**	**106**

. . Not applicable.

(a) Age-specific number of deaths per 100,000 persons.

(b) Male deaths per 100 female deaths.

(c) Male death rate divided by female death rate, multiplied by 100.

Note: For more detailed information, see Table S6 🖱.

Source: ABS 2008d.

Trends

Death rates are declining in Australia, continuing a very long trend. The age-standardised death rate (Box 2.2) for females fell by 73% between 1907 and 2007, from 1,844 to 493 per 100,000. The corresponding male death rate fell by 68%, from 2,234 to 722 per 100,000.

Box 2.2: Comparing death rates: age standardisation

Statistics relating to deaths are sometimes presented as crude death rates, that is, the number of deaths in a year divided by the size of the corresponding population, indexed to 100,000. The crude death rate in Australia was 656 deaths per 100,000 persons in 2007.

However, the risk of getting various diseases and of dying varies greatly with age. This may make comparisons across populations misleading if they have different age structures, and even small age differences may lead to false conclusions. Similarly, analysis of time trends in death rates may be flawed unless this age relationship is taken into account. Age-specific comparisons can be made—that is, comparing death rates at specific ages—but this can be cumbersome because it requires numerous comparisons.

Variations in age structure, between populations or over time, can be adjusted for by a statistical procedure called age standardisation. This procedure converts the age structure of the different populations to the same 'standard' structure. Using age-specific rates from the different populations, overall rates that would occur in the standard age structure can be calculated and compared. This allows the different populations to be compared on an equal age basis.

Unless otherwise specified, death rates in this report have been directly age-standardised (see Glossary) to the Australian population as at 30 June 2001. Both the Australian Institute of Health and Welfare and the Australian Bureau of Statistics have agreed to adopt 2001 as the national standard population. This same standard population was used in the 2004, 2006 and 2008 editions of *Australia's health*. The population at 30 June 1991 was the standard used in the 1996, 1998, 2000 and 2002 editions, whereas the 1992 and 1994 editions used the population at 30 June 1988 as the standard. For this reason, age-standardised death rates in this publication are not directly comparable with those given in editions before 2004.

These reductions in mortality have occurred across all age groups. Mortality reductions in infancy and early childhood (0–4 years) have been substantial, with deaths in this age group accounting for 25% of all deaths in 1910, 15% in 1930 and 1% in 2007. Declining infant mortality (deaths of those aged under 1 year) contributed significantly to this. Death rates among those of 'parent age' (25–44 years) fell rapidly during the first half of the 20th century and have since continued to decline. Death rates among older Australians have also decreased considerably, particularly in the last 30–40 years (AIHW 2006).

With the great increase in Australia's population over the century, reductions in death rates do not necessarily mean a lower death count. The annual number of deaths increased from 45,305 in 1907 to 137,854 in 2007, but much of this reflects population growth. Although the bulk of deaths in Australia (46%) currently occurs among those aged 65–84 years, the number in the 85 years and over group is increasing rapidly. The latter group is already the category with the largest number of female deaths.

Life expectancy

Life expectancy is the average number of years a person can expect to live if the existing mortality patterns continue (Box 2.3). It is one of the most commonly used summary indicators of a population's health.

A direct consequence of declining death rates, as described earlier, is that Australians in general enjoy one of the highest life expectancies in the world. Australian females born in 2006–2008 could expect to live an average of 83.7 years, and a male could expect to live 79.2 years (ABS 2009c). But not all groups within the Australian community are so fortunate—among Aboriginal and Torres Strait Islander people, life expectancy at birth is considerably less than this. More detail about life expectancy for Indigenous Australians is presented in Chapter 5.

Box 2.3: Calculating life expectancy

Technically, life expectancy is the average number of years of life remaining to a person at any specified age. The most commonly used measure is life expectancy at birth, which estimates the average number of years a newborn can expect to live. Life expectancy is also calculated for other ages, for example at ages 30, 65 and 85 years.

Life expectancy for a person is based on the prevailing mortality patterns in a population; the calculation assumes that the current death rates will persist throughout the person's life. For example, the life expectancy of newborns is based on age-specific death rates that year and not on future, projected death rates.

In general, the Australian Bureau of Statistics calculates life expectancy based on 3 years of data. This reduces the effect of small variations in death rates from year to year. Life expectancy calculated in this way is reported as relating to a 3-year period, for example life expectancy for people born in 2006–2008.

For ease of understanding, in this report life expectancy is 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 83.6 years, rather than 18.6 years.

Because of some difficulties in obtaining accurate information about deaths of Indigenous Australians, a slightly adjusted method is used to calculate life expectancy for Aboriginal and Torres Strait Islander people (see Chapter 5, Box 5.2).

Life expectancy at different ages

The calculation of life expectancy at birth takes into consideration factors affecting the full course of life, including the relatively higher death rates in the first few years of life. Some of these factors do not extend beyond those early years. People aged 30 years would have overcome many of these early risk factors and therefore would have a greater life expectancy. In 2006–2008, life expectancies for 30-year-old females and males were 84.5 years and 80.3 years respectively, about 0.8 years and 1.1 years greater than for newborns in that period.

These increments in life expectancy with age continue into the later years of life as well. In 2006–2008, Australian females and males aged 65 years could look forward to living to the ages of 86.6 years and 83.6 years respectively; again, substantially greater than life expectancy at birth and at age 30 years. For those aged 85 years, life expectancy was greater still at 92.0 years for females and 90.9 years for males.

Trends in life expectancy

Life expectancy in Australia has continued to improve during the 21st century, just as it did over the 20th. Apart from a period around 1960 to 1970, when the death rates for heart disease were at their peak, there was a clear and continual improvement in life expectancy throughout the last century and into this century.

The overall increase in life expectancy at birth between 1901–1910 and 2006–2008 was about 43%. For females, the increase was 24.9 years—from 58.8 to 83.7 years. For males, it was 24.0 years—from 55.2 to 79.2 (Table 2.2). Male life expectancy has been consistently lower than for females all through this period, although the size of the difference has varied.

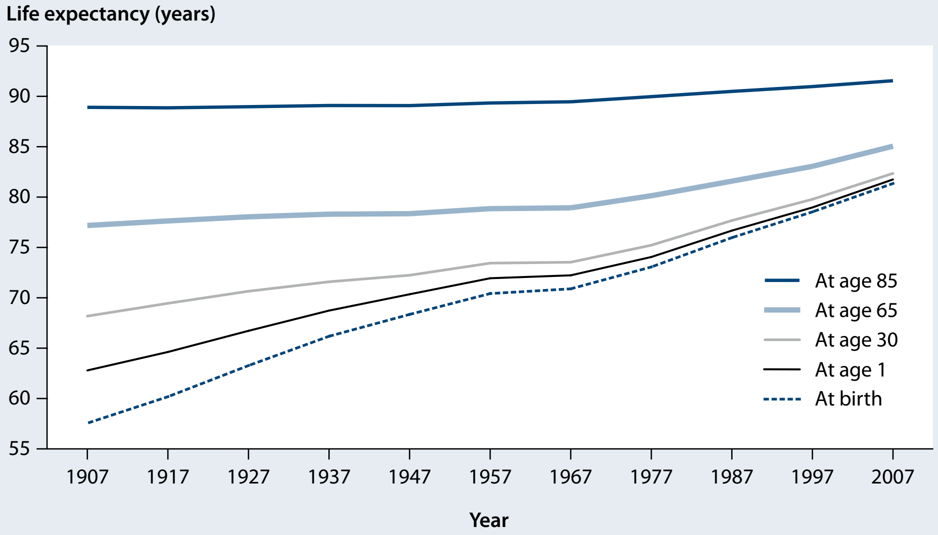
Table 2.2: Life expectancy (years) at different ages, 1901–1910 and 2006–2008

	Males		Females	
Age	**1901–1910**	**2006–2008**	**1901–1910**	**2006–2008**
Birth	55.2	79.2	58.8	83.7
30	66.5	80.3	69.3	84.5
65	76.3	83.6	77.9	86.6
85	88.7	90.9	89.2	92.0

Note: For more detailed information, see Table S8 🖱.

Sources: ABS 2008c, 2009c.

Early in the 20th century, improvements in life expectancy were made at middle or younger ages, with reductions in infant and child mortality being the major contributors (Figure 2.4). Life expectancies at birth and at age 30 years showed similar increasing trends over most of the 20th century. Life expectancy at age 65 years increased only slightly between the early 1900s and 1970, but from 1970 on it has consistently improved. Improvements in life expectancy for persons aged 85 years have also occurred since the 1970s.



Note: Some estimates have been pro-rated for missing years and for consistent time intervals, and are usually based on 3-year periods.

Source: ABS 2008b.

Figure 2.4: Trends in life expectancy at various ages, persons, 1907 to 2007

International comparisons of life expectancy

Overall, Australians enjoy one of the highest life expectancies in the world, at 81.4 years in 2007 for males and females combined—second only to Japan, at 82.6 years (OECD 2009b).

The Australian male life expectancy in 2007 (79.0 years) was marginally behind Iceland and Japan. Life expectancy for Australian females (83.7 years) was also among the countries with the highest life expectancy (Table 2.3).

Table 2.3: Life expectancy (years) at birth, selected countries, 2007

Country	Males	Country	Females
Iceland	79.4	Japan	86.0
Japan	79.2	France	84.4
Australia	**79.0**	**Australia**	**83.7**
Sweden	78.9	Sweden	83.0
New Zealand	78.2	Austria	82.9
Netherlands	78.0	Iceland	82.9
France	77.5	Korea	82.7
Austria	77.3	Netherlands	82.3
Greece	77.0	New Zealand	82.2
Korea	76.1	Greece	82.0
Mexico	72.6	Poland	79.7
Poland	71.0	Slovak Republic	78.1
Slovak Republic	70.5	Mexico	77.4
Turkey	69.3	Hungary	77.3
Hungary	69.2	Turkey	74.2

Source: OECD 2009b.

2.2 How Australia compares

In most aspects of health Australia matches or leads other comparable countries (those from the Organisation for Economic Co-operation and Development: OECD). Figures 2.5 and 2.6 show broadly how Australia ranked in 1987 and 2006 on various measures of health among the 30 member countries of the OECD. Where data were available for a substantial number of countries (on average, 24 countries for each indicator), comparisons were made for the years 1987 and 2006. In a few cases data relate to the preceding or following 1 or 2 years.

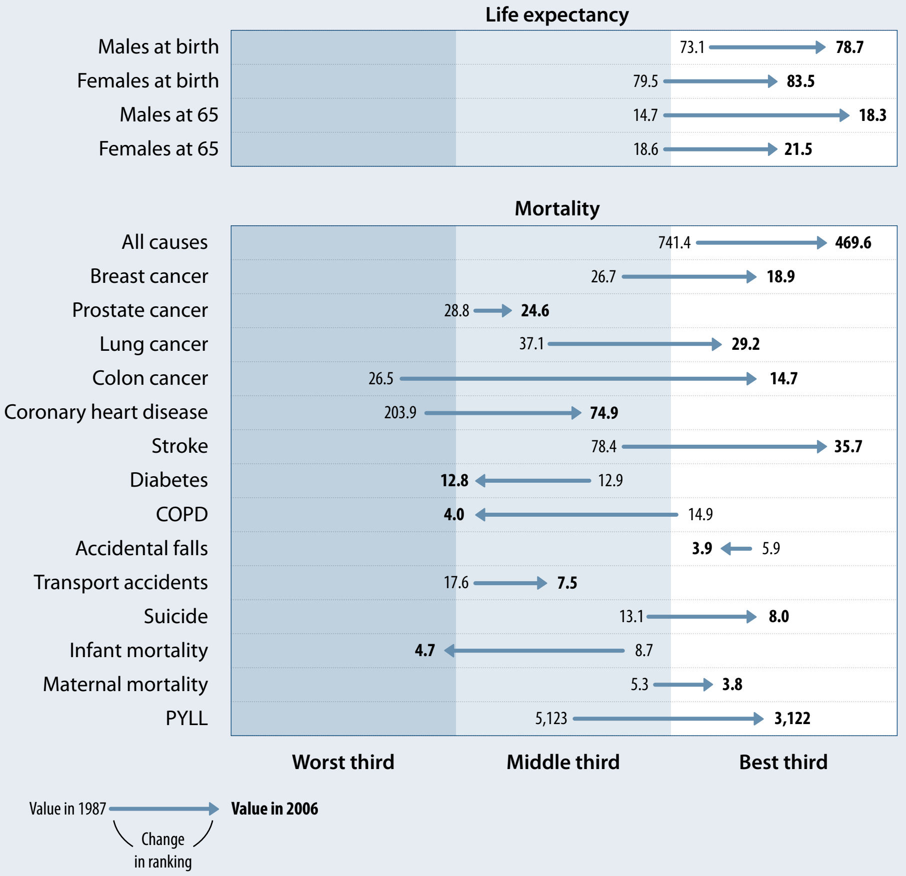
As well as rankings, actual rates or numbers for each indicator are shown on the figures. This is because the level of an indicator may have improved even though Australia's comparative ranking has fallen, and vice versa. For each indicator:

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

Figure 2.5 shows Australia's standing with regard to life expectancy and mortality. In 2006, 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 compared, Australia's ranking among OECD countries improved markedly for mortality rates from coronary heart disease, stroke, lung cancer and colon cancer. However, since 1987 our ranking has fallen in relation to death rates for chronic obstructive pulmonary disease, diabetes and, to a lesser extent, accidental falls, although the actual death rates for these diseases have decreased. Notably, our ranking on infant mortality rates decreased from the middle third to the worst third, although the actual rates have almost halved from 8.7 to 4.7 deaths per 1,000 live births.

Australia's ranking in relation to a range of other factors is shown in Figure 2.6. Our smoking rates have continued to fall, with the ranking improving from middle third to best third. However, our obesity rates are still among the highest in the world, with around 1 in 4 Australian adults being obese.

The ranking for low birthweight babies improved between 1987 and 2006, moving from the worst third into the middle third, although the proportion of Australian babies with low birthweight actually increased slightly over this time. Similarly, the incidence of treated end-stage kidney disease in Australia has more than doubled, but our comparative ranking has improved. 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 AIDS in Australia has decreased by almost 70% since 1987, moving it from the worst third into the middle third.



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

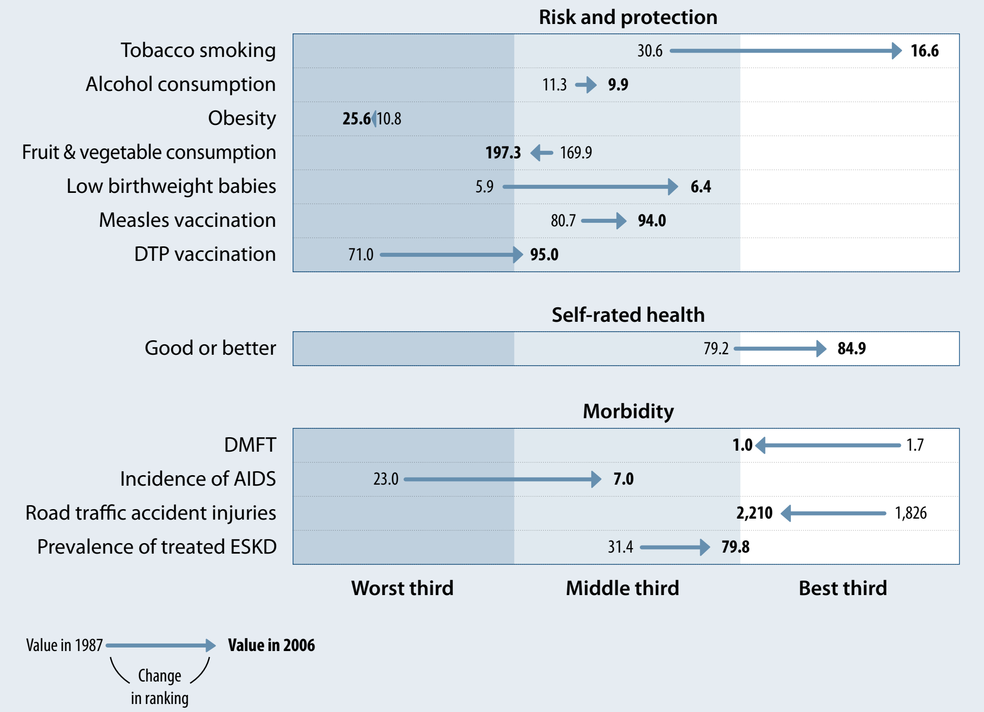
PYLL Potential years of life lost.

Notes

1. Data have been adjusted by the OECD for cross-country comparison purposes and are not comparable to data presented elsewhere in this report.
2. Life expectancy figures represent years of life remaining at the stated age.
3. Mortality data are deaths per 100,000 population, standardised to the 1980 OECD population.

Source: OECD 2009b.

Figure 2.5: Australia's ranking among OECD countries, selected indicators, 1987 and 2006



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

Notes

1. Data have been adjusted by the OECD for cross-country comparison purposes and are not comparable to data presented elsewhere in this report.
2. Risk and protection data are, in order: per cent of daily smokers aged 15 and over; annual litres of alcohol per capita; per cent of people with 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 per cent of children immunised at 24 months.
3. Data for DMFT are the average number of decayed, missing or filled teeth among children aged 12 years.
4. Data on incidence of AIDS and road traffic accident injuries are number per million population; data on treated ESKD are number per 100,000 population.

Source: OECD 2009b.

Figure 2.6: Australia's ranking among OECD countries, selected indicators, 1987 and 2006

2.3 Perceptions of health and life

As Chapter 1 pointed out, health is not just the absence of disease but also encompasses 'physical, mental and social wellbeing'. One way of measuring this aspect of health is to ask people how they feel about their own health, their state of mind and their life in general. Although they are based on a person's own opinion, the answers to these types of questions seem often able to capture the combined effects of various physical and psychological factors. Studies also indicate that these self-assessments are useful in predicting a person's future health, including how long they will live (Idler et al. 1999).

In Australia, information about individual and population health states is collected through national and state-wide surveys. In particular, three surveys run by the Australian Bureau of Statistics (ABS) provide national information on three major aspects of Australia's health:

- the National Health Survey (NHS; Box 2.4) provides self-reported general health information on a regular basis. The latest NHS was conducted in 2007–08.
- the National Survey of Mental Health and Wellbeing (NSMHWB; Box 2.5) is a useful source of information about mental health and mental disorders. The 2007 survey also collected information about self-perceived physical and mental health.
- the Survey of Disability, Ageing and Carers (SDAC; Box 2.6) provides information about the functional limitations and activity restrictions experienced by individuals, and the assistance they need and receive. Results from the latest survey, run in 2009, are not yet available.

Much of the information from these surveys about perceptions of health can be linked to people's background health issues, long-term conditions and disability. It may also be linked to their health risk factors and behaviours.

This section provides an overview of perceptions of health and life in Australia based on self-reports from the two latest ABS surveys—the 2007–08 NHS and the 2007 NSMHWB. Perceptions of physical health, mental health and quality of life are presented for the Australian population as a whole, as well as for those with disability and certain long-term conditions. In addition, Chapter 5 presents some information about self-perceived health among different population groups.

Box 2.4: National Health Survey

The National Health Survey (NHS) is a face-to-face survey run every 3 years by the Australian Bureau of Statistics. 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 (ABS 2009d). 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 NHS data, based on self-reports, cover assessment of health, the 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 latest survey also asked about a person's disability level and associated restrictions in everyday activities.

For self-assessment of health, survey respondents aged 15 years and over are asked to rate their general health status against five categories—excellent, very good, good, fair or poor. Respondents aged 18 years and over are 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.

General health

As this chapter shows, most Australians enjoy good health, and self-assessments of health by respondents to the 2007–08 NHS support this. A large proportion of respondents reported that their health was good, very good or excellent. Fewer than 1 in 6 reported that their health was fair or poor (Table 2.4). A similar proportion of respondents to the 2007 NSMHWB reported their physical health as fair or poor.

Despite the fact that males do more poorly than females on many other indicators of health status—such as life expectancy—no differences between males and females were found in health ratings.

Table 2.4: Trends in self-assessed health status, persons aged 15 years and over (per cent)

	Males			Females			Persons		
Rating	**2001**	**2004–05**	**2007–08**	**2001**	**2004–05**	**2007–08**	**2001**	**2004–05**	**2007–08**
Excellent/ very good	50.1	54.7	54.8	52.9	58.1	57.3	51.5	56.4	56.1
Good	31.4	28.8	29.6	29.2	26.9	28.5	30.2	27.8	29.0
Fair/poor	18.5	16.5	15.6	17.9	15.1	14.2	18.2	15.7	14.9

Note: Age-standardised to the Australian population as at June 2001.

Source: AIHW analysis of the 2001, 2004–05 and 2007–08 National Health Surveys.

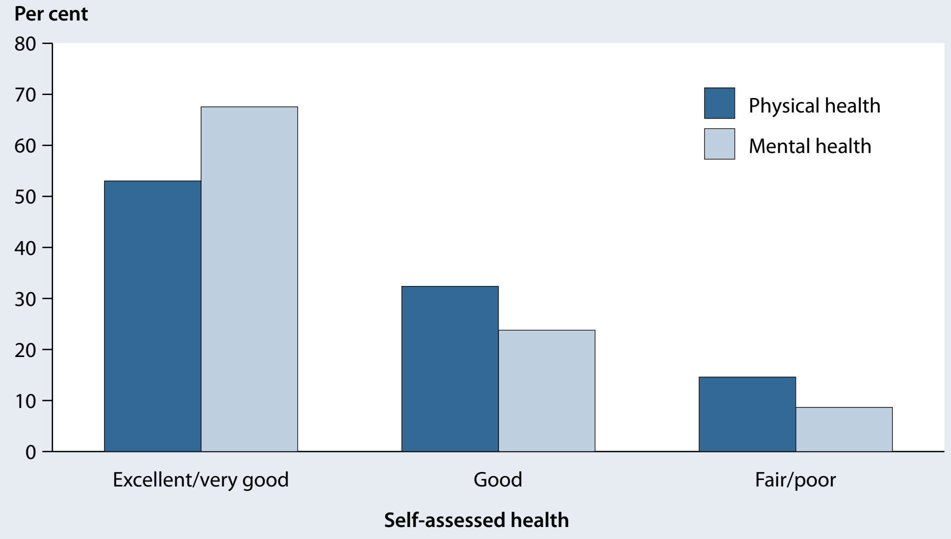
The proportion of respondents reporting their health as fair or poor is on the decline, from 18.2% in 2001 to 14.9% in 2007–08 (Table 2.4). The results from the 2007 NSMHWB confirm this downward trend.

Unsurprisingly, the proportion of people reporting their health as fair or poor increases with age. While fewer than 1 in 10 of those aged 15–24 years reported their health as fair or poor in the 2007–08 NHS, this increased to 3 in 10 among those aged 65 years and over. Similar age patterns for self-assessed physical health were noted in the 2007 NSMHWB (see Figure 2.8).

Mental health

Based on the 2007 NSMHWB (see Box 2.5), many Australians—45% of those aged 16–85 years—have had one or more mental disorders in the course of their life (ABS 2008e). However, when referring to their present mental health, two-thirds of the NSMHWB respondents rated it as excellent or very good (Figure 2.7). Fewer than 1 in 10 respondents rated their mental health as fair or poor. No differences between males and females were found in mental health ratings.

Although physical health tends to deteriorate as we age, mental health does not follow the same pattern. Figure 2.8 shows that the percentage of people rating their mental health as fair or poor tends to remain fairly constant as age increases.

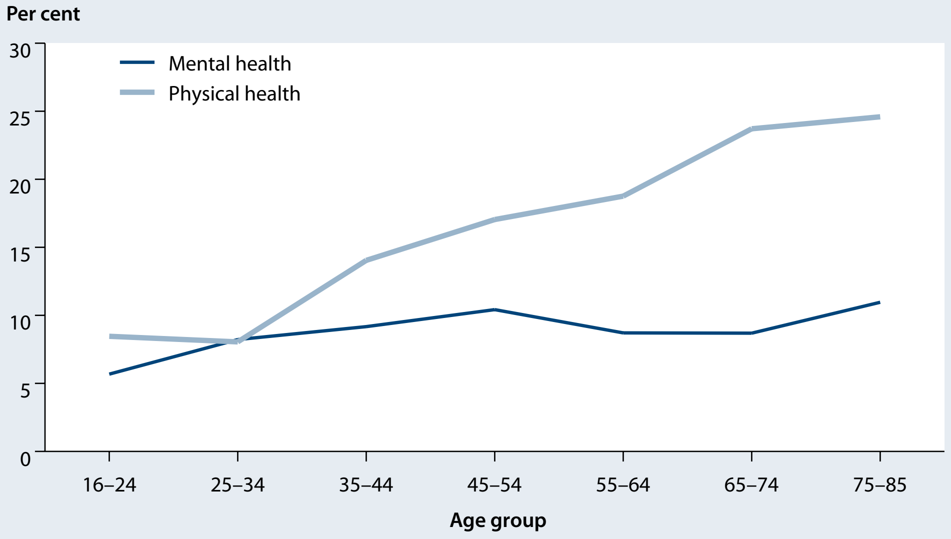


Notes

1. Persons aged 16–85 years.
2. Based on self-reported information.
3. Data are age-standardised to the Australian population as at June 2001.

Source: AIHW analysis of the 2007 National Survey of Mental Health and Wellbeing.

Figure 2.7: Self-assessed physical and mental health, 2007



Note: Persons aged 16–85 years.

Source: AIHW analysis of the 2007 National Survey of Mental Health and Wellbeing.

Figure 2.8: Self-assessed fair/poor health status, by age group, 2007

Box 2.5: National Survey of Mental Health and Wellbeing

The National Survey of Mental Health and Wellbeing (NSMHWB), conducted by the Australian Bureau of Statistics, is designed to obtain national information on the prevalence of mental health disorders among Australians aged 16–85 years (ABS 2008e). The most recent survey was run in 2007, with a previous survey in 1997. The 2007 survey focused on the three most common groups of mental disorders: affective disorders (including depression), anxiety disorders and substance use disorders. The survey does not include information from people living in non-private dwellings or institutions (such as nursing homes, hospitals or prisons).

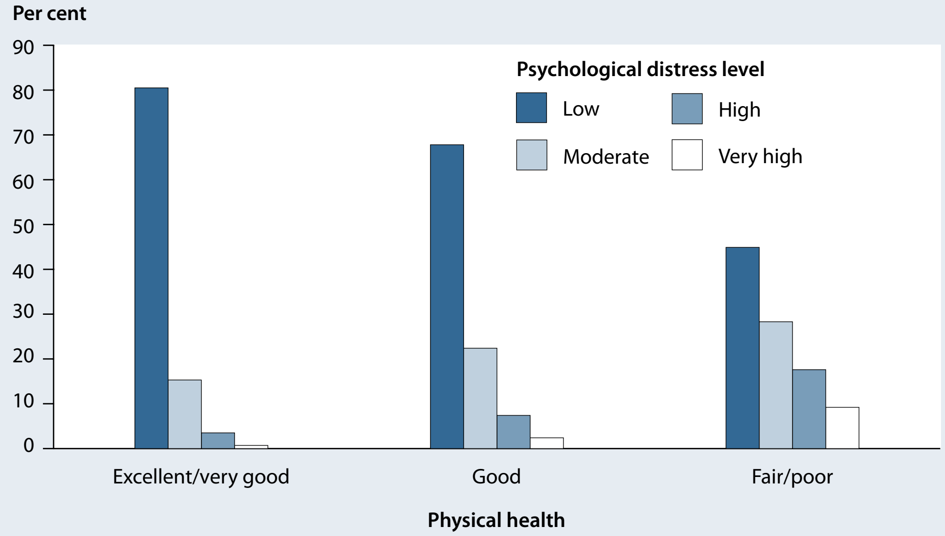
The 2007 NSMHWB included a variety of diagnostic modules derived from the World Mental Health-Composite International Diagnostic Interview (WMH-CIDI) instrument. The information collected through these modules can be used to determine whether a person meets diagnostic thresholds for the mental disorders included in the survey. People who meet these thresholds are sufficiently unwell to be diagnosed with the given mental disorder if they were to be assessed by a doctor according to standard diagnostic criteria.

Other information from the 2007 NSMHWB is based on self-reports and includes physical conditions, the use of health services for mental health problems, and information about social networks and care giving. People were also asked about the nature and severity of any activity limitations or disability.

Respondents were asked to assess their physical and mental health against five grades from excellent to poor, as in the National Health Survey. They were also asked to assess their quality of life and how they felt about their current health status compared with 1 year ago. The Kessler Psychological Distress Scale was applied to measure psychological distress levels among respondents.

Psychological distress

When asked about their feelings and emotions over the previous month, around 1 in 10 respondents to the 2007 NSMHWB showed high to very high levels of psychological distress. There is a strong relationship between self-assessed physical health and psychological distress ratings. Of the respondents who rated their physical health as fair or poor, 1 in 4 had high to very high psychological distress levels compared with less than 1 in 20 of those who rated their physical health as very good or excellent (Figure 2.9). Not surprisingly, more than half of those who rated their mental health as fair or poor reported high to very high levels of psychological distress.



Notes

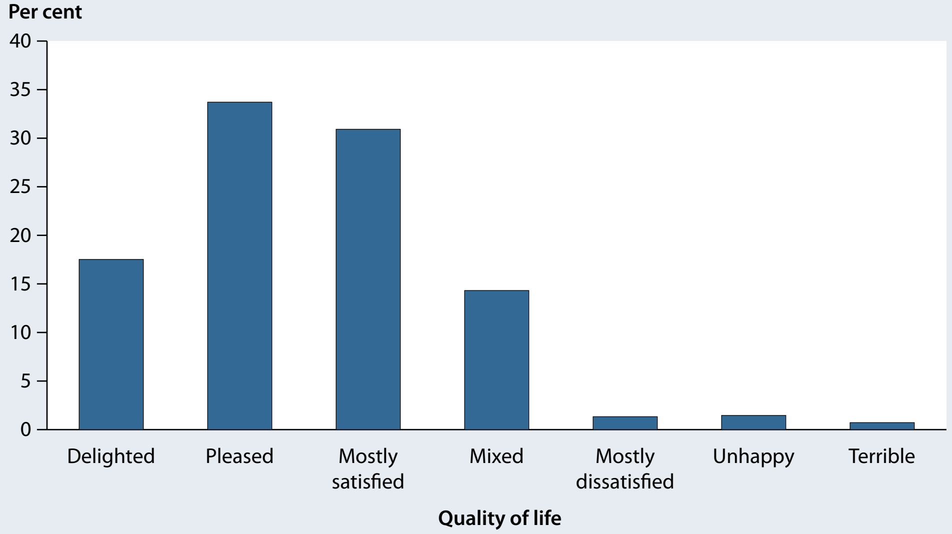
1. Persons aged 16–85 years.
2. Psychological distress levels (low to very high) measured using the Kessler Psychological Distress Scale.

Source: AIHW analysis of the 2007 National Survey of Mental Health and Wellbeing.

Figure 2.9: Psychological distress levels by self-assessed physical health status, 2007

Future outlook on health

When asked in the 2007 NSMHWB 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. Around 14% of respondents said they had mixed feelings about their life, while less than 5% were displeased (Figure 2.10).



Note: Persons aged 16–85 years.

Source: AIHW analysis of the 2007 National Survey of Mental Health and Wellbeing.

Figure 2.10: Self-assessed quality of life (delighted–terrible scale), 2007

As might be expected, most respondents who rated their physical and mental 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.

Self-assessed health and other health indicators

Data about self-assessed health in the NHS can be linked to information about other indicators of health, such as disability level, presence of long-term conditions, and health risk factors and behaviours. Although data from cross-sectional surveys like the NHS cannot show cause and effect, Table 2.5 shows that, in general, the relationships between self-assessed health and these types of indicators follow expected patterns.

For example, those with healthy behaviours—such as healthy weight, not smoking, and eating plenty of fruit and vegetables—were more likely than those with risky behaviours to rate their health as very good or excellent. Similarly, those without any long-term conditions rated their health more favourably than those who did have such a condition. The relationship varies with the type of disease or condition: according to the 2007–08 NHS, those with cancer or diabetes were more likely to rate their health as fair or poor in comparison with those with back pain (42% compared with 24%). Those with severe disability were also much more likely to rate their health as fair or poor compared with those without disability.

Table 2.5: Self-assessed health status and other health indicators, 2007–08 (per cent)

Indicator	Health status Excellent/very good	Good	Fair/poor
Has a long-term condition	54	30	16
Has back pain or a disc disorder	45	32	24
Has cancer	30	28	42
Has diabetes	19	39	42
No long-term condition	74	22	4
Has profound or severe disability[(a)]	17	23	60
No disability	69	26	5
Healthy weight (BMI 18.5–24.9)	63	25	12
Obese (BMI ≥ 30)	36	39	25
Daily smoker	39	38	23
Never smoked	62	27	11
Eats 4 or more serves of vegetables daily	62	25	13
Does not eat vegetables	40	29	31

BMI Body mass index.

(a) The person sometimes or always needs help with a self-care, mobility or communication task.

Notes

1. Persons aged 15 years and over.
2. Based on self-reported information.
3. Data are age-standardised to the Australian population as at 30 June 2001.

Source: AIHW analysis of the 2007–08 National Health Survey.

2.4 Functioning, disability and health

What is disability?

A basic measure of our health and wellbeing is how well we function from day to day. Do we feel sufficiently energetic and well? Can we move around and can we feed, dress and generally take care of ourselves? How well can we communicate with others, and can we take part in work and wider social activities?

Diseases and injuries can often impair how a person functions for a while, but mostly they recover fully. However, for some people the effect can be long term because there is lasting damage or the health condition is chronic. Alternatively, a person may have some permanent impairment from birth. In both these situations, the resulting disability may bring special needs for assistance into the person's daily life.

These days we have moved away from categorising people as 'disabled'. We look instead at how they are able to function day-to-day and the effects that health and other conditions have on their lives. A person's experience of disability is also affected by their environment: do structures, systems and services provide support for social and economic participation, health and wellbeing, or are there barriers? For example, are buildings and public transport designed so that people with wheelchairs can gain access to them? Do policies make it easier for people with disability to be employed where possible?

The ABS Survey of Disability, Ageing and Carers (SDAC; Box 2.6) looks at how well a person is able to function in the basic ('core') activities of everyday life—self-care, mobility and communication—to see if they are limited or restricted in those activities. It also looks at schooling and employment in the same light. From this survey we can determine how many Australians have functional impairment and what degree or severity of limitation it causes them.

This section provides an overview of how many Australians have activity or participation limitations and restrictions, including projections of future prevalence. It also provides a special snapshot of mental health among people with disability, using data from the 2007 National Survey of Mental Health and Wellbeing (NSMHWB). More detailed information, including a comparison of the general health of Australians with and without disability, is in Chapter 5.

Box 2.6: Survey of Disability, Ageing and Carers

Conducted by the Australian Bureau of Statistics, the Survey of Disability, Ageing and Carers (SDAC) collects information on people with disability, older people (aged 60 years or over), and people who care for an older person or a person with disability (ABS 2004). Surveys were run in 1988, 1993, 1998 and 2003, with the latest survey (results of which are not yet available) run in 2009.

The SDAC covers people in private and non-private dwellings. This includes people in cared accommodation establishments but excludes those in correctional institutions. The survey collects data on disability due to impairments, activity limitations and participation restrictions, health status, causes of disability, the need for and receipt of assistance with various activities, and information about caring and its effects on the carer.

The 2003 SDAC collected information about the nature and severity of specific activity limitations or restrictions in 'core activities' (self-care, mobility and communication), and in schooling or employment. The severity of a person's disability was determined based on their level of core activity limitation. This was classified as:

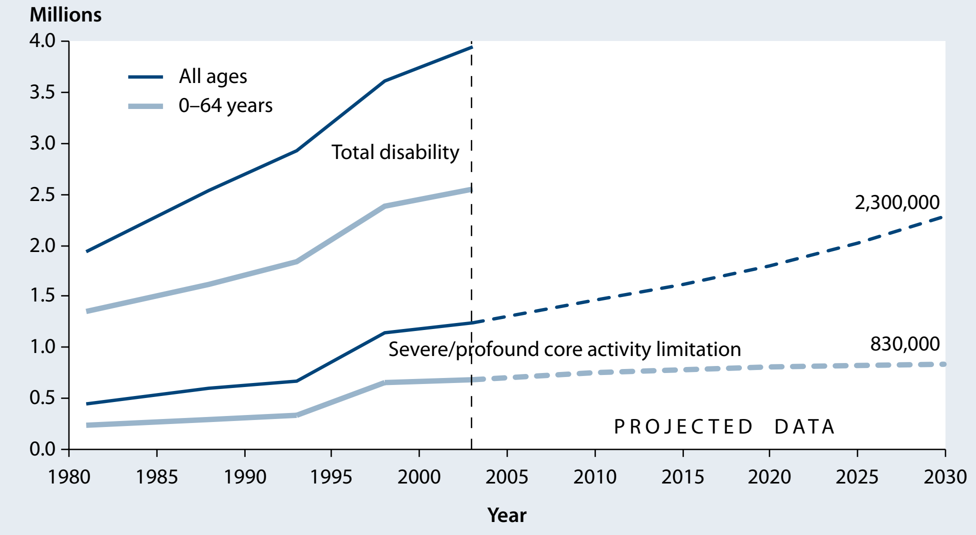
- profound—the person is unable to do, or always needs help with, a core activity task
- severe—the person sometimes needs help with a core activity task, has difficulty being understood by family and friends, or can communicate more easily in sign language or other non-spoken forms of communication
- moderate—the person needs no help but has difficulty with a core activity task
- mild—the person has no difficulty with any core activity tasks, but uses aids or special equipment, has difficulty using public transport, and cannot easily walk 200 m, bend to pick up an object off the floor, or walk up and down stairs without a handrail (ABS 2004).

Respondents to the survey could also report any other limitations or restrictions in non-core activities.

Australians with disability

In 2003 an estimated 3.9 million Australians had some degree of disability, of whom 1.2 million (6% of the population) had severe or profound core activity limitations (ABS 2004). Disability rates and severity of limitation or restriction varied with age. In particular, the prevalence of severe or profound core activity limitation (referred to in this section as 'severe disability') increased from around 2% of young adults to 12% of people aged 65–74 years and 58% of those aged 85 years and over.

It is projected that, by 2030, the number of Australians living with severe disability will have increased to 2.3 million because of population growth and ageing (Figure 2.11).



Notes

1. Children aged 0–4 years were not included in prevalence estimates of severe or profound core activity limitations in 1981, 1988 and 1993.
2. Projections are based on age- and sex-specific rates from the 2003 SDAC, applied to ABS projected population (series 8).

Source: AIHW 2009.

Figure 2.11: Trends and projections in the number of people with disability, 1981–2030

The 2007–08 NHS and the 2007 NSMHWB also asked respondents about functioning, using a shortened version of the disability assessment questionnaire from the SDAC, called the Short Disability Module. These data can be used to examine aspects of physical and mental health among people with disability living in the community, and to compare the health of people with and without disability. However, unlike the SDAC, these surveys do not include people living in non-private dwellings, such as cared accommodation. As a result they are likely to exclude many people with disability, particularly those with more severe limitations. Also, the Short Disability Module does not include all of the components generally used for assessing disability. The NHS and NSMHWB cannot therefore be used to estimate the prevalence of disability in Australia.

Disability and mental health

A growing body of international evidence suggests that the mental health of people with disability is markedly poorer than that of others (Chan et al. 2004; Emerson 2003; Okoro et al. 2009; Scott et al. 2009; White et al. 2005). Australian data support this. The 2007 NSMHWB suggests that more than half of people aged 16–64 years with severe or profound disability had symptoms of a mental disorder in the previous 12 months (see Box 2.7). Almost 30% of all people with disability had experienced a mental disorder with symptoms in the previous 12 months.

Box 2.7: Mental health data

The 2007 National Survey of Mental Health and Wellbeing (see Box 2.5) provides a number of different measures of the prevalence of mental disorders. These are based on whether or not the person has reported having symptoms, either during their lifetime or in the last 12 months, of selected major disorders—those being anxiety disorders, affective disorders and substance use disorders. Each measure sheds light on different aspects of mental disorder and potential service needs.

The data used in this section focus on people who reported symptoms of a major mental disorder in the previous 12 months. This is because these people will often be those who currently need intervention and specific help. However, because these data alone would provide an inadequate picture of the overall prevalence of major mental disorders among people with disability, lifetime data (that is, a disorder at any point in a person's life, with or without symptoms in the last 12 months) are also provided. Table 2.6 gives figures for both lifetime mental disorders and disorders with symptoms in the last 12 months, along with data on the specific classes of disorder.

Broadly speaking, rates of mental disorders increase with higher levels of activity limitation or restriction, with the exception of alcohol use disorder (Table 2.6). Anxiety disorder and affective disorders stand out among people with severe or profound core activity limitations, particularly those aged 16–64 years, at rates of 45% and 27% respectively. In each disability category, depressive episodes are around three times as common among people aged 16–64 years as among people aged 65–85 years. Of particular concern is the large number of people with disability reporting that they had seriously considered suicide in the previous 12 months.

Substance use disorder (that is, harmful use or dependence on illicit or licit drugs) is most common among people aged 16–64 years with the highest level (profound or severe) of core activity limitation, double the rate among people the same age without disability. Elevated rates of substance use disorder are also apparent among people with less severe limitations and restrictions. Mental disorders specifically related to alcohol use tell a slightly different story: alcohol use disorder is most prevalent among 16–64 year olds with disability but without specific limitations or restrictions.

Table 2.6: Mental disorders and comorbidities among Australians with disability, by disability status, people aged 16–85 years, 2007

	Disability status						
	Severe/ profound core activity limitation		Moderate/ mild core activity limitation or schooling/ employment restriction		No specific limitation or restriction		
	16–64 years	65–85 years	16–64 years	65–85 years	16–64 years	65–85 years	Total
Number in group ('000)	306	175	1,609	359	2,360	960	5,769
	Per cent						Number ('000)
Any lifetime mental disorder	81.1	44.2	72.2	36.6	60.3	30.0	3,329
Any 12-month mental disorder(a)	56.0	20.1	42.8	12.5	29.0	7.6	1,697
Anxiety disorder(a)	44.7	13.1	33.3	8.4	22.7	5.4	1,313
Depressive episode(a)	16.9	6.4	12.1	4.3	5.8	1.6	425
Bipolar affective disorder(a)	9.2	1.4	5.7	n.p.	2.0	0.1	169
Affective disorder(a)	27.0	7.8	19.4	4.8	8.3	2.1	641
Substance use disorder(a)	9.7	2.0	8.1	1.2	7.0	0.9	337
Alcohol use disorder(a)	5.2	1.8	5.7	1.2	5.9	0.9	263
Considered suicide(b)	15.0	1.8	8.0	1.2	2.9	1.1	261

n.p. Not published due to small sample size.

(a) Disorder with symptoms in the previous 12 months.

(b) Seriously considered committing suicide in the previous 12 months.

Source: AIHW analysis of ABS 2007 NSMHWB confidentialised unit record file.

Disability or health?

Disability is defined in the context of health in the International Classification of Functioning, Disability and Health (WHO 2001), but this does not necessarily mean that a person with disability is in poor health. Disability may arise in the interaction of health conditions and environmental and personal factors, and in many cases the health condition involved may have long since passed. As shown in Table 2.5, 40% of 2007–08 NHS respondents who had severe or profound disability rated their health as good, very good or excellent.

As the preceding section on mental health suggests, health conditions can be an outcome of disability as well as a cause of it. For example, people with physical disabilities and who cannot exercise may be at risk of problems such as heart disease, Type 2 diabetes and osteoporosis. Other health conditions can also arise and progress independently of a person's pre-existing disability. Although they cannot show causation, data from the 2007–08 NHS suggest that people with disability are far more likely than people without disability to have multiple health conditions (see Figure 5.8 and Section 5.4).

Among those with disability and health conditions it may be difficult to determine whether a new symptom is a complication of an existing condition or represents a new problem. For example, symptoms of depression are sometimes thought to be due to a person's intellectual disability rather than a new, unrelated and treatable health condition. This problem, where a pre-existing condition that affects a person's functioning obscures new symptoms, is called 'diagnostic overshadowing'.

The common occurrence of mental disorders and other long-term health conditions among people with severe disability suggests that there is a considerable risk of this problem occurring. This has many implications for the health status and needs of people with disability, because they may not get the diagnosis and help they need to stay healthy and function as well as possible.

2.5 Long-term conditions

Based on the latest NHS, an estimated 75% of Australians had a long-term condition in 2007–08—that is, a disease or health problem that had lasted, or was expected to last, 6 months or more. This proportion has remained stable for over 10 years (74.5% in 1995 compared with 75.3% in 2007–08).

Many conditions are commonly reported by both males and females (Table 2.7), but some are more commonly reported by one or the other sex. For example, hearing loss and high cholesterol feature in the top 10 conditions reported by males, whereas osteoarthritis and migraines are more commonly reported by females.

The list of top 10 conditions in the table below is similar to that reported in previous editions of *Australia's health*, except that mood (affective) disorders entered this ranking for the first time in 2007–08.

Table 2.7: Commonly reported long-term conditions, 2007–08

	Males		Females	
Condition	**Per cent**	**Rank**	**Per cent**	**Rank**
Long-sightedness	22.8	1	28.5	1
Short-sightedness	20.1	2	25.3	2
Hayfever and allergic rhinitis	14.1	3	16.0	3
Back pain/problems, disc disorders(a)	14.1	4	13.5	4
Hearing loss	13.1	5	7.4	11
Asthma	8.9	6	11.0	6
Hypertensive disease	8.8	7	10.0	7
Chronic sinusitis	6.7	8	11.2	5
Mood (affective) problems	6.2	9	8.7	9
High cholesterol	6.0	10	5.4	15
Osteoarthritis	5.9	11	9.7	8
Migraine	3.3	16	8.0	10

(a) Includes back problems not elsewhere classified.

Source: ABS 2009d.

Age-specific distributions

The types of long-term conditions that people reported varied with age (Table 2.8). For example, conditions such as asthma, and hayfever and rhinitis were common in the younger age groups, whereas osteoarthritis and hypertensive diseases (high blood pressure or related conditions) featured as common conditions for those aged 55 years and over. Long- and short-sightedness were common in most age groups. As noted above, 2007–08 saw the emergence of mood (affective) disorders as commonly reported conditions; these were most apparent in the 15–24 years and 25–34 years age groups.

Table 2.8: Five most commonly reported long-term conditions, by age group, 2007–08

Age (years)	Condition	Per cent[a]	Age (years)	Condition	Per cent[a]
0–14	Asthma	10.3	45–54	Long-sightedness	49.5
	Hayfever & allergic rhinitis	7.2		Short-sightedness	31.8
	Allergy (undefined)	5.4		Back pain & disc problems[b]	20.8
	Short-sightedness	4.0		Hayfever & allergic rhinitis	17.7
	Long-sightedness	3.5		Chronic sinusitis	12.6
15–24	Hayfever & allergic rhinitis	17.5	55–64	Long-sightedness	59.4
	Short-sightedness	17.2		Short-sightedness	37.6
	Asthma	11.2		Hypertensive diseases	23.6
	Back pain & disc problems[b]	8.6		Back pain & disc problems[b]	22.9
	Mood (affective) disorders	7.8		Osteoarthritis	20.4
25–34	Short-sightedness	22.6	65–74	Long-sightedness	56.4
	Hayfever & allergic rhinitis	19.2		Short-sightedness	37.3
	Back pain & disc problems[b]	14.1		Hypertensive diseases	32.0
	Mood (affective) disorders	9.8		Hearing loss	26.3
	Chronic sinusitis	9.6		Osteoarthritis	23.6
35–44	Short-sightedness	22.7	75 and over	Long-sightedness	52.6
	Hayfever & allergic rhinitis	20.7		Hearing loss	41.8
	Back pain & disc problems[b]	17.8		Hypertensive diseases	38.7
	Long-sightedness	15.3		Osteoarthritis	32.0
	Chronic sinusitis	10.9		Short-sightedness	30.3

(a) The proportion in each age group who reported that long-term condition.

(b) Includes back problems not elsewhere classified.

Source: ABS 2009d.

Numbers of conditions

The number of long-term conditions that people report generally increases with their age. Less than 2% of those aged up to 14 years reported having five or more such conditions. In comparison, half of those aged 65 years or older reported having five or more long-term conditions. Slightly higher proportions of females than males reported having five or more conditions (Table 2.9).

Table 2.9: Prevalence of five or more long-term conditions, by sex and age group, 2007–08 (per cent)

Sex	0–14	15–24	25–34	35–44	45–54	55–64	65–74	75–84	85 and over
Males	1.3	2.6	5.5	10.8	22.2	36.2	49.1	52.6	68.0
Females	1.5	7.9	11.5	15.1	23.2	42.2	49.3	59.7	71.7

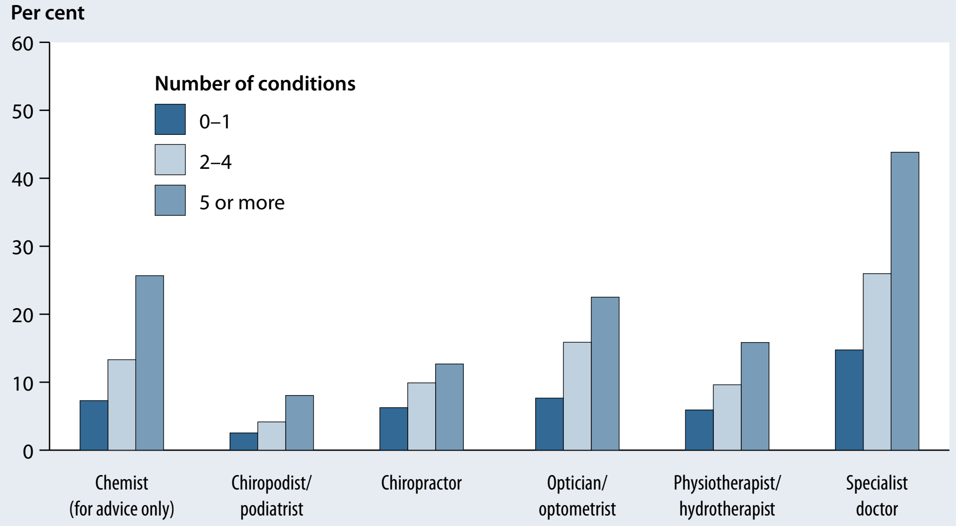
Source: 2007–08 National Health Survey.

Consultations with health professionals

Consulting a health professional can be done for a number of reasons—for example, poor health, maintaining good health, or advice about health. It is important to note that the statistics below do not attribute any consultations to health conditions that a person may or may not have.

Generally, the more long-term conditions people reported, the more likely they were to report having consulted a health professional in the year before interview.

Of those who reported no or one long-term condition, 1 in 7 reported visiting a specialist in the last 12 months, compared with 1 in 2 of those who reported five or more conditions (Figure 2.12). The differences were less marked for those who visited allied health professionals.

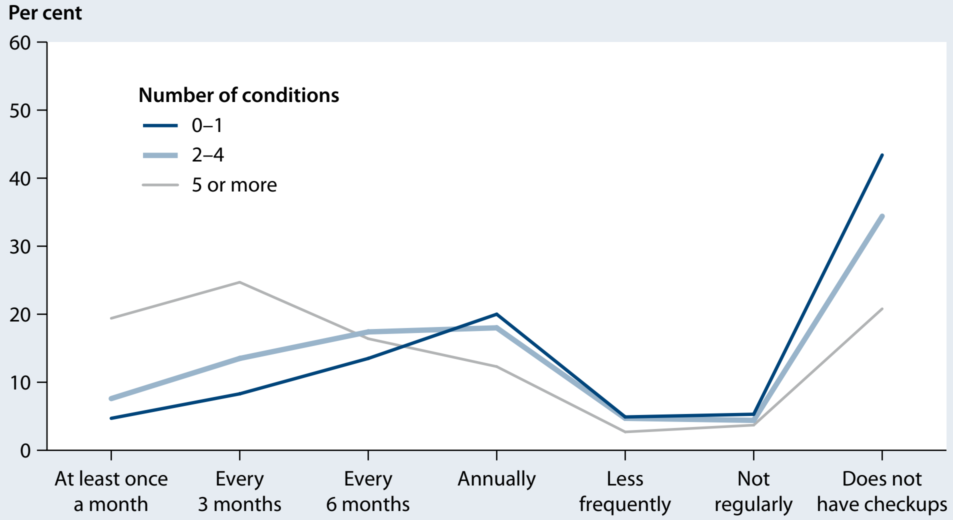


Note: Proportions have been directly age-standardised to the Australian population as at 30 June 2001.

Source: 2007–08 National Health Survey.

Figure 2.12: Proportion consulting various health professionals in preceding 12 months, by number of long-term conditions, people aged 15 years and over, 2007–08

About two-thirds (65%) of people aged 15 years and over say they have check-ups with a GP; those with more long-term conditions visit GPs for check-ups more frequently than those who have no or one long-term condition (Figure 2.13).



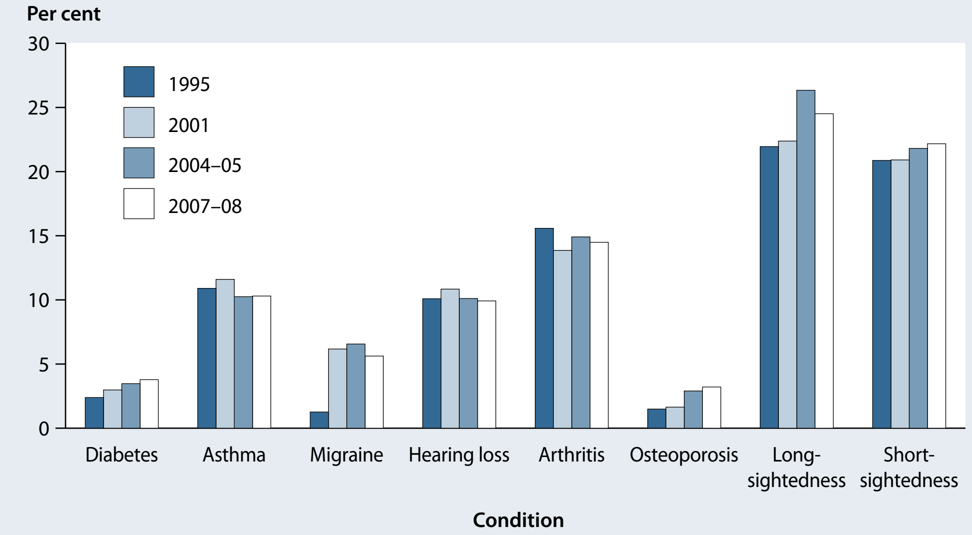
Note: Proportions have been directly age-standardised to the Australian population as at 30 June 2001.
Source: 2007–08 National Health Survey.

Figure 2.13: Frequency of check-ups by number of long-term conditions, people aged 15 years and over, 2007–08

Trends in prevalence

Results from the last four NHSs provide information about self-reported long-term conditions in the community for over 10 years. For many conditions, the proportions reported remain similar over time—for example, hearing loss (Figure 2.14). For other conditions, such as diabetes and osteoporosis, progressive increases in the proportions of people reporting them are evident.

Changes in prevalence rates over time can be due to factors such as better diagnosis, changing survival rates and increased awareness as well as to real changes in how common the condition is in the population. Sometimes it is hard to untangle which of these many factors is at work. More information about specific conditions can be found in Chapter 5.



Notes

1. Based on self-reported information.
2. Age-standardised to the Australian population as at 30 June 2001.

Sources: ABS 1997, 2002, 2006, 2009d.

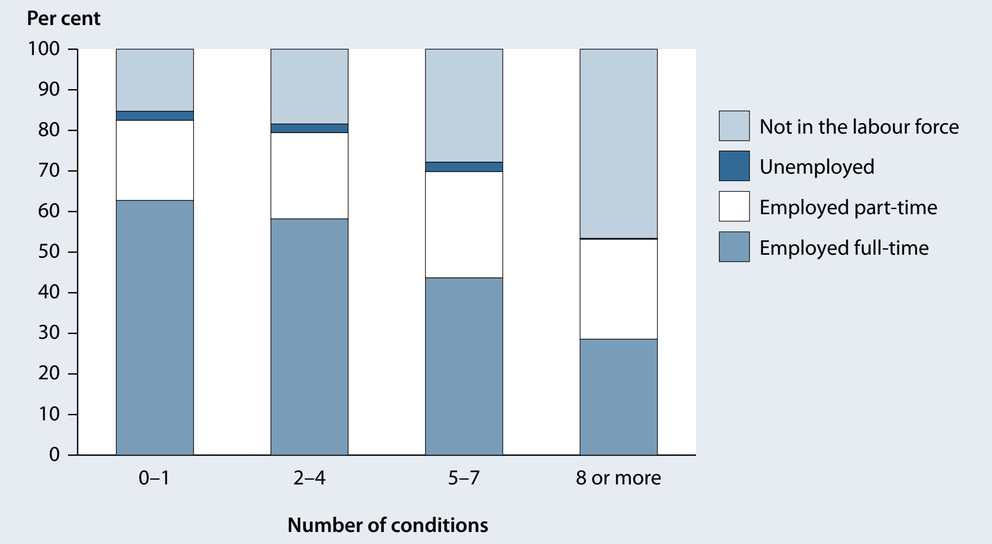
Figure 2.14: Selected long-term conditions, 1995 to 2007–08

Chronic conditions and employment

Many long-term health conditions can greatly affect individuals' physical and mental wellbeing and their ability to participate in everyday activities. Examples include conditions such as depression, arthritis, diabetes, and heart and respiratory problems. In comparison, other long-term conditions—for example, short-sightedness that can be corrected with glasses—may have little effect on a person's day-to-day life.

A major consequence of chronic conditions can be their effect on employment prospects. Depending on how severely an individual is affected by their condition, they may not be able to work full-time, may need to have extended periods of sick leave, or may require special equipment or assistance to do a particular task. All of these factors can make it difficult to get or keep a job. People may also find they are unable to work at all due to their health.

Figure 2.15 shows the labour force and employment status of people according to the number of chronic conditions they reported in the 2007–08 NHS, excluding those conditions least likely to affect their ability to participate in life activities. Although no causality can be inferred from these cross-sectional data, it is clear that the likelihood of being employed decreased as the number of conditions increased. After adjustment for age, almost 1 in 2 of those with eight or more conditions were not in the labour force (that is, neither employed nor looking for work), compared with 1 in 7 people with no or one condition. Part-time employment rates were similar across the groups, but the proportion of people employed full time varied greatly, from 63% of those with no or one condition to 29% of those with eight or more. The proportion who were unemployed (that is, not having a job but looking for work) also decreased as the number of conditions increased.



Notes

1. Count of conditions excludes varicose veins, haemorrhoids, high cholesterol and vision problems correctable with glasses.
2. Age-standardised to the Australian population aged 25–64 years at 30 June 2001.

Source: 2007–08 National Health Survey.

Figure 2.15: Labour force status by number of self-reported chronic conditions, persons aged 25–64 years, 2007–08

2.6 Causes of death

This section provides an overview of the leading causes of death in Australia as well as the main causes of years of life lost due to premature death.

Cause-of-death statistics are usually based on the ‘underlying cause’, which is the disease or injury that initiated the train of events leading directly to an individual’s death—in other words, the condition believed to be the primary cause of death. Any other condition or event that is not the underlying cause, but is still considered to contribute to the death, is known as an associated cause. In Australia, the underlying cause is derived from information on death certificates, using an automated process.

Leading causes of death

For the population as a whole, the top 20 causes presented here have been listed as specific causes rather than at the broader International Classification of Diseases (ICD) chapter level (Box 2.8). Information on cancer deaths, for example, has been provided by individual cancer type rather than for cancer overall.

Box 2.8: Classifying causes of death

The major causes of death are coded according to the 10th revision of the International Classification of Diseases (ICD-10) (WHO 1992). ICD-10 categorises diseases into 21 broad groupings (chapters) on the basis of type of condition or body system. Causes of death can be further subdivided either on the basis of similar disease causation (for example infectious diseases) or into specific entities (for example tuberculosis, breast cancer or AIDS). Commonly accepted groupings have been used in this report.

The top 20 specific causes of death were responsible for about 68% of all deaths in 2007 (Table 2.10). Coronary heart disease (also known as ischaemic heart disease: heart attack and related disorders) was the leading specific cause of death in both sexes and accounted for more than one-sixth of all deaths that year.

Lung cancer and cerebrovascular disease (notably stroke) were the second and third leading cause of male deaths, followed by chronic obstructive pulmonary disease (COPD) and prostate cancer. In contrast, cerebrovascular disease, and dementia and Alzheimer disease were the second and third leading cause of death among females, followed by lung cancer and breast cancer.

Colorectal cancer, COPD, diabetes, cancers with an unknown primary site, and dementia and Alzheimer disease were among the top 10 leading causes of death in both sexes. The latter two groups have become more important causes of death in recent years.

Major causes of death by life stage

The statistics for various age groups are provided here at the broad ICD chapter level, rather than at the specific disease level, to give a better picture of the broad distribution of causes of death. Overall, cancer and other tumours was the most common cause of death for males in 2007, followed by cardiovascular disease and respiratory system diseases. For females, cardiovascular disease was the most common cause of death, followed by cancer and other tumours, and respiratory system diseases.

However, the relative contribution of different underlying causes of death varies with age (Table 2.11). Conditions emerging from the perinatal period dominate the infant mortality statistics, followed by congenital anomalies. Injury and poisoning followed by cancer and other tumours are the most common causes of death in the age groups 1–14 years and 15–24 years. The changes in leading causes of death as age increases reflect both longer exposure to various environmental factors and the underlying ageing processes. Among those aged 25–44 years, injury and poisoning is the leading cause of death in males, but cancer and other tumours takes over as the leading cause of death among females. In both sexes, cancer and other tumours is the most common cause of death among those aged 45–64 years, followed by cardiovascular disease, which includes both coronary heart disease and stroke. Cancer and other tumours, and cardiovascular disease are again the two most common causes among those aged 65–84 years, but cardiovascular disease dominates the 85 and over age group.

Respiratory diseases are significant contributors to death among those at older ages. Prominent among these is COPD, a leading specific contributor to deaths overall. Dementia and Alzheimer disease, which is split across two ICD chapters, contributes almost 1 in 10 deaths in the 85 and over age group.

Table 2.10: Leading underlying specific causes of death, all ages, 2007

	Males			Females		
Rank	**Cause of death (code)**	**Number of deaths**	**% all male deaths**	**Cause of death (code)**	**Number of deaths**	**% all female deaths**
1	Coronary heart diseases (I20–I25)	12,119	17.2	Coronary heart diseases (I20–I25)	10,610	15.8
2	Lung cancer (C33,C34)	4,715	6.7	Cerebrovascular diseases (I60–I69)	6,975	10.4
3	Cerebrovascular diseases (I60–I69)	4,516	6.4	Dementia and Alzheimer disease (F01,F03,G30)	4,905	7.3
4	Chronic obstructive pulmonary disease (J40–J44)	2,965	4.2	Lung cancer (C33,C34)	2,911	4.3
5	Prostate cancer (C61)	2,938	4.2	Breast cancer (C50)	2,680	4.0
6	Dementia and Alzheimer disease (F01,F03,G30)	2,415	3.4	Chronic obstructive pulmonary disease (J40–J44)	2,187	3.3
7	Colorectal cancer (C18–C21)	2,221	3.1	Heart failure and complications and ill-defined heart diseases (I50–I51)	2,083	3.1
8	Diabetes (E10–E14)	1,923	2.7	Diabetes (E10–E14)	1,887	2.8
9	Unknown primary site cancers (C26,C39,C76–C80)	1,832	2.6	Colorectal cancer (C18–C21)	1,886	2.8
10	Suicide (X60–X84)	1,453	2.1	Unknown primary site cancers (C26,C39,C76–C80)	1,655	2.5
11	Heart failure and complications and ill-defined heart diseases (I50–I51)	1,361	1.9	Influenza and pneumonia (J09–J18)	1,463	2.2
12	Pancreatic cancer (C25)	1,233	1.7	Kidney failure (N17–N19)	1,301	1.9
13	Kidney failure (N17–N19)	1,163	1.6	Hypertensive diseases (I10–I15)	1,075	1.6
14	Influenza and pneumonia (J09–J18)	1,160	1.6	Pancreatic cancer (C25)	1,015	1.5
15	Liver diseases (K70–K77)	977	1.4	Ovarian cancer (C56)	848	1.3
16	Land transport accidents (V01–V89)	948	1.3	Cardiac arrhythmias (I47–I49)	830	1.2
17	Leukaemia (C91–C95)	892	1.3	Diseases of the musculoskeletal system and connective tissue (M00–M99)	751	1.1
18	Melanoma (C43)	864	1.2	Nonrheumatic valve disorders (I34–I38)	705	1.0
19	Oesophageal cancer (C15)	790	1.1	Accidental falls (W00–W19)	621	0.9
20	Lymphomas (C81–C85,C96)	780	1.1	Lymphomas (C81–C85,C96)	615	0.9
	Ill-defined excluding SIDS (R00–R94,R96–R99)	*1,047*	*1.5*	*Ill-defined excluding SIDS (R00–R94,R96–R99)*	*777*	*1.2*
	Event of undetermined intent (Y10–Y34)	*745*	*1.1*	*Event of undetermined intent (Y10–Y34)*	*344*	*0.5*
	Total 20 leading causes	**47,250**	**67.0**	**Total 20 leading causes**	**46,986**	**69.8**
	All deaths	**70,569**	**100.0**	**All deaths**	**67,285**	**100.0**

SIDS Sudden infant death syndrome.

Note: Codes refer to the International Classification of Diseases, 10th revision (ICD-10).

Source: AIHW National Mortality Database.

Table 2.11: Leading underlying broad causes of death[(a)], by age group, 2007

Age group	Males: Cause of death	Males: Per cent of deaths[(b)]	Females: Cause of death	Females: Per cent of deaths[(b)]
Infants (less than 1 year)	Conditions originating in the perinatal period	49.2	Conditions originating in the perinatal period	46.0
	Congenital anomalies	23.4	Congenital anomalies	28.6
	Ill-defined conditions	12.5	Ill-defined conditions	11.5
	Respiratory system diseases	2.7	Injury and poisoning	3.5
1–14	Injury and poisoning	37.1	Injury and poisoning	36.3
	Cancer and other tumours	16.3	Cancer and other tumours	17.9
	Nervous system disorders	10.2	Nervous system disorders	9.4
	Congenital anomalies	6.8	Cardiovascular disease	7.1
15–24	Injury and poisoning	72.1	Injury and poisoning	53.8
	Cancer and other tumours	8.2	Cancer and other tumours	14.2
	Ill-defined conditions	5.6	Cardiovascular disease	7.8
	Nervous system disorders	4.4	Ill-defined conditions	5.6
25–44	Injury and poisoning	50.3	Cancer and other tumours	35.0
	Cancer and other tumours	14.5	Injury and poisoning	27.7
	Cardiovascular disease	12.8	Cardiovascular disease	11.5
	Ill-defined conditions	5.9	Ill-defined conditions	4.5
45–64	Cancer and other tumours	42.6	Cancer and other tumours	55.8
	Cardiovascular disease	24.5	Cardiovascular disease	13.9
	Injury and poisoning	10.0	Injury and poisoning	7.1
	Digestive disorders	5.4	Respiratory system diseases	5.9
65–84	Cancer and other tumours	37.5	Cancer and other tumours	33.3
	Cardiovascular disease	31.6	Cardiovascular disease	32.4
	Respiratory system diseases	9.5	Respiratory system diseases	8.8
	Endocrine-related disorders	4.1	Endocrine-related disorders	4.8
85 and over	Cardiovascular disease	42.3	Cardiovascular disease	48.6
	Cancer and other tumours	20.2	Cancer and other tumours	12.1
	Respiratory system diseases	11.6	Respiratory system diseases	8.7
	Mental disorders	5.9	Mental disorders	8.3
All ages	Cancer and other tumours	32.3	Cardiovascular disease	36.5
	Cardiovascular disease	31.3	Cancer and other tumours	26.0
	Respiratory system diseases	8.6	Respiratory system diseases	8.2
	Injury and poisoning	7.3	Mental disorders	5.4

(a) Organised at ICD chapter level.

(b) Per cent of deaths within each age and sex group.

Note: Deaths from ill-defined conditions include those for which a more specific diagnosis could not be made or where signs and symptoms could not be determined. This refers to the ICD-10 chapter 'Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified'. This category includes deaths from sudden infant death syndrome (SIDS).

Source: AIHW National Mortality Database.

Contributing causes of death

A fuller picture of events and circumstances around the time of death may be generated from 'multiple causes of death' data, made available by the ABS since 1997 (Box 2.9). As well as the underlying cause of death, other conditions or diseases that played a part in the death are recorded on the death certificate, and are known as associated causes of death. Considering the contribution that a particular condition or disease makes as either the underlying or an associated cause can provide a fuller picture of its role in leading to deaths in the population. The term 'contributing causes of death' is used here to include both underlying and associated causes of death.

The rankings of the most common contributing causes of death show the significant toll of cardiovascular diseases to the Australian community, producing three of the top four specific causes for both males and females (Table 2.12). Cardiovascular diseases as a group contributed to 54% of all male deaths and 59% of all female deaths.

The rankings also reveal the importance of some chronic conditions that are rarely the underlying cause of death. Hypertensive diseases (high blood pressure and its effects) contributed to more than 17,500 deaths in 2007 but was the underlying cause in only 1,291 deaths. Septicaemia, and pneumonia and influenza also fall into this category.

In contrast, lung cancer was the underlying cause of death in nearly 93% of deaths where it was listed. Ranked second for males and fourth for females as an underlying cause of death, it drops to 12th in the male contributing cause of death rankings, and does not make the top 15 female rankings. Most other cancers, suicide and land transport accidents show similar patterns.

Table 2.12: Contributing causes of death, all ages, 2007

Rank	Cause of death	Deaths[(a)]	Per cent deaths by sex	Per cent underlying by sex[(b)]
	Males			
1	Coronary heart disease (I20–I25)	20,343	28.8	52.2
2	Heart failure and complications and ill-defined heart diseases (I50–I51)	9,125	12.9	14.7
3	Pneumonia and influenza (J09–J18)	8,839	12.5	13.0
4	Cerebrovascular disease (I60–I69)	8,779	12.4	48.7
5	Renal failure (N17–N19)	7,970	11.3	13.1
6	Hypertensive diseases (I10–I15)	7,502	10.6	6.0
7	Chronic obstructive pulmonary disease (J40–J44)	7,464	10.6	39.1
8	Diabetes (E10–E14)	6,992	9.9	27.3
9	Dementia and Alzheimer disease (F01,F03,G30)	6,401	9.1	37.0
10	Cardiac arrhythmias (I47–I49)	5,368	7.6	10.5
11	Unknown primary site cancers (C26,C39,C76–C80)	5,183	7.3	31.8
12	Lung cancer (C33,C34)	5,113	7.2	92.2
13	Cardiac arrest (I46)	5,043	7.1	4.2
14	Prostate cancer (C61)	4,390	6.2	66.9
15	Septicaemia (A40–A41)	3,895	5.5	13.7
	Ill-defined excl SIDS (R00–R94,R96–R99)	*8,880*	*12.6*	*11.6*
	All male deaths	**70,569**	**100.0**	
	Females			
1	Coronary heart disease (I20–I25)	16,994	25.3	55.1
2	Cerebrovascular disease (I60–I69)	11,700	17.4	55.7
3	Dementia and Alzheimer disease (F01,F03,G30)	11,409	17.0	42.3
4	Heart failure and complications and ill-defined heart diseases (I50–I51)	10,973	16.3	18.6
5	Hypertensive diseases (I10–I15)	10,173	15.1	8.3

Rank	Cause of death	Deaths[(a)]	Per cent deaths by sex	Per cent underlying by sex[(b)]
6	Pneumonia and influenza (J09–J18)	9,154	13.6	15.9
7	Renal failure (N17–N19)	7,362	10.9	16.1
8	Diabetes (E10–E14)	6,109	9.1	30.7
9	Cardiac arrhythmias (I47–I49)	5,975	8.9	13.8
10	Chronic obstructive pulmonary disease (J40–J44)	4,884	7.3	44.1
11	Cardiac arrest (I46)	4,602	6.8	4.0
12	Unknown primary site cancers (C26,C39,C76–C80)	4,312	6.4	35.0
13	Diseases of the musculoskeletal system and connective tissue (M00–M99)	4,009	6.0	16.7
14	Septicaemia (A40–A41)	3,777	5.6	15.1
15	Breast cancer (C50)	3,469	5.2	77.3
	Ill-defined excl SIDS (R00–R94,R96–R99)	*9,196*	*13.7*	*8.2*
	All female deaths	**67,285**	**100.0**	

(a) Deaths where the cause was listed as either the underlying or an associated cause of death.

(b) Underlying cause of death listings as a percentage of all deaths where the cause was listed.

Notes

1. Codes refer to the International Classification of Diseases, 10th revision (ICD-10).
2. Numbers and percentages cannot be added within columns because a single death can have multiple contributing causes.

Source: AIHW National Mortality Database.

Potential years of life lost

The potential years of life lost (PYLL) from a disease or injury is an indicator of premature or untimely death. If dying before the age of 75 years is considered premature, then a person dying at the age of 50 years would have lost 25 potential years of life.

Box 2.9: National Mortality Database

The Australian Institute of Health and Welfare's National Mortality Database contains information about all deaths registered in Australia. Deaths are certified by a medical practitioner or the coroner and registered by the Registrar of Births, Deaths and Marriages in each state or territory. The information is provided to the Australian Bureau of Statistics for coding of the cause of death and compilation into aggregate statistics. The cause of death is coded using the International Classification of Diseases (see Box 2.8). The database includes multiple causes of death, which comprise the underlying and all associated causes of death recorded on the death certificate. Multiple causes are available from 1997 onwards.

In contrast to the basic mortality measures where all deaths are counted equally, PYLL highlights deaths that occur at younger ages. These deaths strongly affect families and society because they occur prematurely and often have economic consequences. Furthermore, many of these premature deaths may be avoidable.

Among the specific causes of death, coronary heart disease is the greatest contributor to premature mortality among males, but breast cancer is the leading cause of PYLL among females (Table 2.13).

Males lose 70% more potential years of life than females. Three of the largest contributors to this gap are coronary heart disease, suicide and land transport accidents.

Table 2.13: Leading causes of potential years of life lost, 2007

	Males			Females		
Rank	**Cause of death (code)**	**PYLL**	**% all causes PYLL**	**Cause of death (code)**	**PYLL**	**% all causes PYLL**
1	Coronary heart diseases (I20–I25)	54,908	10.0	Breast cancer (C50)	28,118	8.7
2	Suicide (X60–X84)	46,193	8.4	Lung cancer (C33,C34)	19,509	6.1
3	Land transport accidents (V01–V89)	34,406	6.3	Conditions originating in the perinatal period (P00–P96)	18,846	5.8
4	Lung cancer (C33,C34)	28,949	5.3	Congenital anomalies (Q00–Q99)	14,599	4.5
5	Conditions originating in the perinatal period (P00–P96)	24,137	4.4	Coronary heart diseases (I20–I25)	13,156	4.1
	All causes	**547,325**	**100.0**	**All causes**	**322,272**	**100.0**

PYLL Potential years of life lost.

Notes

1. Codes refer to the International Classification of Diseases, 10th revision (ICD-10).
2. PYLL is the sum of years between the age of death and 75, for all deaths for selected causes. All deaths occurring under 1 year of age were considered to have lost 74.5 years of life.

Source: AIHW National Mortality Database.

2.7 Burden of disease

The information presented so far in this chapter has been about specific aspects of disease, such as how many people have it, how many people die from it, and what is the level of disability associated with it. But these varied aspects mean that it is difficult to get a clear and simple picture of the extent of the burden of disease and injury in Australia. For example, how can the effects of a common chronic disease that leads to long-term disability, but rarely causes death (for example depression), be compared with the effects of a disease that is less common but often fatal (for example brain cancer)?

Measuring the burden of disease and injury

Allocating health resources in the most effective way requires information about which conditions have the greatest effect on Australians and where the most gains in health can be made. To meet this need, a summary unit of measure called the DALY (pronounced 'dally', a disability-adjusted life year) has been developed to compare the effects of different diseases and injuries on an equal basis. It can also be used to compare the burden between different population groups and for different countries (allowing for different population sizes). The contribution of various risk factors can be assessed in the same way.

One DALY is one year of 'healthy life' lost due to a disease or injury. The more DALYs, the greater the burden, whether applied to an individual or a population. That lost healthy life can be from premature death, prolonged illness or disability, or a combination. To illustrate the basic concepts, a person who has been healthy all his life but who suddenly dies of a heart attack 20 years early has lost 20 years of healthy life—20 DALYs. For a person who lives to a normal old age but has been only 'half-well' for 30 years, there are 15 DALYs. 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. Box 2.10 explains this in more detail.

The main advantage of DALYs is that they give appropriate weight to health problems that cause much 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.

More detailed information on the burden posed by particular diseases is given in Chapter 3.

Total burden of disease and injury

The projected burden of disease and injury in Australia in 2010 is estimated to be more than 2.8 million DALYs. Males account for more of this burden than females (1.47 million compared with 1.38 million). Years lost due to disability (YLD; see Box 2.10) contribute slightly more to the total than do years of life lost due to death (YLL), with YLD responsible for 50% of the DALYs for males and 57% for females.

Box 2.10: Calculating disability-adjusted life years

According to the burden of disease estimates provided here, Australia will amass more than 2.8 million years of lost 'healthy life' due to disease and injury in 2010. How is this estimated?

Let's build this estimate by starting with just one case, Jim. His is a typical case of a person with a serious disease. He is fully healthy until he gets the disease in 2003, aged 50. Evidence about the disease shows he is likely to live with it until he dies aged 60. Based on further evidence, those 10 years suffering his particular disease will be equal to only 3 years of full health. This means he will 'lose' 7 healthy years even though he is alive. (In technical terms, his disease has a 'severity weight'—often known as a 'disability weight'—of 0.7. As other examples, if the severity weight had been 0.55 he would have 'lost' 5.5 of those 10 years; and 1.8 years if it had been 0.18.)

But Jim's 7 lost years are then adjusted using a standard method from economics. Because future gains or losses mean less to us than present ones, each successive year lost is 'discounted' by a small amount (3%). This brings the estimated years lost through disability or illness (known as YLDs) down from 7 to 6.3.

As well as the 6.3 healthy years lost through disability, Jim will lose many years through dying too early. At the age he dies, 60, a male in 2003 would normally go on to live until he is 81. As was done for the years lost through illness or disability, these further 21 lost years (or YLLs) are discounted by 3% per year. This brings them down to 15.6.

Jim's total disability-adjusted life years (DALYs) are therefore 6.3 plus 15.6, making 21.9.

Using this reasoning, we can take all the people getting Jim's disease and start to build towards a grand total. This means drawing on surveys and other research that shows:

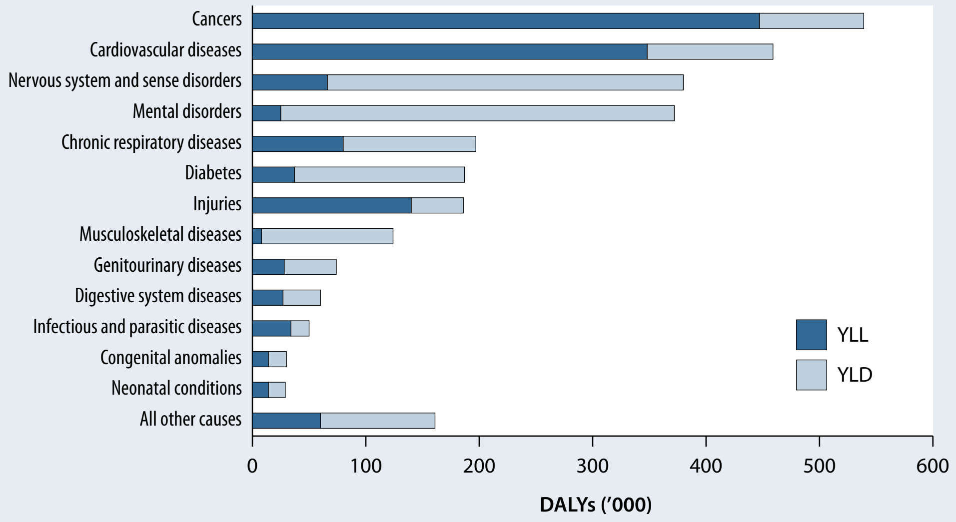
- how many males and females are newly diagnosed with this disease in the year in question (2003)
- what sex and age groups they are in
- how long people of each group will typically have their disease for
- the average age at which the people in each group are likely to die.

Next we can calculate subtotals for each group and then total them to get the disease's DALYs for the Australian population, and the steps taken for this disease can be applied to all other forms of disease and injury that arose in the year of interest.

Finally, the trends in disease patterns and changes in population can be overlaid on the methods described above to estimate the burden in future years. Such projections are presented in this section.

At the broad cause level, cancers are the leading contributor (19% of total DALYs), followed by cardiovascular diseases (16%), nervous system and sense disorders (13%), mental disorders (13%) and chronic respiratory diseases (7%). For cancers and cardiovascular diseases the majority of DALYs were due to deaths (YLL), whereas disability (YLD) was the main component for nervous system and sense disorders, and mental disorders (Figure 2.16).

Note that these DALY estimates represent the overall burden of disease remaining after preventive and treatment interventions have had their effect. Consequently, some important disease groups are low in the DALY rankings because preventive and treatment interventions for these diseases have been very successful. This applies in particular to infectious and parasitic diseases, which are expected to contribute only 1.7% of DALYs in 2010, and oral health conditions, which are responsible for only 1.0%.



DALY Disability-adjusted life years.
YLD Years of life lost due to disability.
YLL Years of life lost due to death.
Source: AIHW Burden of Disease database.

Figure 2.16: Projected burden (YLL, YLD and total DALYs) of major disease groups, 2010

Leading specific causes of burden of disease

Examining the disease burden at a specific disease level provides more detail about the conditions having the greatest effect on Australia's health. Coronary heart disease, anxiety and depression, and Type 2 diabetes are expected to be the largest specific contributors to the overall burden in 2010 (Table 2.14). The ranked list overleaf highlights the substantial contribution to the overall burden made by largely non-fatal conditions, with anxiety and depression, asthma and hearing loss all featuring in the top 10.

Table 2.14: Projected leading specific causes of burden of disease and injury, 2010

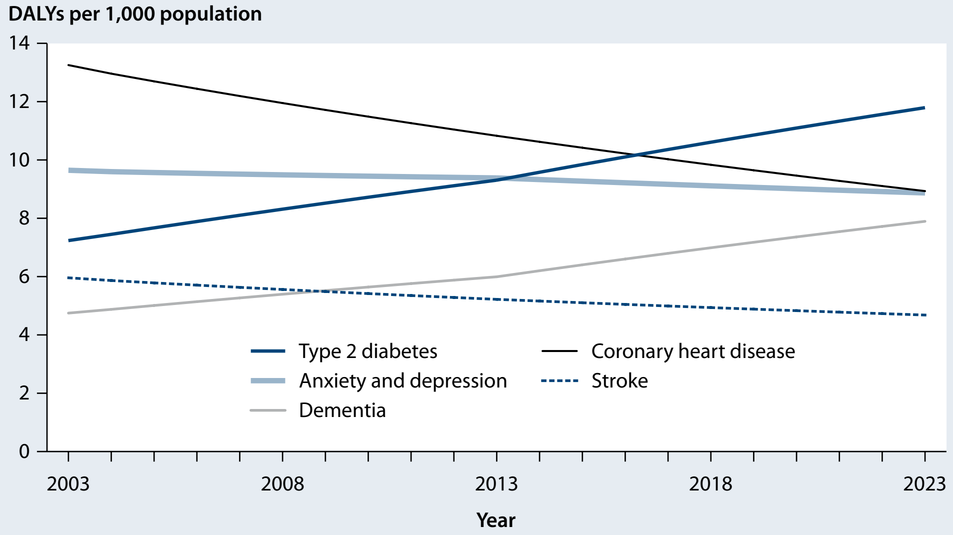
Rank	Condition	DALYs ('000) Males	Females	Total	Per cent of total DALYs
1	Coronary heart disease	139	108	247	8.7
2	Anxiety and depression	70	134	203	7.1
3	Type 2 diabetes	94	82	176	6.2
4	Dementia	45	77	122	4.3
5	Stroke	53	63	117	4.1
6	Lung cancer	57	41	98	3.4
7	Chronic obstructive pulmonary disease (COPD)	45	40	85	3.0
8	Adult-onset hearing loss	52	27	79	2.8
9	Colorectal cancer	38	30	68	2.4
10	Asthma	30	36	66	2.3
	All other causes	845	742	1,587	55.7
	All causes	**1,468**	**1,381**	**2,849**	**100.0**

DALY Disability-adjusted life year.

Source: AIHW Burden of Disease database.

Trends in leading causes of disease burden

As mentioned in Box 2.10, the data presented in this section are derived from projections of the burden of disease as assessed for 2003. The top five specific causes in 2003 (reported in *Australia's health 2008*) are still the top five in 2010, with only dementia and stroke swapping fourth and fifth rank (Figure 2.17). Over the longer term and accounting for population changes, Type 2 diabetes is projected to become the leading cause of disease burden by 2023, partly attributable to the expanding problem of overweight and obesity. Over this same period, the decreasing rate of DALYs per 1,000 population for coronary heart disease is seen to converge with the rate for anxiety and depression. These top five conditions remain the top five for the whole period of the projections.



DALY Disability-adjusted life year.

Source: AIHW Burden of Disease database.

Figure 2.17: Trends in leading causes of disease burden, 2003–2023

References

ABS (Australian Bureau of Statistics) 1997. National health survey: summary of results, Australia, 1995. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2002. National health survey: summary of results, Australia, 2001. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2004. Disability, ageing and carers: summary of findings, Australia, 2003. ABS cat. no. 4430.0. Canberra: ABS.

ABS 2006. National health survey: summary of results, Australia, 2004–05. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2008a. Australian historical population statistics, 2008: births. ABS cat. no. 3105.0.65.001. Canberra: ABS. Viewed 22 January 2010, <www.abs.gov.au>.

ABS 2008b. Australian historical population statistics, 2008: life tables. ABS cat. no. 3105.0.65.001. Canberra: ABS. Viewed 3 July 2009, < www.abs.gov.au>.

ABS 2008c. Australian historical population statistics, 2008: life tables. ABS cat. no. 3105.0.65.001. Canberra: ABS. Viewed 22 January 2010, < www.abs.gov.au>.

ABS 2008d. Deaths, Australia, 2007. ABS cat. no. 3302.0. Canberra: ABS.

ABS 2008e. National survey of mental health and wellbeing: summary of results, Australia, 2007. ABS cat. no. 4326.0. Canberra: ABS.

ABS 2009a. Australian demographic statistics, June quarter 2009. ABS cat. no. 3101.0. Canberra: ABS.

ABS 2009b. Births, Australia, 2008. ABS cat. no. 3301.0. Canberra: ABS.

ABS 2009c. Deaths, Australia, 2008. ABS cat. no. 3302.0. Canberra: ABS.

ABS 2009d. National health survey: summary of results, Australia, 2007–08 (reissue). ABS cat. no. 4364.0. Canberra: ABS.

ABS 2009e. Population by age and sex, Australian states and territories, June 2009. Canberra: ABS. Viewed 13 January 2010, < www.abs.gov.au>.

AIHW (Australian Institute of Health and Welfare) 2006. Mortality over the twentieth century in Australia: trends and patterns in major causes of death. Cat. no. PHE 73. Canberra: AIHW.

AIHW 2009. Australia's welfare 2009. Cat. no. AUS 117. Canberra: AIHW.

Carolan M 2003. The graying of the obstetric population: implications for the older mother. Journal of Obstetric, Gynecologic, and Neonatal Nursing 32(1):19–27.

Chan J, Hudson C & Vulic C 2004. Services for adults with intellectual disability and mental illness: are we getting it right? Australian e-Journal for the Advancement of Mental Health 3(1):24–9.

Cleary-Goldman J, Malone FD, Vidaveer J, Ball RH, Nyberg DA, Comstock CH et al. 2005. Impact of maternal age on obstetric outcome. Obstetrics and Gynecology 105(5 part 1):983–90.

Emerson E 2003. Prevalence of psychiatric disorders in children and adolescents with and without intellectual disability. Journal of Intellectual Disability Research 47(1):51–8.

Idler EL, Hudson SV & Leventhal H 1999. The meanings of self-ratings of health: a qualitative and quantitative approach. Research on Aging 21(3):458–76.

Laws P & Sullivan E 2009. Australia's mothers and babies 2007. AIHW Cat. no. PER 48. Sydney: Australian Institute of Health and Welfare National Perinatal Statistics Unit.

OECD (Organisation for Economic Co-operation and Development) 2009a. OECD factbook 2009: economic, environmental and social statistics. Paris: OECD. Viewed 25 August 2009, <www.sourceoecd.org/factbook>.

OECD 2009b. OECD health data online, June 2009. Paris: OECD. Viewed 1 July 2009, <www.ecosante.org/oecd.htm>.

Okoro C, Strine TW, Balluz LS, Crews JE, Dhingra S, Berry JT et al. 2009. Serious psychological distress among adults with and without disabilities. International Journal of Public Health 54:s52–s60.

Scott KM, Von Korff M, Alonso J, Angermeyer MC, Bromet E, Fayyad J et al. 2009. Mental–physical co-morbidity and its relationship with disability: results from the World Mental Health Surveys. Psychological Medicine 39:33–43.

Treasury (Australian Government Department of the Treasury) 2010. Australia to 2050: future challenges. Intergenerational report series no. 3. Canberra: Treasury.

White P, Chant D, Edwards N, Townsend C & Waghorn G 2005. Prevalence of intellectual disability and comorbid mental illness in an Australian community sample. Australian and New Zealand Journal of Psychiatry 39(5):395–400.

WHO (World Health Organization) 1992. International statistical classification of diseases and related health problems, 10th revision. Geneva: WHO.

WHO 2001. International classification of functioning, disability and health. Geneva: WHO.

Determinants: keys to prevention

3

KEY POINTS

- Risk factors contribute to over 30% of Australia's total burden of death, disease and disability.
- Tobacco smoking is the single most preventable cause of ill health and death in Australia.
- However, Australia's level of smoking continues to fall and is among the lowest for OECD countries, with a daily smoking rate of about 1 in 6 adults in 2007.
- Three in 5 adults (61%) were either overweight or obese in 2007–08.
- One in 4 children (25%) aged 5–17 years were overweight or obese in 2007–08.
- One out of every 20 children aged 14–16 years consumed the recommended intake of vegetables in 2007.
- Rates of sexually transmissible infections continue to increase, particularly among young people.
- Use of illicit drugs has generally declined in Australia, including the use of methamphetamines (the drug group that includes 'ice').
- Among Australians aged 15–74 years in 2006–2007, less than half (41%) had an adequate or better level of health literacy.

Many things can affect how healthy we are. They range from society-wide influences right down to highly individual factors such as blood pressure and genetic makeup—and of course they include the health care we receive. This chapter focuses on these various influences, which are known as health determinants because they help determine how likely we are to stay healthy or become ill or injured. (Health services, however, are discussed in Chapter 7.)

The chapter begins by discussing determinants using a framework to show how they relate to each other in their influence on health. The remainder of the chapter presents information on patterns and trends for selected determinants.

3.1 What are health determinants?

As Figure 1.1 in Chapter 1 shows, a person's health and wellbeing has many facets. They result from complex interplay between societal, environmental, socioeconomic, biological and lifestyle factors, nearly all of which can be modified to some extent by health care and other interventions. Figure 3.1 summarises the main determinants of health (excluding health care) and the pathways through which they can act.

It is important to note that 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 known as 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 (see Chapter 5), and to develop and evaluate policies and interventions to prevent disease and promote health.

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. Also, they vary in the amount of risk they pose, and the level and duration of a person's exposure to them. 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—coming down with lung cancer within a given time 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 very 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. 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 of it, the prospects for its 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 persons, and enforcing the wearing of seatbelts) 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.

A framework for determinants

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. Figure 3.1 presents a conceptual framework that illustrates some of the complexity involved. It divides determinants into four broad groups 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 or direct influences (such as blood pressure).

The figure shows how one main group—the broad features of society and environmental factors—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 these 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.

Despite the general direction of these influences, they can occur in reverse. For example, an individual's health can also influence physical activity levels, employment status and wealth.

Five of these clusters of determinants are described in the major sections of this chapter. A summary of the remaining four groups, with some related statistics, follows here.

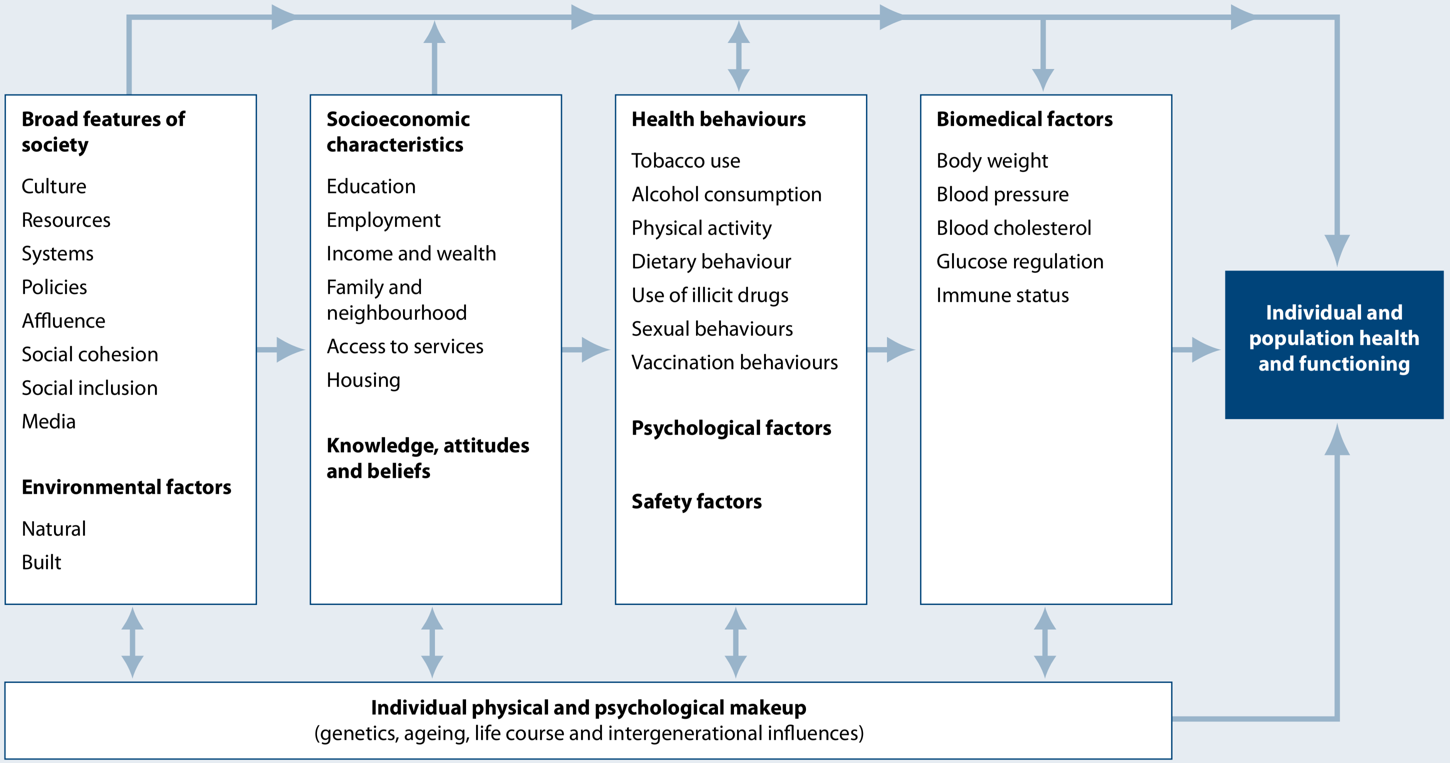


Figure 3.1: A conceptual framework for determinants of health

Broad features of society

Broad features of society are those widespread factors that affect all individuals to some extent. Alone or together, these characteristics influence the basic levels of security, safety, hygiene, nourishment, knowledge, technology, development, freedom and morale of societies. They can also influence how much equality or inequality there is among individuals or groups in society. Despite their widespread influence, the specific effects of these characteristics are difficult to measure.

Psychological factors

Apart from being valuable in its own right, the degree of a person's psychological wellbeing can affect their health in various ways. This can include how they seek care or look after themselves, whether they smoke or not, drink heavily or not, and are physically active or not. There are also suggestions that various forms of stressors can harm health directly. For example, there is evidence that heart disease can result from psychological stress, depression or major adverse life events, regardless of whether the people affected have risk factors such as smoking or low socioeconomic status (Rosengren et al. 2004). Risk behaviours such as the use of illicit drugs, alcohol misuse and dependence, and eating disorders often occur together with depression (AIHW 2008a).

Safety factors

Safety generally refers to the notion of being and feeling protected against harm, and is an important aspect of physical and mental wellbeing. Governmental policies—such as road standards, compulsory wearing of seatbelts, and food and industry regulations—influence levels of safety in our environment. Knowledge, attitudes and personal behaviours can also modify this protection.

Australians generally have a high level of safety and have enjoyed some marked safety improvements. For example, deaths from motor vehicle traffic accidents have declined dramatically since the early 1970s. This is generally attributed to the success of policies and campaigns aimed at enhancing road safety (for example, compulsory wearing of seat belts, enforced speed limits and random breath testing for alcohol) and improved motor vehicle construction and road infrastructure (AIHW 2006a). The 2005 International Crime Victim Survey asked people about their experience of conventional crime (for example, theft of or from a vehicle, theft of other personal property, robbery, assault and, for females, sexual offences). The results from this study ranked Australia in the middle third of the countries surveyed (OECD 2009a).

Personal safety is often measured in terms of both the perception of feeling safe and of the actual experience of harm. Estimates from the 2005 Personal Safety Survey show that most Australian adults (95% of males and 83% of females) felt safe if alone in their own home at night (ABS 2006a). This survey also revealed that 11% of adult males and nearly 6% of adult females had experienced physical and/or sexual violence in the past 12 months. Among those aged 18–24 years, males were more likely to have experienced violence than females (31% versus 12%). However, in older ages, the rate of violence reported by females was higher than for males.

Personal behaviours aimed at injury prevention—perhaps supported by government regulations—help maintain a high level of safety. For example, in New South Wales in 2008, almost 94% of adults lived in homes fitted with smoke alarms or detectors—a substantial increase from 58% in 1997 (Centre for Epidemiology and Research 2009).

Individual makeup

An individual's makeup results from the complex interaction of their genetic makeup and physical, psychological and social influences, and from the interactions between these over various stages of their life.

Some conditions are more determined by genetic factors than others. Muscular dystrophy, for example, is entirely genetic whereas many other diseases have a variable mix of genetic and external factors.

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 in the population. 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 Chapter 2 for an explanation of DALYs.). Australia's most recent national study of the burden of illness and injury applied to 2003 and summarised the contribution of risk factors to the national burden for that year. Tobacco smoking was estimated to contribute the greatest burden (7.8% of the total health burden), followed by high blood pressure (7.6%) and overweight/obesity (7.5%). The joint contribution of 14 selected health determinants to the total burden was 32.2%. 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 health risk factors.

Most of the total burden of disease and injury in Australia in 2003 was attributed to chronic conditions, the leading contributors being cancers (19%) and cardiovascular diseases (18%). These conditions are strongly related to most of the health determinants described in this chapter. Determinants that contribute to the development of one or more chronic diseases include lifestyle behaviours such as tobacco smoking, physical inactivity, alcohol consumption, illicit drug use and unsafe sex; physiological conditions such as excess body weight, high blood pressure and high blood cholesterol; and social and environmental factors such as occupational exposures, intimate partner violence and air pollution. Some of these associations are presented in Table 3.1.

It is interesting to note that the effect of a risk factor can be multiplied because the disease it is linked to may increase the risk of developing another. For example, people with high blood pressure have a greater risk of developing chronic kidney disease as well as heart attack and stroke; and kidney disease itself increases the risk of heart attack and stroke as well as further increasing a person's blood pressure levels (AIHW 2007).

When diseases have common risk factors—such as tobacco smoking being common to heart disease and cancer—the diseases are more likely to occur together. At the same time, controlling such risk factors offers great potential for prevention.

Table 3.1: Relationship between selected chronic diseases (conditions) and risk factors (determinants)

	Condition							
Risk factor	**Arthritis**	**Asthma**	**COPD**	**Coronary heart disease[a]**	**Depression**	**Type 2 diabetes**	**Osteoporosis**	**Stroke**
Behavioural								
Tobacco smoking	✓ (b)	✓	✓	✓			✓	✓
Physical inactivity	✓ (c)			✓	✓	✓	✓	✓
Alcohol misuse				✓	✓	✓	✓	✓
Poor nutrition				✓		✓	✓	✓
Biomedical								
Obesity	✓ (c)			✓	✓	✓		✓
High blood pressure				✓				✓
High blood cholesterol				✓				✓

COPD Chronic obstructive pulmonary disease.

(a) Also known as ischaemic heart disease.

(b) Relates to rheumatoid arthritis.

(c) Relates to osteoarthritis.

Source: Table adapted from AIHW 2008a.

3.2 Environmental factors

The term 'environment' has a broad definition and can refer to whatever surrounds us or is outside us, both physical and social. This section applies only to the physical environment. Of particular interest are factors such as the quality of air, food and water, which are fundamental to human life, health and wellbeing. Other factors include the built environment, which extends to urban design and safety, and can also influence our levels of physical activity. In addition, environmental health issues are re-emerging as potential threats, especially with global warming and its far-reaching effects.

Like other determinants, environmental influences on health may be direct or indirect, immediate or delayed, obvious or subtle. Some of the relationships between the environment and health are straightforward, others are much more complex. They include demographic, economic and social influences, and it is very difficult to factor these in to assess the full scope and size of the environmental effect, both positive and negative. Some of the harmful health effects include:

- diseases due to microbial contamination of food and water
- vectorborne diseases transmitted by insects and other animals
- respiratory and heart diseases attributed to air pollution and chemical exposure in the workplace
- injuries associated with workplaces and traffic systems
- disasters or changes in ecological systems associated with climate change.

The following pages describe the effects of selected environmental determinants on human health.

Food safety

The safety of our food supply can be affected by harmful levels of microorganisms, natural toxins, chemicals and foreign matter—all of which can potentially cause illness in the population. Food safety can be affected anywhere in the food chain: production, packaging, transport, storage and meal preparation.

Foodborne disease

Common causes of foodborne disease include the bacteria *Campylobacter* and *Salmonella*, viruses such as norovirus and toxins such as ciguatoxin. Sometimes the disease is part of a recognised 'outbreak', with a known or unknown food source responsible for causing illness in a number of people. Preventing foodborne diseases depends on appropriate practices in food production, storage, transport and preparation, and there is a complex system of regulations to that end.

Foodborne disease places a considerable burden on Australian society, costing an estimated $1.2 billion annually (Abelson et al. 2006). It has been estimated that there are between 4.0 and 6.9 million cases of foodborne gastroenteritis each year in Australia (Hall et al. 2005).

Notification rates for suspected foodborne diseases have increased over recent decades. This is partly due to better identification and reporting systems but changes in consumer behaviour are believed to have also played a role. More foods are prepared outside the home, which may carry higher risks if poorly prepared (Hall et al. 2002). The increase in globalisation has also increased the potential for widespread outbreaks of foodborne disease due to the larger scale of production. OzFoodNet was established by the Australian Government in 2000 in collaboration with the 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 formulation.

In 2007, 149 foodborne disease outbreaks were recorded in Australia and they affected 2,290 people (Table 3.2). Of these people, 266 were hospitalised and five died. The number of outbreaks increased from the previous two years: there were 115 in 2006 (affecting 1,522 people) and 102 in 2005 (affecting 1,975 people) (OzFoodNet 2008).

A wide variety of foods was responsible for the 2007 outbreaks. Fish was the food most commonly associated with outbreaks, although eggs, fresh produce, poultry, and meat and meat products were also implicated. Most outbreaks occurred where food was prepared in restaurants and private residences (OzFoodNet 2008).

Table 3.2: Foodborne disease outbreaks, selected characteristics, 2007

Agent category	Number of outbreaks	Persons affected	Average outbreak size (persons)	Persons hospitalised	Deaths
Bacterial toxin	5	78	16	0	0
Campylobacter	4	20	5	1	0
Ciguatoxin	8	24	3	1	0
Cyclospora	1	8	1	0	0
Histamine poisoning	7	17	2	4	0
Norovirus	16	520	33	6	0
Plant toxins	1	2	2	2	0
Salmonella Typhimurium	39	914	23	225	5
Salmonella other	11	125	11	15	0
Shigella	1	55	55	3	0
Unknown	56	527	9	9	0
Total	**149**	**2,290**	**15**	**266**	**5**

Source: OzFoodNet 2008.

Chemical contaminants

Chemical contaminants include pesticide residues, metals and dioxins. Pesticide use is common in the agricultural industry for controlling pests and diseases. Although its use aims to increase the availability, quality and variety of food, there are associated risks. Metals that may contaminate the food supply include cadmium, lead, mercury, tin and zinc.

Exposure to chemical contaminants is monitored by Food Standards Australia New Zealand as part of the Australian Total Diet Study. The study, run about every 2 years, assesses the population's dietary exposure to a range of food chemicals. It has consistently shown that Australia's dietary exposure to chemical contaminants is well within international health standards and poses very little risk to public health and safety (FSANZ 2008).

Air pollution

Air pollution can aggravate a range of health conditions, including respiratory ailments and cardiovascular disease (Anderson et al. 2004). Air pollution has a range of sources, both natural and human. Natural sources include bushfires, dust storms and vegetation (for example, the volatile organic compounds released by some trees). Industrial activities and motor vehicle emissions are examples of human sources.

Pollutants directly emitted into the atmosphere are known as 'primary' pollutants, some of which undergo chemical changes in the atmosphere and form 'secondary' pollutants. For example, the primary pollutants nitrogen oxide and volatile organic compounds react in sunlight to form the secondary pollutant ozone. Table 3.3 outlines the main sources of air pollutants in Australia and describes their health effects.

Table 3.3: Air pollutant sources and effects

Pollutant and sources	Health effects
Particulates	
Produced in combustion processes such as power generation, industrial activities and motor vehicle use as well as agricultural burning, bushfires and emissions from domestic solid fuel heaters and woodstoves.	Aggravates respiratory and cardiovascular diseases, and irritates upper airways and eyes.
Ozone (O_3)	
Formed when nitrogen oxides (NO and NO_2) and volatile organic compounds react in sunlight. Sources include combustion in motor vehicles, power generation and bushfires.	Aggravates respiratory and cardiovascular diseases, decreases lung function and irritates airways.
Nitrogen dioxide (NO_2)	
Formed when nitric oxide (NO) is combined with oxygen (O_2) in the atmosphere. Sources of nitric oxide include industrial activities and motor vehicles.	Aggravates respiratory disease and decreases resistance to infection.
Carbon monoxide (CO)	
Formed when substances containing carbon (such as fossil fuels) are burned with an insufficient air supply. The major sources include industrial activities and motor vehicles.	Aggravates cardiovascular disease and affects mental function.
Sulfur dioxide (SO_2)	
Major sources include natural sources such as erupting volcanoes as well as the burning of fossil fuels and smelting of mineral ores that contain sulfur.	Aggravates cardiovascular disease, irritates eyes and throat, and can damage lungs.

Sources: Anderson et al. 2004; BTRE 2005; DEH 2005; Katsouyanni 2003.

In recognition of the effects of these pollutants on health and climate, a range of standards has been introduced across Australia over recent decades. The National Environment Protection Measures describe standards for six main pollutants (Table 3.4). A description of the averaging period used to determine whether or not the maximum allowable levels have been exceeded is in Box 3.1.

Table 3.4: National ambient air quality standards and goals

Pollutant	Averaging period	Maximum ambient concentration	Maximum days per year[(a)]
Particulates (as PM_{10})[(b)]	1 day	50 µg/m^3	5 days a year
Ozone (O_3)	1 hour	0.10 ppm	1 day a year
	4 hours	0.08 ppm	1 day a year
Nitrogen dioxide (NO_2)	1 hour	0.12 ppm	1 day a year
	1 year	0.03 ppm	None
Carbon monoxide (CO)	8 hours	9.00 ppm	1 day a year
Sulfur dioxide (SO_2)	1 hour	0.20 ppm	1 day a year
	1 day	0.08 ppm	1 day a year
	1 year	0.02 ppm	None

ppm Parts per million.

(a) Goal for the maximum number of times the standard may be exceeded.

(b) Particulate matter, or inhalable particles, over 10 microns in diameter.

Source: DEH 2005.

Box 3.1: Air quality standards averaging period

The averaging period in Table 3.4 refers to the period over which the air pollution readings are averaged. In the case of an averaging period of 1 hour, for example, data are grouped by the hour of the day in which they were recorded—for example, from 1 am to 2 am or from 4 pm to 5 pm. The average reading is then calculated for each hour of the day. The highest average hourly reading is taken as the reading for that day.

The level specified as the maximum allowable is generally lower where the averaging period is longer. Averaging the readings over a longer period means that the result is less influenced by brief peaks in pollutant levels. Selecting an averaging period is a balance, however. On the one hand, it is important to avoid results being skewed by very short-term peaks in pollutant readings that may not relate to substantive increases in exposure in the community. On the other hand, long averaging periods can become less sensitive to relatively sustained increases in pollutant levels that do relate to real increases in exposure in the community.

Table 3.5 describes trends in pollutant concentrations against the National Environment Protection Measures since 1991. Most of these pollutants have declined considerably since the standards were introduced. The air pollutants of most concern are particulates and ozone. High temperatures are the main contributors to both these pollutants in Australia. Sunlight and high temperatures play a key role in chemical reactions associated with the production of ozone and also contribute to extreme events, such as bushfires and dust storms, that produce particulates.

Table 3.5: Trends in concentration of air pollutants

Pollutant	Trend
Particulates (as PM_{10})[(a)]	All capital cities except Hobart had PM_{10} concentrations above the standard between 1991 and 2001. In Melbourne the levels of PM_{10} remained above the standard from 2001 to 2006, with concentration peaks seen in 2003 and 2006. New South Wales also recorded PM_{10} levels above the standard from 2001 to 2006, with a peak in 2003. The peaks can be attributed to severe bushfires and dust storms in those years (DECC 2007).
Ozone (O_3)	In most Australian cities, ozone standards were exceeded every year in the period 1991 to 2001. The only capital city with ozone levels consistently below the standards was Canberra. Ozone levels in Sydney and Melbourne remained above the standards from 2001 to 2006.
Nitrogen dioxide (NO_2)	All major cities showed an overall decline in NO_2 concentrations between 1991 and 2001. NO_2 concentrations remained below the standards in Sydney and Melbourne from 2001 to 2006.
Carbon monoxide (CO)	Since the introduction of unleaded petrol and catalytic convertors in 1985, CO levels have dropped considerably. Sydney, Adelaide and Canberra were the only capital cities that exceeded the standard between 1991 and 2001. The levels in these three cities dropped below the standard in 1996.
Sulfur dioxide (SO_2)	Most capital cities have shown a fairly steady rate of sulfur dioxide emissions and met the National Environment Protection Measures standards for highest daily average and highest daily maximum between 1991 and 2001. This trend was maintained in Sydney and Melbourne from 2002 to 2006. Until 1996, Adelaide exceeded the standards but since then the levels have been below the standard.

(a) Refers to particulate matter, or inhalable particles, over 10 microns in diameter.

Sources: BTRE 2005; DECC 2007; DEH 2005; Katsouyanni 2003.

Water

Access to an adequate and safe supply of water is a fundamental requirement for good personal and public health. This includes both drinking and recreational water. As the term implies, ‘drinking water’ is water that is intended for human consumption, but since the source is usually the same it also includes water used for other domestic purposes such as bathing and washing. Water availability and usage in Australia is described in Box 3.2.

Water quality in Australia is generally of a very high standard; contamination is rare, especially in and around major population centres. However, many things can affect water quality and a safe water system requires constant surveillance and monitoring to control concentrations of potentially harmful chemical and microbial contaminants.

Some viruses (for example, adenovirus, hepatitis viruses and rotaviruses), bacteria (for example, *Escherichia coli*, *Enterococci*, *Campylobacter* and *Salmonella*) and protozoa (for example, *Cryptosporidium* and *Giardia*) can be transmitted by contaminated water supplies. The presence of harmful microbes in drinking water is due mainly to contamination by human or animal faeces. The quality of natural recreational water bodies may be affected by discharges of sewage, stormwater and agricultural runoff, whereas risks to swimming pool water quality arise from microbial contaminants originating from bathers themselves.

Drinking or bathing in contaminated water can result in health effects ranging from irritated eyes, skin and throat and mild gastroenteritis, to more severe diarrhoea and potentially life-threatening dysentery, hepatitis and cholera. Some chemical contaminants in water are suspected of causing cancer.

Almost all water supplied through utilities in Australia meets the guidelines for microbial and chemical contamination. The Australian Drinking Water Guidelines use *E. coli* as an indicator for faecal contamination, and to meet the guidelines for microbial contamination there must be zero counts of *E. coli* in 98% of routinely monitored samples over a 12-month period. However, each jurisdiction may have more stringent guidelines than this. In 2007–08, 82% of all water utilities reported full compliance with microbiological and chemical contamination standards (National Water Commission 2009).

Low flows and warm water temperatures can alter water chemistry and pathogen content, often resulting in blue-green algae (cyanobacteria) blooms which are toxic to humans and animals. The growth of algae is also encouraged by the phosphorous and nitrogen in fertilisers that can run off into waterways. Bushfires that occur near water catchment areas can also affect water quality when runoff from rain on the bare landscape, ash and debris fall into the catchment.

The fluoridation of tap water delivers a public health benefit by reducing the incidence of tooth decay. In 2001, more than three-quarters of the population, in every state or territory except Queensland, had access to fluoridated drinking water. In December 2008, fluoride was introduced to the water supply for Brisbane and parts of south-east Queensland (Brisbane City Council 2009).

Box 3.2: Water availability and usage

Based on a range of measures—average rainfall, distribution of rainfall and potential evaporation—Australia is considered the driest inhabited continent on the planet. Water availability depends largely on rainfall, but also on the amounts stored in aquifers (underground storage), dams, rivers and lakes. This in turn determines how much water can be used for agricultural, recreational, industrial and domestic purposes.

In Australia, rainfall varies by year, season and geographical location. The average annual rainfall in Australia in 2008 was around 480 mm, slightly higher than the average for 1961–2008 of about 470 mm (Bureau of Meteorology 2009). Some areas in Australia have an average annual rainfall between 600 and 1500 mm, which is comparable to that across most of Europe and North America (ABS 2006b), while for half of Australia the average is less than 300 mm (ABS 2008a). Annual rainfall variability is greater for Australia than for any other continental region (Smith 1998 cited by ABS 2006b).

In 2005, 96% of Australia's water supply was sourced from surface water stored mainly in catchments, while groundwater (that is, water occurring below the ground) supplied nearly 4%. Desalinated sea water accounted for the remainder (less than 0.5%) of the water supply (ABS 2008a).

Prolonged drought over south-eastern Australia since the beginning of this century has heavily affected rural communities, their amenities and their livelihoods. This drought exceeds all previous droughts in both duration and intensity. It is no longer considered a drought, which implies there will be a return to 'normal' conditions, but rather a new rainfall regime (Hennessy et al. 2008).

Water usage patterns in Australia are changing. Water restrictions have been in place in most states and territories since 2002. Between 2000–01 and 2004–05 there was a 7% decrease in household water consumption and this could be due partly to the restrictions (ABS 2008a). These restrictions have achieved broad acceptance, along with the use of rainwater tanks and domestic water recycling. The proportion of households that reported using a rainwater tank as a source of water increased from 17% in 2004 to 19% in 2007 (ABS 2007a). South Australia, the driest state, had the highest proportion (45%) of households using rainwater as a source of water.

Environmental changes, climate and health

There are growing concerns that large-scale changes to the environment will expose Australians to a range of increased environmental hazards, such as extreme temperature, natural disasters, famine and vectorborne diseases. Human settlements, industrialisation, land clearing and farming practices all affect environmental systems, including climate systems (Corvalan et al. 2005; IPCC 2007). Changes to the global environment will have both direct and indirect implications for human health. This may be of particular concern for vulnerable groups, such as Indigenous Australians and the elderly.

Climate change

Australians now see climate change as a pre-eminent social, economic and environmental issue—82% of adults in a large national survey in 2007–08 reported that they were concerned about environmental problems (ABS 2009a). Further, international health experts have labelled climate change as the biggest global health threat of the 21st century (Costello et al. 2009).

The most topical area of concern about the environment is the threat of global warming through a mechanism known as the greenhouse effect. This is a natural and necessary effect in which gases are trapped in the Earth's atmosphere so the earth is warmed to a level that supports life. The three main long-lived greenhouse gases that are of interest are carbon dioxide, nitrous oxide and methane: if too much of these gases is released into the atmosphere then the greenhouse effect is increased, causing the earth to warm excessively.

Human activities contribute to climate change by causing changes in the Earth's atmosphere in the amounts of greenhouse gases, aerosols (small particles) and clouds. The largest known contribution comes from the burning of fossil fuels, which releases carbon dioxide gas into the atmosphere. According to the Intergovernmental Panel on Climate Change (IPCC 2007), since the start of the industrial era (about 1750), the overall effect of human activities on climate has been a warming influence.

In Australia, average temperatures have risen by around 1°C since the first half of the last century, with an increase in the frequency and intensity of heatwaves and a decrease in the numbers of frosts and cold days (Bureau of Meteorology 2009).

Some effects of climate change and other environmental changes may be beneficial, such as increased crop yields or displacement of disease-carrying animals and insects in some areas; however, most of the effects are expected to be harmful, and are further discussed below.

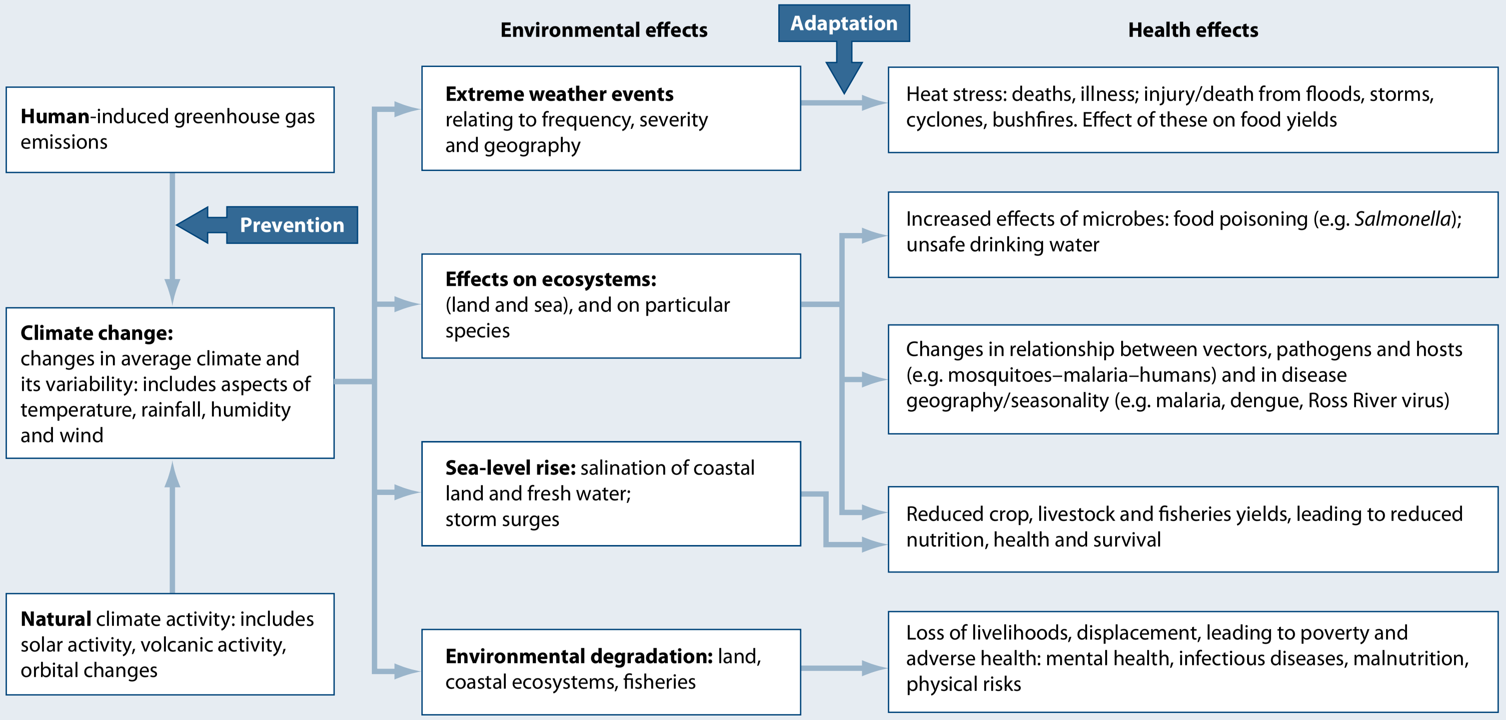
Health effects of climate change

Attributing health effects to climate change, and quantifying these associations, is difficult for a number of reasons:

- the links between climate and health may involve indirect and complex relationships
- the effects are often delayed or displaced
- the chains of effect mean there would be great uncertainty in showing that climate change over time—not just a particular climate event—has caused ill health in any particular individual (however, it may well be possible to show effects at a population level)
- there is no clear 'baseline'; that is, climate change has been occurring for many years
- any future effects are subject to global efforts to reduce the effects of human activity on climate.

The changes and increased variability of climate and environment will result in both direct and indirect effects on health. The direct risks to health caused by climate change include extreme heat or cold, storms, bushfires, floods and other weather-related disasters (Corvalan et al. 2005; McMichael et al. 2006). Indirect health effects include increased exposure to air pollutants, contaminated food and water, and changes in patterns of transmission of various infectious diseases. Moreover, mental and physical illness may be caused by climate change-induced social upheaval and disruption (Confalonieri et al. 2007). Dislocation of populations often leads to poor health, and limited resource availability raises the potential for conflict in the areas that people migrate to (GHF 2009; United Nations 2007).

Figure 3.2 summarises the main pathways by which climate change can affect population health, and suggests where interventions—both as prevention and adaptation—may reduce health damage.



Note: Prevention refers to ways of reducing greenhouse gas emissions. Adaptation entails interventions to reduce health damage.

Source: Adapted from McMichael et al. 2006.

Figure 3.2: Main pathways by which climate change affects population health

On the basis of data collected over the past 150 years, heat waves in Australia are increasing in frequency and intensity, with record high temperatures observed in 2009 across South Australia, Tasmania and Victoria. In January 2009, Victoria recorded 374 deaths over what would usually be expected, equating to a 62% increase in total all-cause mortality (DHS 2009). Currently there are an estimated 1,115 heat-related deaths per year in Australia's five largest capital cities, and this number is projected to double by 2020 (Whetton et al. 2005). A threshold maximum temperature above which mortality is observed to increase in eastern Australian cities is about 28–30°C (Guest et al. 1999). Australia can therefore expect significant increases in heat-related health problems, especially among the elderly, arising from the additional number of very hot days.

The extreme weather across Australia during the summer of 2008–09 was associated with floods in Queensland and New South Wales, and bushfires in the southern states. A warming climate is expected to lengthen bushfire seasons and increase the frequency and intensity of bushfires. Total fire weather, measured as the daily Forest Fire Danger Index, has increased by 40% since the late 1990s, such that the measure for Melbourne airport is already at twice the projection for 2020 using the most severe warming scenarios (Lucas et al. 2007). The Black Saturday fires in Victoria in 2009 were the most intense and most lethal in Australia's recorded history. Over 170 people perished, and many suffered severe burns and were hospitalised.

Some activities contribute to preventing further climate change while at the same time providing a benefit to individuals' health. For example:

- riding bicycles or walking instead of driving not only decreases greenhouse gas emissions, but also improves overall health and fitness
- shopping locally for fruit and vegetables, say at farmers' markets, decreases greenhouse gas emissions caused by transport and refrigeration.

The built environment

The built environment refers to aspects of our surroundings that are created or modified by people rather than occurring naturally. It includes our homes, schools and workplaces, recreation areas and transport systems.

The built environment is an important determinant of lifestyle and health. Its design and structure can shape both our physical health (for example, road traffic accidents or occupational injuries) and mental wellbeing (for example, stress due to noise or light pollution). More broadly, human-made surroundings such as public recreation spaces can influence the quality of social relationships and sense of community in an area.

The effects of the built environment on human health and wellbeing are most apparent in cities and towns, and Australia is one of the most urbanised countries in the world. At the latest Census, two-thirds of Australians (66%) lived in urban areas of greater than 100,000 people, with most (60% of the total population) living in cities of more than 1 million people (ABS 2008b).

Urban design, housing and transport are three aspects of the built environment that have received considerable attention from policy makers, urban planners and public health experts.

Urban design plays a role in influencing physical activity, particularly walking and cycling for transport. Residents are more likely to be physically active (and less likely to be overweight and obese) in neighbourhoods that are pedestrian-friendly and designed to include footpaths and cycle paths, public open spaces, well-connected street networks and access to shops and services (Gebel et al. 2005; NHFA 2009a).

An increasing body of evidence has linked housing quality with morbidity from infectious and chronic illness, and injuries. For example, living in a home that is damp and mouldy can increase the risk of developing respiratory and asthma-related symptoms such as coughing, wheezing and irritation of the upper respiratory tract by 30–50% (Fisk et al. 2007).

Greater use of cars for transportation has been associated with higher levels of congestion and air pollution as well as traffic accident injuries and deaths (WHO 2000). More recently, car dependence has been identified as a major contributor to sedentary lifestyles and growing rates of overweight and obesity. In one study, residents of New South Wales who drove to work were 13% more likely than non-car commuters to be overweight or obese and significantly less likely to achieve recommended levels of physical activity (Wen et al. 2006).

These are just some of the numerous pathways through which the built environment can influence human health. With increasing urbanisation, the continued study of the built environment and its relationship with health is important to inform urban planning and create sustainable healthy cities.

3.3 Socioeconomic characteristics

Socioeconomic factors such as income, employment, education, social support and housing are all intricately linked to health. Disentangling the relationships between health and these factors is complex because the causal direction is often unclear. For example, people who have higher levels of education are more likely than others to be employed in white-collar or professional jobs, and also tend to have higher incomes than unskilled workers. Therefore, some of the connection between income and health is due to the indirect effects of education and occupation. Education promotes skills and knowledge that can help an individual understand information and seek services to improve their health. Further, illness or disability can contribute to unemployment, which in turn results in reduced income.

Burden-of-disease studies indicate greater burden among people who are relatively disadvantaged in society. Those with lower levels of socioeconomic status (SES) have markedly higher rates of diabetes, injuries and mental disorders than those with the highest SES (Begg et al. 2007). Features common to these conditions include lifestyle-related risk factors, which also show a similar pattern of being more common as SES declines. The relationship between SES and specific health conditions and behaviours is further described in Chapter 5.

The following section is about socioeconomic characteristics that have been shown to be determinants of health; that is, they play some causal role in health status. The most recent Australian data are presented along with an indication of trends over the past decade.

Education

The higher a person's levels of education and literacy, the better their health is likely to be. 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 well and obtain the best health care.

Education level can be summarised according to retention, attainment and literacy. The 'apparent retention rate' for Year 7/8 to Year 12 represents the percentage of school students in Year 12 of their respective Year 7/8 cohort. In Australia in 2008, the national apparent retention rate was 75% (ABS 2009b), an increase from 72% in 1998. The rates in Victoria, Queensland and the Australian Capital Territory were higher than the national rate. Rates were higher for females than for males in 2008—81% versus 69% respectively. Although the rate for Indigenous Australians was substantially lower than for non-Indigenous Australians, steady increases are evident for them—from 38% in 2002 to 47% in 2008.

Along with improvements in school retention, the proportion of Australians aged 15–64 years with post-school qualifications has also increased—54% in 2008 compared with 42% in 1998 (ABS 2008c) (Table 3.6). This has been due to a steady increase in the proportion attaining a bachelor or higher degree—22% in 2008 compared with 14% in 1998 (ABS 2008c).

Table 3.6: Highest post-school qualification of persons aged 15–64 years, 1998 to 2008 (per cent)

Qualification	1998	2000	2002	2004	2006	2008
Bachelor degree or above	14.3	15.7	17.8	18.9	20.6	21.9
Diploma or certificate	27.6	28.1	29.8	31.3	30.8	30.8
None	58.1	56.2	51.8	49.1	47.6	46.1

Note: Totals may not add to 100% because the level of highest non-school qualification of some persons could not be determined.

Source: ABS 2008c.

Income and wealth

Income influences health at multiple levels: there is a country's wealth, the typical wealth of its people, and how evenly wealth is distributed. From a global perspective, Australia is a very wealthy country and this allows its governments to provide many health services and to subsidise Australians' use of them (see chapters 7 and 8). For individual citizens, 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.

The Australian Bureau of Statistics' (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. Due to changes to the latest of these surveys (2007–08) it is difficult to compare its results to those for previous years. However, it is clear that household incomes in Australia have grown considerably during the past decade in real (inflation-adjusted) terms—by about 35% between 1995–96 and 2005–06 (ABS 2007b).

This income varied between states and territories and with area of residence, with the average being 25% higher in capital cities than in other areas (ABS 2009c).

Despite Australia's high overall wealth, there is still a degree of inequality in wealth among its people. Income distribution across the population is commonly measured by percentile ratios. In 2007–08, the household income level of those at the 80th percentile (that is, the value dividing the top 20% of households from the 80% below them) was $1,079 per week, while that of the 20th percentile was $410. The ratio of these two income levels, known as the P80/P20 ratio, was 2.63 (ABS 2009c).

In lone-parent households there is poorer health among children and young people, and this has been attributed to material disadvantage (Mathers 1995; Spencer 2005). In 2007–08 the median income in those households with dependent children was $464 per week, one-third less than the national median of $692 per week.

3.4 Knowledge, attitudes and beliefs

Knowledge, attitudes and beliefs about health are important determinants of lifestyle and health behaviours. An understanding of good health and its importance can influence an individual to adopt health-protective behaviours (such as regular physical activity) rather than risky behaviours (such as unsafe sexual practices). Because these behaviours will shape both present and future health status, health interventions that aim to increase knowledge or modify attitudes and beliefs are a valuable component of health promotion.

Australians are exposed to, or seek out, health 'knowledge' from a wide range of sources. Health professionals are traditionally considered the first point of contact for a health concern, but there is now a range of other sources of information available. These include friends, family, the internet, and books, magazines and television programs focused on good health and positive lifestyle behaviours. A study conducted in 2002 found that 27% of regular internet users in Australia (1.4 million people) had sought health information on the internet (BHC 2008a). Of these internet users, three-quarters had used the internet to become better informed about their illness, and one-fifth to decide whether to seek medical attention. While more recent data on health-related internet use are unavailable, it is likely that an increasing number of Australians are looking to the internet for information about health concerns.

One way of discussing Australians' knowledge about health is through surveys of health literacy (see Box 3.3). Being health-literate involves knowing what constitutes good quality advice, how and where to seek further information when required and how to translate information into action. A person with a higher level of health literacy will find it easier to successfully manage their health. In contrast, low levels of health literacy (and poor health management) will be detrimental to both the individual concerned and the broader community.

Box 3.3: Health literacy

The 2006 Adult Literacy and Life Skills Survey derived an overall measure of health literacy from questions that pertain to five different health activities. These are:

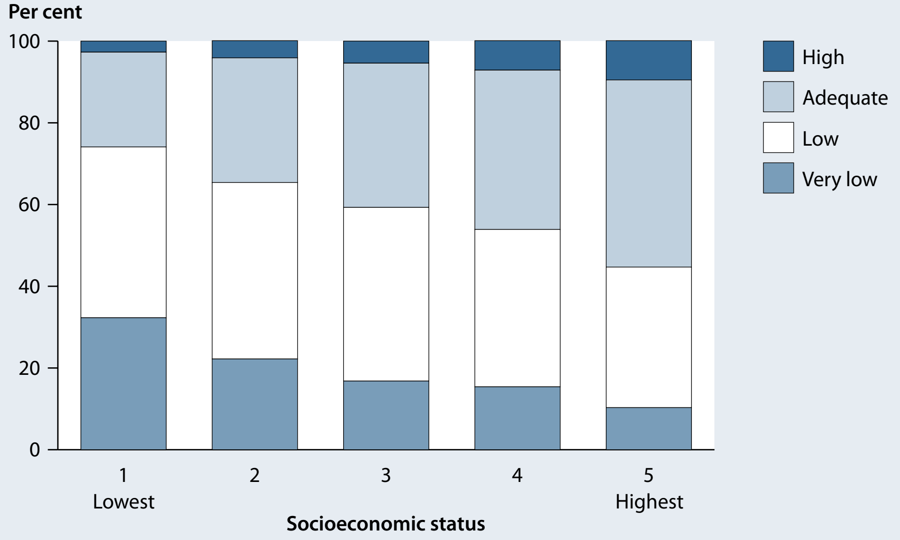
- health promotion—the ability to enhance and maintain health by locating and using health-related articles and information; for example, planning an exercise regime or using information on food charts or product safety labels
- health protection—the ability to safeguard individual or community health by reading newspaper articles, information about health and safety, or air and water quality reports, or participating in referenda
- disease prevention—the ability to take preventive measures and engage in early detection by understanding health alerts on television or in newspapers, or in letters about medical test results; for example, to determine risks, seek screening or diagnostic tests and follow up on courses of treatment

- health care information—the ability to seek and form a partnership with health care providers, provide a health history, follow directions on medicine labels, or understand and discuss the merits of alternative treatments with a health professional
- systems navigation—the ability to understand and access required health services by completing application forms, reading maps to locate appropriate facilities or understanding health benefits packages (notably about what private health insurance funds offer their members).

Literacy level is grouped into 5 levels, where Level 1 is the lowest level and Level 5 is the highest. Level 3 is regarded as the 'minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy'. Level 1 tasks usually required respondents to find a single piece of literally stated information in a document, while Level 5 tasks involved multiple phrases in the question and required finding multiple pieces of information to arrive at the correct result.

Sources: Adapted from ABS 2007c; ABS 2008d.

In its 2006 Adult Literacy and Life Skills Survey, the ABS rated health literacy skills on a scale of 1 (lowest) up to 5, where 3 was regarded as the minimum required for meeting the complex demands of everyday life and work ('adequate health literacy'). Findings from the survey show that, overall, 41% of Australians aged 15–74 years had an adequate or better level of health literacy (2008d). However, people living in higher SES areas were more likely to have a higher level of health literacy than those in lower SES areas (Figure 3.3). Slightly over a quarter (26%) of people from the lowest SES areas had an adequate level of health literacy or above, compared with 55% of people from households in the highest SES areas.



Note: This figure is based on the Index of Relative Socioeconomic Disadvantage (IRSD), one of the four Socioeconomic Indexes for Areas (SEIFAs) developed by the ABS. See Box 5.5 Chapter 5 for further explanation of SEIFA.

Source: ABS 2008d.

Figure 3.3: Level of health literacy and socioeconomic status

The survey also showed that health literacy was higher among people who were employed, had higher levels of formal education, participated in social groups and organisations, or were born in a mainly English-speaking country. Males and females had similar levels of literacy—40% of males and 41% of females achieved an adequate level or above.

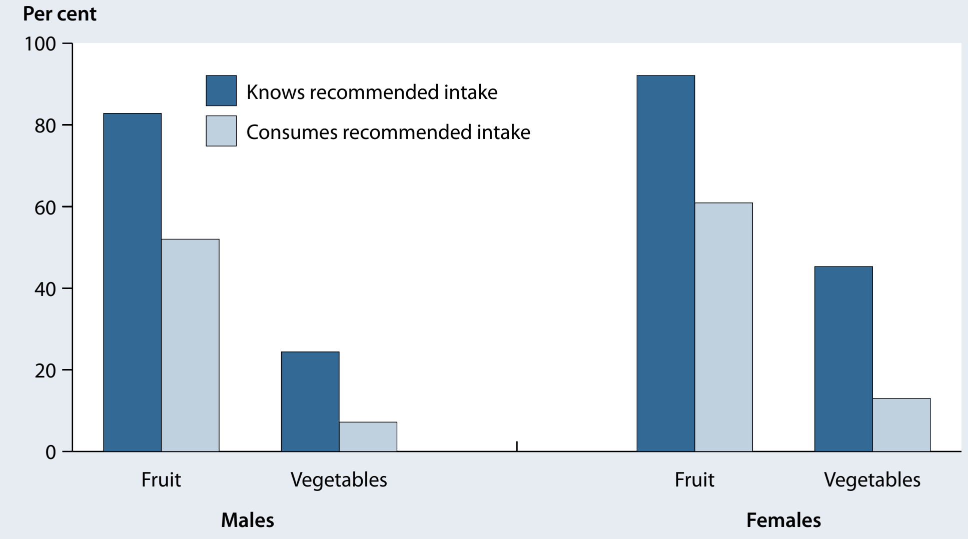
There is a reasonable assumption behind the notion of health literacy: that good knowledge about health will tend to lead to better health for the people concerned. However, common observation tells us that 'knowing' something is often not enough for a person to act in their own best interests. In the case of health, for example, people's underlying attitudes and beliefs interact with many other factors that can influence their behaviour, such as prior experience with a particular disease, physical addiction, financial and time constraints, and peer group norms. This means that health promotion campaigns and efforts to increase people's health awareness and knowledge will not automatically translate into health-protective behaviours.

As an example, there is a large inconsistency between knowledge and practice relating to sun exposure and protection. Despite widespread acceptance that excessive exposure to ultraviolet (UV) radiation increases the risk of developing skin cancer, many Australians have not adhered to sun safety messages. Findings from the National Sun Protection Survey show that 22% of Australian adolescents and 11% of adults deliberately tanned in the summer of 2006–07 (Cancer Council of South Australia 2008). For more information on sun protection, see Section 3.5.

For tobacco smoking there is also a discrepancy between knowledge and behaviour. Extensive efforts have been made to reduce the level of tobacco smoking among Australians by providing information about the health risks of this harmful behaviour. This has been quite successful in terms of increasing knowledge about the effects of smoking. Most smokers acknowledge the risks associated with smoking—in a survey conducted in 2007 in New South Wales, three-quarters of smokers believed they either definitely or probably would become seriously ill if they continued to smoke (Cotter et al. 2008). Furthermore, 83% of smokers agreed that smoking-related deaths are likely to be slow and painful. However, less than half of all smokers (45%) felt that they were 'seriously' thinking about quitting in the next 6 months. For further information on tobacco smoking, see Section 3.5.

The same survey found similar evidence in relation to nutritional knowledge and practice. Although 88% of adults (83% of males and 92% of females) knew the recommended number of daily serves of fruit, only 56% met that recommendation. Similarly, although 35% of adults knew the recommended daily intake for vegetables, only 10% consumed the recommended amount. Knowledge and consumption were greater for females than males—45% of females and 24% of males knew the recommended vegetable intake, while 13% and 7% respectively consumed the recommended amount (Figure 3.4).

Knowledge about sexually transmissible infections (STIs) and sexual health is another area of interest. Results from the Fourth National Survey of Australian Secondary Students and Sexual Health show that most students (88%) had sought information about sexual health (Smith et al. 2009). Sources of information included mothers (56%), female friends (55%) and the school sexual health program (49%). While not used as frequently, doctors (39%) were considered to be the most trusted source of information on sexual health.



Source: Centre for Epidemiology and Research 2009.

Figure 3.4: Knowledge and practice of recommended daily fruit and vegetable consumption, people aged 16 years and over, New South Wales, 2008

Despite the range of information sources reported, knowledge about sexual health was found to be inconsistent among secondary school students. Although knowledge about HIV/AIDS was high, knowledge about other STIs and their transmission was poorer, especially for chlamydia, hepatitis, gonorrhoea and genital warts. The majority of students did not perceive themselves to be at risk of STIs—less than 1 in 10 (7%) believed they were likely or very likely to become infected with an STI. The perceived risk of STIs was higher among students who were sexually active (12%), had three or more sexual partners in the past year (26%) or were attracted to people of the same sex (15%). The risk of becoming infected with an STI was considered more salient when the student's sexual partner was not previously known to them. Complementary research has shown that condom use among young adults was governed more by concerns about pregnancy than STIs, making condom use less likely (de Visser 2005). For further information on sexual behaviours, see Section 3.5.

Finally, apart from the imperfect link between knowledge and practice, there is evidence that health knowledge may be misinterpreted or missed altogether by some population groups. Studies have shown that some people from non-English-speaking backgrounds are not as informed about risky health behaviours as their English-speaking counterparts (Perusco et al. 2007). In some cases, those who come from countries where smoking is seen as the social norm are often not aware of the health and social problems associated with smoking (Lê & Lê 2006). Accordingly, health promotion programs that aim to increase knowledge and challenge beliefs require careful planning to ensure that they benefit all population groups.

3.5 Health behaviours

Many things can influence a person's health-related behaviours, including other health determinants and a person's individual makeup. For example, the consumption of alcohol or tobacco can be a function of a person's preferences, modified by cultural or family influences and socioeconomic resources. A person's knowledge, attitudes and beliefs may make a particular behaviour more or less likely. Further, behaviours may be affected by the presence of disease or disability.

Changing health behaviours is a primary goal of health promotion, which often operates at a population level (such as through television advertisements promoting physical activity). Other population health interventions such as legislation, regulation or price control may make it harder for people to continue with unhealthy behaviours. For example, these mechanisms have been used to make it harder to purchase cigarettes and to reduce the number of places where smoking is allowed, with the expectation that people will either not take up smoking or choose to quit. These population-level interventions may be supplemented by advice from health professionals, and perhaps by medication or other medical treatments.

Ultimately, individuals make their own choices about health-related behaviours based on this mix of determinants, interventions and other influences, and consequently have more power to change their own behaviours than many of the other determinants discussed in this chapter.

The following sections describe the levels, patterns and trends of the health-related behaviours that have been shown to have a major influence on health.

Tobacco smoking

Tobacco smoking is the single most preventable cause of ill health and death in Australia. It contributes to more hospitalisations and deaths than alcohol and illicit drug use combined (AIHW 2008c). It is a major risk factor for coronary heart disease, stroke, peripheral vascular disease, cancer and a variety of other diseases and conditions.

The usual measure of population smoking rates is 'daily' smoking (that is, smoking every day), as this reflects the pattern of smoking most harmful to health. The great majority of smokers do smoke every day, while around 7% of smokers smoke at least once per week but not every day, and around 8% smoke less often.

Prevalence

Estimates from the latest National Drug Strategy Household Survey (see Box 3.4) show that in 2007 around 2.9 million Australians—1 in 6 aged 14 years and over —smoked daily (AIHW 2008d). Males were more likely to be daily smokers (18.0%) than females (15.2%). More than half of the population had never smoked (55.4%), and around a quarter of the population were former smokers. Males were more likely to be ex-smokers (27.9%) than females (22.4%).

Some groups within the population were more likely to smoke than others: those who were unemployed (38.2%), unable to work (33.7%), living in areas with the least socioeconomic resources (25.9%) or living in remote areas (25.0%). Indigenous Australians were more likely to be smokers than other Australians (34.1% and 19.0% respectively) (AIHW 2008b).

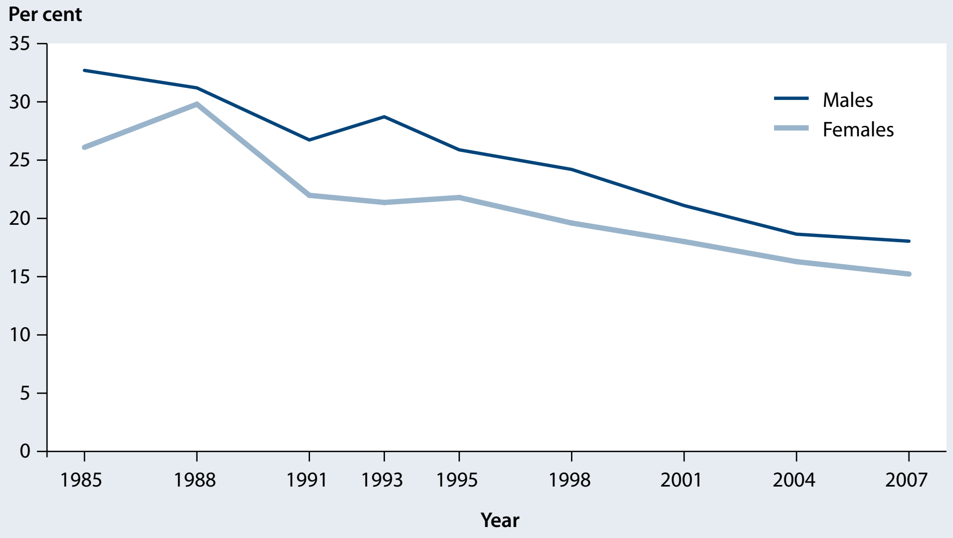
Box 3.4: National Drug Strategy Household Survey

The National Drug Strategy Household Survey 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 2007, the ninth in a series that started in 1985, and collected information from over 23,000 respondents. People living in non-private dwellings and institutions were not included in the sample. The first seven surveys covered people aged 14 years and over; and since 2004, people aged 12 years and over have been included.

Like many other surveys, the National Drug Strategy Household Survey is based on self-reported information. Individuals may be less inclined to report illegal drug use than to report the use of legal drugs (AIHW 2008c). Illicit drug users may also be marginalised and difficult to reach (AIHW 2008d). This means that survey results relating to illicit drug use may be underestimates of actual prevalence.

Smoking rates have been declining for several decades; it has been estimated that around 70% of adult males and 30% of adult females in Australia smoked in the 1950s. Between 1985 and 2007, the prevalence of smoking declined for both males and females (Figure 3.5). This trend is also apparent in data collected during general practitioner (GP) consultations: among adult patients, daily smoking rates decreased from 19.2% in 1998–99 to 16.5% in 2007–08 (Britt et al. 2008).



Sources: AIHW 2005a; 2008d.

Figure 3.5: Daily smokers, population aged 14 years and over, 1985–2007

Despite these positive trends, tobacco smoking continues to cause more ill health and death than other well-known health determinants such as high blood pressure, overweight/obesity and physical inactivity. It was estimated to be responsible for 7.8% of the burden of disease in Australia in 2003: 9.6% of the total burden for males and 5.8% for females (Begg et al. 2007). Another way of looking at the impact of smoking is through 'social costs'. Social costs comprise tangible costs which are borne by governments, businesses and households (such as health care, fires and lost productivity) and intangible costs which are borne by individuals through pain and suffering. For 2004/05, the social costs of tobacco smoking were estimated to be $31.5 billion, the majority (62%) being intangible (Collins & Lapsley 2008).

These social costs of tobacco smoking are expected to rise even as smoking rates decline due to the delay between past consumption and subsequent effects on health. However, it is expected that over time, and assuming that prevalence continues to fall, costs will eventually drop substantially (Collins & Lapsley 2008).

Smoking reduction

As mentioned above, around a quarter of Australians aged 14 years and over are former smokers—a larger proportion than current smokers in Australia. In the 2007 National Drug Strategy Household Survey, 71.8% of people aged 14 years and over who had smoked in the last 12 months reported attempting to reduce or quit their tobacco consumption. Among people who made such attempts, the most common reason for doing so was that smoking was affecting their health or fitness (45.0%). Those who attempted to reduce their smoking may have had more than one reason for doing so. Other common reasons included that smoking cost them too much (35.8%), the person wanted to get fit (27.4%) and family or friends asked them to quit (25.0%). A lower proportion (13.9%) said they cut down because of their doctor's advice (AIHW 2008b).

Smoking among young people

As a group, Australian teenagers are markedly less likely to smoke than those older than them: in 2007, among those aged 12–19 years, 5.6% smoked daily compared with 16.1% for the wider population aged 12 years and over (AIHW 2008d). Across this narrow 12–19 year age span, rates increased with age, from 2.0% among 12–15 year olds to 5.7% among 16–17 year olds and 12.6% for those aged 18–19 years.

Successive Australian Secondary Schools Alcohol and Drug surveys have found that smoking among young people has been declining. Between 1987 and 2005, the proportion of students aged 12–15 years who reported smoking in the week before the survey declined from 15% to 7% (Hill et al. 2002; White & Hayman 2006).

One of the strategies used to discourage smoking among young people is bans on the sale of cigarettes to people under the age of 18 years. Australian Secondary Schools Alcohol and Drug Surveys have estimated that the proportion of young smokers who purchased their most recent cigarette (instead of obtaining it some other way) fell markedly between 1987 and 2005 (White & Hayman 2006). For current smokers aged 12–15 years in 2005, 17% had purchased their most recent cigarette compared with 52% in 1987. For those aged 16–17 years, 29% purchased their most recent cigarette in 2005 compared with 64% in 1987.

Other data about the sources of tobacco for young people (AIHW 2005b, 2008b) show that people aged 12–17 years most commonly reported friends or relatives as their means of obtaining tobacco (Table 3.7). A smaller proportion of young tobacco smokers aged 12–17 years obtained their tobacco from shops in 2007, compared with 2004.

Table 3.7: Means of obtaining tobacco, smokers(a) aged 12–17 years, 2004 and 2007 (per cent)

Means of obtaining tobacco	2004	2007
Friend or relative	53.0	57.0
Bought at shop/retail outlet	70.0	49.5
Paid cash but not at retail outlet	26.4	*20.0
Stole or traded goods or services	18.6	*11.6
Other	19.3	**8.2

* Relative standard error > 25%.

** Relative standard error > 50%.

(a) Includes daily, weekly or less than weekly smokers.

Note: Recent smokers could indicate more than one means of obtaining tobacco.

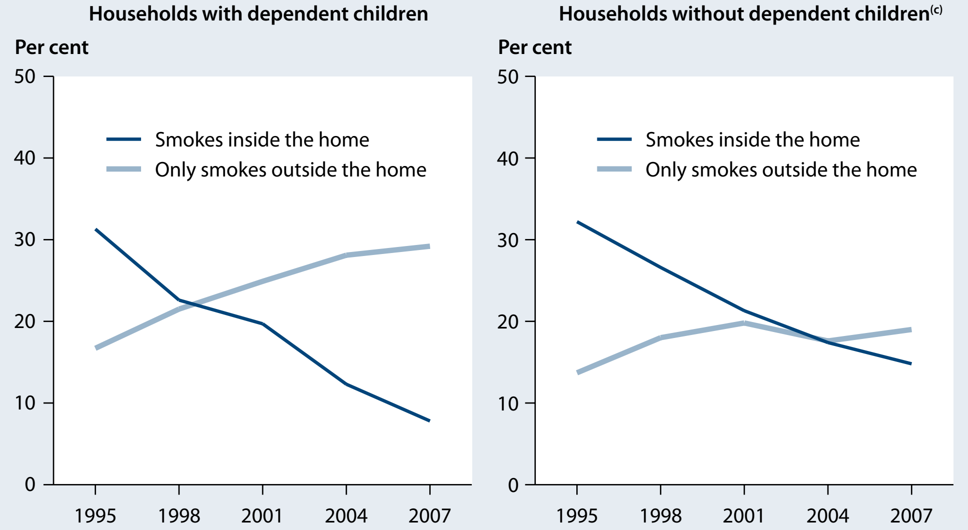
Source: AIHW analysis if the NDSHS 2004 and 2007.

Among those aged 14–19 years, 49.6% had the opportunity to smoke in the last year and 20.8% of those took up that opportunity when it presented itself. People aged under 20 years were less than half as likely to smoke as people over 20 years when they had the opportunity (AIHW 2008b).

Children exposed to tobacco smoke

The effects of passive smoking have become a focus of great concern in recent years, particularly for children who may be exposed to tobacco smoke. Such exposure increases the risk of a range of health problems in children, including chest infections, ear infections, asthma and sudden infant death syndrome (Dunn et al. 2008). The National Preventative Health Taskforce recently called for further action to reduce children's exposure to environmental smoke (NPHTTWG 2009).

Several states and territories have implemented bans on smoking in cars as a strategy to reduce children's exposure to environmental smoke. It also appears that parents' actions are reducing their children's exposure to smoke at home. Over the period 1995 to 2007, households with dependent children comprised about one-third of all households. During this period, among households with dependent children, the proportion having someone smoking inside the home fell from 31.3% to 7.8% (Figure 3.6). Of these same households, the proportion having smokers who chose to only smoke outside the home rose from 16.7% in 1995 to 29.2% in 2007. In households without dependent children, the shift from smoking inside the home to smoking outside the home was less pronounced (Figure 3.6). Overall there was little difference in smoking prevalence between households with and without dependent children.



(a) Household smoking status as reported by respondents aged 14 years and over.

(b) Households including dependent children aged 14 years and under.

(c) Includes dependents aged 15 and over.

Source: AIHW 2008c.

Figure 3.6: Household smoking status[(a)], by dependent children status[(b)], 1995–2007

International comparisons

Among the 30 member countries of the Organisation for Economic Co-operation and Development (OECD), Australia reported the third lowest daily smoking rate in 2007, behind Sweden and the United States (OECD 2009c). There was a nearly three-fold variation in prevalence between the lowest in Sweden (14.5%) and the highest in Greece (40%).

With few exceptions, all OECD countries saw a continuous decline in the prevalence of regular smoking between 1966 and 2006, with major reductions in the early part of this period and a slowing of the decline in the last decade (AIHW 2008c).

Alcohol consumption

Excessive alcohol consumption is a major risk factor for a variety of health problems such as stroke, coronary heart disease, high blood pressure, some cancers, and pancreatitis (Irving et al. 2009; WHO 2002a). It also contributes to motor vehicle accidents, drownings, homicides and falls (WHO 2002a). The most recent Australian Burden of Disease Study reported that the only group for whom alcohol benefits outweighed the harmful effects was females over the age of 65 years. In terms of the population overall, alcohol prevented 0.9% of the burden of disease and injury in 2003 while being responsible for 3.2% of the total burden (Begg et al. 2007). Other research suggests that benefits from alcohol consumption only occur at very low levels of drinking or that there is no protective effect from drinking (NHMRC 2009).

The impact of alcohol in Australia can be described in terms of social costs. In 2004/05, the total social costs of alcohol amounted to $15.3 billion, the majority (71%) being for tangible costs (Collins & Lapsley 2008). For alcohol, tangible costs include, for example, costs associated with lost productivity, road accidents and crime.

Measuring the health risks posed by different levels and patterns of drinking is complex and informed by a large body of research. The National Health and Medical Research Council (NHMRC) released new guidelines in March 2009 (Box 3.5) to help Australians reduce their health risks from drinking alcohol. These guidelines move away from previous threshold-based definitions of 'risky' or 'high risk' drinking in recognition of the fact that the lifetime risk of harm from consuming alcohol increases progressively with the amount consumed (NHMRC 2009).

Box 3.5: Australian guidelines to reduce health risks from drinking alcohol (2009)

These guidelines advise both men and women to drink no more than two drinks per day, to reduce their risk of health effects over their lifetime. Earlier guidelines set out four drinks for men and two for women, on average. Young people (under 18 years) and pregnant or breast feeding women are now advised not to drink at all.

The new guidelines have implications for the interpretation of data from surveys about alcohol use. In this *Australia's health* report, results from the 2007 National Drug Strategy Household Survey are analysed using the older guidelines, as these were current during the collection period.

The National Drug Strategy Household Survey series shows that the proportion of Australians who drink, and how frequently they do so, has remained relatively stable over the period 1993–2007. Most Australians drink alcohol (82.9% of those aged 14 years and older in 2007) and about 8.1% drink daily (Table 3.8). Almost half the population drank alcohol at least once a week.

Table 3.8: Alcohol drinking status, population aged 14 years and older, 1993–2007 (per cent)

Drinking status	1993	1995	1998	2001	2004	2007
Daily	8.5	8.8	8.5	8.3	8.9	8.1
Weekly	39.9	35.2	40.1	39.5	41.2	41.3
Less than weekly	29.5	34.3	31.9	34.6	33.5	33.5
Ex-drinkers[(a)]	9.0	9.5	10.0	8.0	7.1	7.0
Never a full serve of alcohol	13.0	12.2	9.4	9.6	9.3	10.1

(a) Ex-drinkers are those who consumed at least a full serve of alcohol in their lives, but not in the last 12 months.

Source: AIHW 2008c; AIHW 2008d.

Alcohol use, risk of harm and health status

This section reports against the 2001 NHMRC alcohol consumption guidelines as these were the guidelines in place when the data were collected. The guidelines were expressed in terms of short-term and long-term risk of harm (injury, ill health and death). In 2007, an estimated 17.1% of Australians aged 14 years and older had not consumed alcohol in the previous 12 months (AIHW 2008b), and so are not assessed for risk here. The majority of Australians (60.8%) had drunk at levels considered low risk for harm in the short and long term, and 8.6% had drunk at levels considered risky or high risk for both short- and long-term harm.

Perhaps unsurprisingly, people who drank at high-risk levels in 2007, both in the short and long term, were more likely than other drinkers to assess their own health as fair or poor (AIHW 2008b). People who abstained from alcohol consumption were more likely to report their health as fair or poor compared with risky or low-risk drinkers. It is important to note that other factors such as age and socioeconomic status may also affect self-assessment of health status.

Risky drinkers also appeared to have poorer mental health: a higher proportion of those who drank at levels considered to be high risk in the short term reported that they had a mental health illness (13.2%) compared with low-risk drinkers (10.2%) or the whole population aged 14 years and over (10.8%) (AIHW 2008b). The survey also showed that high-risk (15.3%) and risky (11.0%) drinkers were more likely than low-risk drinkers (8.5%) to experience high or very high levels of psychological distress. The relationship between mental health and alcohol consumption is not in one direction. In some cases, mental health issues may have preceded or prompted alcohol use, while for others the alcohol use may have occurred first.

Drinking reduction

Although almost half of all Australians aged 14 years and over drink at least once a week, a substantial number report taking action to reduce their drinking. In 2007, 48.2% of recent drinkers (those who had consumed at least one full drink of alcohol in the last 12 months) had taken actions to reduce their consumption. Around 8.3% of this group had stopped drinking and 7.4% had switched to drinking more low-alcohol drinks than in the past. The most common moderating actions were to reduce the amount of alcohol consumed at one time (29.0%) and/or to reduce the number of drinking occasions (29.4%).

Alcohol use among young people

Estimates of alcohol use by young people are affected by low prevalence and smaller sample sizes. Nonetheless, estimates suggest that in 2007 around two-thirds of those aged 12–15 years had never had a full serve of alcohol (AIHW 2008d). Around 1 in 50 drank at least once a week, and 1 in 4 drank less often than weekly. Among those aged 16–17 years, 20.3% had never had a full serve of alcohol. The majority of this age group (57.0%) drank less frequently than once a week. Few (0.8%) young people aged 16–17 years drank daily, compared with 7.9% of the Australian population aged 12 years and over.

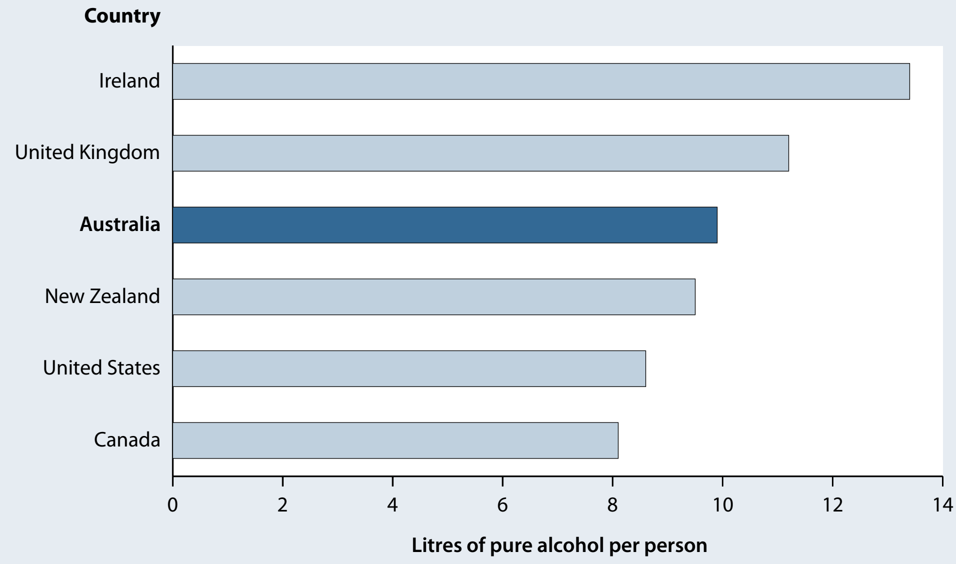
There were some differences in drinking patterns for young males and females. Generally, greater proportions of young females drank at risky or high-risk levels compared with young males (but note that, under the 2001 NHMRC guidelines, males could drink more than females before they were at risk) (AIHW 2008b). Girls aged 12–15 years drank more frequently than boys; 3.2% drank weekly compared with 1.0% of boys the same age

(AIHW 2008d). In the group aged 16–17 years, boys drank more often than girls: 22.0% drank daily or weekly compared with 15.4% of girls.

Levels of risky alcohol drinking among young people have been relatively stable between 2001 and 2007 (AIHW 2008b). Similarly, young people's choice of product has been stable over that period, with the youngest drinkers preferring spirits.

International comparisons

Measured in terms of per person consumption of pure alcohol (a means of taking account of the different alcohol content of different beverages), Australia ranks in the middle of all OECD countries and of key comparison countries (Figure 3.7), at around 10 litres of alcohol per person per year (OECD 2009b).



Note: Data are from 2006 or 2007.

Source: OECD 2009b.

Figure 3.7: Alcohol consumption, population aged 15 years and over, key comparison countries, 2006–2007

Over time the pattern of per-person alcohol consumption has varied among OECD countries. Australia, like the majority of OECD countries, appeared to have a peak in consumption in the 1970s and 1980s, followed by reductions over the 1990s and early 21st century. Notable among the key comparison countries, Ireland and the United Kingdom had an increase in consumption over the past 40 years.

Physical inactivity

Physical inactivity is linked to poor health, including many chronic conditions and injuries, excess body weight and low bone-mineral density. Of the modifiable health risk factors, physical inactivity is the second largest contributor—after tobacco smoking—to the burden of disease and injury in Australia. In 2003, it accounted for 6.6% of the disease burden and was mainly associated with coronary (ischaemic) heart disease (Begg et al. 2007). A recent study estimated that the direct cost of physical inactivity in Australia was almost $1.5 billion in 2006–07; the largest components of this cost were associated with falls ($469 million) and coronary heart disease ($372 million) (Econtech 2007).

Conversely, regular physical activity is associated with maintaining good health, and is important in helping to prevent the onset of some chronic diseases. It helps with better maintenance and control of certain conditions such as arthritis and Type 2 diabetes; and for those who have experienced heart attacks, physical activity can improve recovery and reduce the likelihood of further cardiovascular events (Briffa et al. 2006). Participating in regular physical activity, in conjunction with a healthy diet, helps to maintain a healthy body weight and reduce body fat, thereby preventing or eliminating obesity (see Box 3.6 and Section 3.6).

Box 3.6: Understanding physical activity

Put simply, physical activity is any bodily movement produced by the muscles that results in energy expenditure. Exercise is a subset of physical activity, and is defined as planned, structured and repetitive bodily movements done to improve or maintain one or more components of physical fitness. As an example, most sports include physical activity done for enjoyment, exercise or both.

Although most measures of physical activity focus on deliberate activity in leisure time, other forms of activity—such as walking or cycling for transport, and activity associated with a person's job—are important components of overall activity. Indeed, even the activity associated with everyday tasks such as shopping and housework—so-called incidental activity—is part of the physical activity spectrum and contributes to better health.

Physical activity is a critical factor in determining a person's body weight. If the energy taken in (from food and drink) is not balanced by energy expenditure (through activity and internal bodily functions) and the situation is sustained, the excess food is stored as body fat. Hence, at a population level, physical inactivity may be an important contributor to rising levels of obesity. Also see Section 3.6.

National guidelines for physical activity, for both adults and children, provide recommendations about how much physical activity should be undertaken to gain a health benefit (see Box 3.7). Measuring compliance against these guidelines in the general population is usually done using surveys to ascertain the amount of time spent on various levels of activity, and the number of sessions undertaken for each level, over a 1-week period. The latest data about physical activity come from the 2007–08 ABS National Health Survey (NHS), which included questions about exercising for sport, recreation and fitness, as well as walking for transport. These data cannot be used to measure compliance with the national guidelines. However, by using the number of days on which exercise was undertaken over a 1-week period as a proxy for the number of sessions, these data enable activity levels to be calculated (see Box 3.7).

Non-leisure time physical activity, such as activity at work or around the house, also contributes to overall physical activity. However, this component of physical activity is difficult to measure and the methods used to measure it are not generally practical for use in population surveys.

Box 3.7: National physical activity guidelines

The National Physical Activity Guidelines for Australians (DHAC 1999) are guidelines for adults and recommend at least 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week. Recommendations for older adults are also available (DoHA 2009a). They build on the guidelines for adults and provide advice about adjusting physical activity to accommodate abilities and health problems common to older people. The recommendations for children and adolescents (DoHA 2004a,b) advise at least 60 minutes of moderate to vigorous activity every day and no more than 2 hours of screen-time activity each day.

Examples of moderate-intensity activity are brisk walking, swimming, doubles tennis and medium-paced cycling. More vigorous physical activity includes jogging and active sports like football and basketball. These guidelines correspond to the notion of 'sufficient' activity; that is, the amount needed to obtain health benefits.

For population-monitoring purposes, there are two ways of calculating 'sufficient' activity. These are:

- 'sufficient time' (at least 150 minutes per week of moderate-intensity physical activity, with each minute of vigorous activity counted as 2 minutes of moderate activity)
- 'sufficient time and sessions' (at least 150 minutes of moderate-intensity physical activity accrued over at least five sessions per week, with vigorous activity counted as double).

Sufficient time and sessions is the preferred measure of sufficient activity for health as it takes into account the frequency of physical activity as well as duration. Shorter sessions (down to 10 minutes) can also be beneficial, provided they add up to the required total over the week.

Sufficient physical activity—adults

In 2007–08, the proportion of adults who exercised sufficiently (in terms of both time and proxy sessions in a 1-week period) to obtain benefits to their health was 37% (Table 3.9). The NHS did not collect the number of sessions of physical activity, therefore the number of days on which physical activity was undertaken was used as a proxy for the number of sessions. A further 8% exercised for sufficient time, but not for five or more sessions, and another 10% had a sufficient number of sessions but not for enough accumulated time.

Slightly more males than females exercised at sufficient levels: 39% compared with 36%.

Table 3.9: Physical activity, by time and sessions[(a)], adults, 2007–08 (per cent)

	Sufficient time			Insufficient time			
	Fewer than 5 sessions	5 or more sessions	Total sufficient time	No sessions	Fewer than 5 sessions	5 or more sessions	Total insufficient time
Males	9.2	39.4	48.5	20.7	21.7	9.1	51.5
Females	7.5	35.5	43.0	19.6	27.2	10.1	57.0
Persons	8.3	37.4	45.7	20.1	24.5	9.6	54.3

(a) Defined as exercising for 150 minutes or more, over at least five sessions in a 1-week period, where the number of days doing exercise was used as a proxy for the number of sessions.

Notes

1. Insufficient time spent exercising equates to less than 150 minutes of moderate or vigorous exercise (including walking for exercise and transport) in a 1-week period. Sufficient time spent exercising equates to 150 minutes or more.
2. Achieving sufficient time and sessions, that is, complying with the recommended guidelines, equates to exercising for 150 minutes or more over at least five sessions in a 1-week period.

Source: AIHW analysis of the 2007–08 NHS.

People who exercised sufficiently (based on the time and proxy sessions as presented above) were more likely to assess their health as excellent or very good (65%) compared with those who did not meet the guidelines (49%) (Table 3.10). They were also more likely to report that their activity levels had increased in the last 12 months (31% compared with 17%).

Recent studies have indicated that the amount of time spent sitting during a day can affect a person's health, regardless of how much moderate or vigorous activity they do (Brown et al. 2009). Other studies have also found associations between the amount of daily sitting time and mortality rates, in particular for cardiovascular disease (Katzmarzyk et al. 2009). Results from the 2007–08 NHS show that more than 96% of adults spend between 1 and 11 hours sitting (during leisure time) per day. Interestingly, males who did not meet the guidelines for physical activity also reported slightly higher proportions of heavy physical activity levels at work.

Table 3.10: Whether undertook sufficient physical activity[(a)], by selected characteristics, 2007–08 (per cent)

	Sufficient			Insufficient		
Characteristic	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Age group (years)						
18–24	15.5	14.4	15.0	11.5	11.2	11.4
25–34	19.8	21.0	20.4	17.8	16.2	17.0
35–44	18.5	19.2	18.8	19.9	19.4	19.6
45–54	16.8	18.0	17.4	19.3	18.5	18.9
55–64	14.9	14.1	14.5	15.2	15.0	15.1
65–74	10.0	9.0	9.5	8.5	9.4	8.9
75–84	3.9	3.9	3.9	6.6	7.7	7.2
85 and over	0.6	0.4	0.5	1.2	2.6	1.9
Self-assessed health status						
Excellent/very good	63.8	66.6	65.1	47.2	50.5	48.9
Good	10.8	9.3	10.1	19.5	18.3	18.9
Fair/poor	25.4	24.1	24.8	33.3	31.2	32.2
Activity level compared to 12 months ago						
Same	56.0	49.2	52.7	60.4	53.4	56.7
Less	15.0	17.3	16.1	24.3	27.7	26.1
More	29.0	33.5	31.1	15.3	18.9	17.2
Hours spent sitting at leisure on a usual day						
Less than 1 hour	0.2	0.5	0.4	0.3	0.4	0.4
1 to 11 hours	97.6	96.4	97.0	96.1	96.4	96.3
12 or more	1.8	2.5	2.1	2.9	2.7	2.8
Does not spend any time sitting	0.4	0.6	0.5	0.7	0.5	0.6
Activity level at work[(b)]						
Mostly sitting	49.4	58.5	52.7	41.2	54.1	45.7
Mostly standing	16.5	17.2	16.8	19.1	21.3	19.8
Mostly walking	17.0	18.6	17.5	17.0	19.3	17.8
Mostly heavy labour or physically demanding work	17.1	5.7	13.0	22.7	5.3	16.7
Hours spend sitting at work on a usual day[(c)]						
1 to 11 hours	35.4	36.9	35.9	50.9	52.4	51.4
12 or more	0.0	0.1	0.0	0.6	0.2	0.5
Does not spend any time sitting	4.2	3.7	4.1	8.8	6.6	8.0

(a) Defined as exercising for 150 minutes or more, over at least five sessions in a 1-week period, where the number of days doing exercise was used as a proxy for the number of sessions.

(b) Employed persons.

(c) Employed persons who usually work 34 hours or more in a week.

Source: AIHW analysis of the 2007–08 NHS.

Physical activity for children

Children's physical activity tends to be less structured than that of adults. For example, children may participate in organised sports or activities, at school or through clubs, or may just be physically active through unstructured activities such as playing with friends, in or out of school. The 2007 Australian National Children's Nutrition and Physical Activity Survey (ANCNPAS) collected information about activity levels of children by using the Multimedia Activity Recall for Children and Adolescents tool. This allows for different activities to be recorded for small blocks of time, over four 24-hour periods. From these data, time spent on moderate to vigorous physical activity and time spent on screen-based activities (for example, watching television or DVDs, or using a computer) was assessed against the national recommendations (see Box 3.8).

For both physical activity and screen time, there are four suggested ways of calculating whether a child meets the recommendations (see Box 3.8). These different methods are important to note because they can yield quite different results (Table 3.11).

Box 3.8: Methods of interpretation to assess compliance with the national recommendations

All days method: Children are considered compliant if they meet the guidelines (for both physical activity and screen time) on all 4 days.

Most days method: Children are considered compliant if they meet the guidelines (for both physical activity and screen time) on at least 3 of the 4 days.

Four-day average method: Children are considered compliant if their activity, averaged over 4 days, is 60 minutes per day or more, and their average daily screen time is 120 minutes per day or less.

Child by day method: Prevalence was calculated as the probability that a randomly chosen child on a randomly chosen day would meet the guidelines. To calculate this prevalence estimate, it is simply a matter of calculating the proportion of all days that meet the recommendations.

Source: Olds et al. 2007.

Results from the ANCNPAS show that most children (aged 9–16 years) met physical activity recommendations when analysed using three of the four suggested methods (Table 3.11). At all ages, boys were more likely than girls to meet the recommendations.

Table 3.11: Children aged 9–16 years who met physical activity recommendations, by method of interpretation, 2007 (per cent)

	Method of interpretation			
Sex and age group (years)	**All days**	**Most days**	**Four-day average**	**Child by day**
Boys				
9–13	46	74	94	80
14–16	25	53	77	64
Total 9–16	*38*	*66*	*87*	*74*
Girls				
9–13	33	60	86	71
14–16	13	33	59	51
Total 9–16	*25*	*50*	*75*	*64*
Persons				
9–13	40	68	90	76
14–16	19	43	68	58
Total 9–16	*32*	*58*	*82*	*69*

Source: DoHA 2008a.

Results from the ANCNPAS also show that few children met the recommendations for screen time, which is no more than 2 hours (120 minutes) per day. On any given day, there was a one in three chance that any given child would get only 2 hours or less of screen time (DoHA 2008a). On average, children aged 9–16 years engaged in 223 minutes of screen time each day (Table 3.12). Boys engaged in more screen-time activities than girls of the same age, particularly when playing video games.

Table 3.12: Children aged 9–16 years, average number of minutes per day engaged in screen time, 2007

	Type of screen activity[(a)] (minutes)			
Sex and age group (years)	**Television**	**Video games**	**Computer**	**Total screen[(b)]**
Boys				
9–13	157	55	21	233
14–16	159	60	52	272
Total 9–16	*158*	*57*	*33*	*248*
Girls				
9–13	149	21	24	194
14–16	144	15	47	205
Total 9–16	*147*	*18*	*33*	*198*
Persons				
9–13	153	38	22	214
14–16	152	38	50	239
Total 9–16	*153*	*38*	*33*	*223*

(a) Screen-time activity refers to the amount of time children spend watching television, including videos and DVDs, playing computer games on a games console or on personal computers, and using computers for other purposes. Using mobile phones is not included.

(b) Calculated on the amount of leisure time spent on screen time, because all in-school screen time was considered education, not entertainment.

Source: DoHA 2008a.

Illicit drug use

'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 prescribed drugs. Illicit drug use is a substantial risk factor for ill health and death and it has been estimated to account for 2.0% of the burden of disease in Australia in 2003. In terms of its contribution to the burden of disease nationally, this is similar to occupational exposure and low fruit and vegetable consumption (Begg et al. 2007).

Illicit drug use is associated with bloodborne viruses, low birthweight, malnutrition, infective endocarditis (an infection that damages the heart valves), poisoning, mental illness, suicide, self-inflicted injury and overdose. The World Health Organization (WHO) has estimated that globally 0.4% of deaths (0.2 million) and 0.8% of the total burden of disease are attributable to illicit drug use (WHO 2002a).

As with tobacco and alcohol use, the impact of illicit drug use can be described as social costs made up of tangible and intangible costs. The total social costs of illicit drugs in 2004/05 were estimated at $8.2 billion. Most (84%) of these were tangible costs; that is, associated with crime, lost productivity and health care (Collins & Lapsley 2008).

Around 38.1% of Australians aged 14 years and over have tried or used an illicit drug at some time in their life. By far the most common illicit drug that Australians have used is marijuana/cannabis: around one-third of the population have tried or used marijuana/cannabis at least once in their lifetime. The average age for first use was around 19 years (Table 3.13) and this age of initiation has remained stable since 1995. However, for a number of other substances, the age of initiation has increased over this period, suggesting that drug strategies may be helping to prevent or delay the uptake of illicit drug use among many young Australians.

Table 3.13: Average age of initiation[(a)] of lifetime illicit drug use, people aged 14 years and over, 1995 to 2007 (years)

Drug	1995	1998	2001	2004	2007
Marijuana/cannabis	19.1	18.7	18.5	18.7	18.8
Pain killers/analgesics(b)	19.0	19.7	18.9	23.4	20.9
Tranquillisers/sleeping pills(b)	23.8	23.4	22.8	25.2	25.7
Steroids(b)	18.7	21.6	22.5	25.2	23.9
Barbiturates(b)	18.2	19.7	18.7	19.6	19.6
Inhalants	16.1	17.5	17.6	18.6	19.3
Heroin	20.6	21.5	20.7	21.2	21.9
Methadone(c) or buprenorphine(d)	n.a.	21.6	21.8	24.8	23.3
Meth/amphetamine(b)	20.2	19.9	20.4	20.8	20.9
Cocaine	21.1	22.3	22.6	23.5	23.1
Hallucinogens	19.1	18.8	19.1	19.5	19.6
Ecstasy(e)	22.7	22.7	21.9	22.8	22.6
Ketamine	n.a.	n.a.	n.a.	23.7	24.0
GHB	n.a.	n.a.	n.a.	23.7	24.6
Any illicit	*18.9*	*18.8*	*18.6*	*19.4*	*19.1*

n.a. Not available.

(a) Age first tried/used drug.

(b) For non-medical purposes.

(c) Not supplied for medical purposes.

(d) This category did not include buprenorphine before 2007.

(e) This category included substances known as 'Designer drugs' before 2004.

Source: AIHW 2008d.

Trends in illicit drug use

Over recent years there have been decreases in population-level estimates of the recent use (that is, used in the past year) of most illicit drugs (AIHW 2008d). For example, in 2007, 9.1% of the population aged 14 years and over had recently used marijuana/cannabis compared with 13.0% in most previous survey years since 1993. Heroin use has been stable at 0.2% of this population since 2001, after reaching a high of 0.8% in 1998. Methamphetamine use, including 'ice', has steadily declined from 3.7% in 1998 to 2.3% in 2007. Similarly, recent use of any illicit drug has decreased since 1998, from 22.0% to 13.4%.

More than half (60.7%) of recent heroin users found that they could not cut down even though they wanted or had tried to do so. A smaller proportion of recent meth/amphetamine users (13.3%) and marijuana/cannabis users (12.1%) had been unable to cut down. Among all illicit drugs, cocaine had the smallest proportion of users who had been unable to reduce their consumption when they wanted or had tried to (2.8%).

Illicit drug use among young people

Of the population aged 12–15 years, 4.6% had used an illicit drug in the previous year. Illicit drug use was more common for older teenagers: 18.9% of young people aged 16–17 years had used an illicit drug in the previous year, and 23.4% of 18–19 year olds had done so (AIHW 2008b).

In the 12–15 years age group, marijuana/cannabis was the most commonly used illicit substance (2.7%), followed by the non-medical use of pain-killers (1.1%). Less than 1.0% of young teenagers had used each of the other illicit drugs asked about in the survey.

When asked what influenced them to try illicit drugs, most teenagers reported they were curious, as did people aged 20 years and older. Young people who had decided never to use illicit drugs were most often 'just not interested'. Teenagers were more likely to have 'reasons related to the law or health' or 'fear of death' for never trying illicit drugs, compared with people aged over 20 years.

Illicit drug use and health status

Overall, illicit drug users reported poorer health than the general community. Marijuana/cannabis users were less likely to report excellent health (13.7%) than the general population (16.9%) (Table 3.14).

The association between illicit drug use and health appears strong in the case of mental illness. Heroin users were much more likely to have a mental illness (52.4%) than the general population (10.8%). Similarly, users of any illicit drug (17.6%) were more likely to have a mental illness. However, 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.

Table 3.14: Self-assessed health status and mental illness, by selected drugs used, persons aged 14 and older, 2007 (per cent)

	Self-assessed health status[(a)]					
Illicit drug use[(b)]	**Excellent**	**Very good**	**Good**	**Fair**	**Poor**	**Mental illness[(c)(d)]**
Marijuana/cannabis	13.7	34.4	39.4	10.6	1.9	16.8
Heroin	**8.1	23.9	46.3	13.9	**7.8	52.4
Methamphetamines	14.0	29.1	41.5	13.5	1.8	21.0
Ecstasy	16.1	35.0	38.4	9.2	1.2	15.5
Any illicit drug	14.1	33.4	38.9	11.5	2.1	17.6
All persons (14 and over)	**16.9**	**37.7**	**33.4**	**10.1**	**1.9**	**10.8**

** Relative standard error greater than 50%.

(a) In response to the question 'In general, would you say your health is…?'.

(b) Reported use in the last month.

(c) Respondents could select more than one condition in response to the question 'In the last 12 months have you been diagnosed or treated for…?'.

(d) Includes depression, anxiety disorder, schizophrenia, bipolar disorder, eating disorders and other forms of psychosis.

Sources: AIHW analysis of NDSHS 2007; AIHW 2008b.

International comparisons

Illicit drug use in Australia seems moderate to high among key comparison countries (Table 3.15). While these data need to be interpreted with caution, the most recent estimates for marijuana/cannabis use in these countries suggest that prevalence ranged from 6.3% in the Republic of Ireland to 17% in Canada, with Australia at 10.6%. Australia had the highest prevalence for ecstasy and meth/amphetamines and was in the middle of the range for cocaine (UNODC 2009).

Table 3.15: Annual prevalence of substance use, population aged 15–64 years, selected countries (per cent)[(a)]

Country	Marijuana/cannabis	Ecstasy	Amphetamine	Cocaine	Opiates
Australia	10.6	4.2	2.7	1.9	0.4
New Zealand	13.3	2.6	2.3	0.8	0.4
Republic of Ireland	6.3	1.2	0.4	1.7	0.5
USA	12.3	1.1	1.6	2.8	0.6
Canada	17.0	1.3	1.0	2.3	0.2–0.4
United Kingdom					
England and Wales	7.4	1.5	1.0	2.3	0.9–1.0
Scotland	11.0	3.2	2.2	3.8	1.5–1.7
Northern Ireland	7.2	1.8	1.0	1.9	0.1

(a) The methods, including age groups, vary for deriving prevalence. The specific data years also vary from 2000 to 2008 due to the timing of data collection in each country. See UNODC 2009 for details.

Source: UNODC 2009.

Injecting drug use

Injecting drug use is a significant risk factor for transmitting bloodborne viruses. In Australia, people with a recent history of injecting drug use continue to be the main group contracting both hepatitis C and hepatitis B (NCHECR 2008). However, there is some evidence of a decrease in injecting drug use and an associated fall in bloodborne virus infections. For example, the prevalence of injecting drug use among young people appears to have fallen at the same time that hepatitis C prevalence in this age group declined from 32% in 2003 to 28% in 2007. Around 8% of HIV (human immunodeficiency virus) diagnoses in the period 1998–2007 were in people who had injected drugs, although more than half of this group also reported homosexual contact.

There is a strong association between the length of injecting practice and the prevalence of infections with the hepatitis C virus (HCV). Of people with a history of injecting drug use for 10 years or more, around 72% tested positive to HCV antibody between 2004 and 2008 (Table 3.16) (NCHECR 2009). Such a relationship does not hold for HIV—less than 2% of the injecting drug users assessed over the same period tested positive for HIV antibody.

Table 3.16: Prevalence of HIV or HCV antibodies among injecting drug users aged 14 years and over, by history of injecting drug use, 2004 to 2008 (per cent)

History of injecting drug use	Tested positive to HIV antibody					Tested positive to hepatitis C antibody				
	2004	2005	2006	2007	2008	2004	2005	2006	2007	2008
Less than 3 years	1.5	2.4	1.0	1.0	4.5	25	31	18	20	27
3–5 years	0.9	1.1	1.4	1.6	1.8	33	33	30	42	31
6–10 years	0.6	0.0	1.5	0.6	0.3	56	51	55	48	51
10 or more years	1.3	0.8	1.6	1.8	1.5	73	72	72	71	72

HIV Human immunodeficiency virus.

HCV Hepatitis C virus.

Source: NCHECR 2009.

Dietary behaviours

The food we eat plays a major role in our health and wellbeing. The dietary guidelines for Australians provide guidance on healthy food choices and lifestyle patterns that promote good nutrition and health. Each guideline deals with a key health issue; however, they are designed to be followed together to achieve the best health.

Dietary guidelines are provided for different life stages and there are two current publications: the *Dietary Guidelines for Australian Adults* (NHMRC 2003a) and the *Dietary Guidelines for Children and Adolescents in Australia incorporating the Infant Feeding Guidelines for Health Workers* (NHMRC 2003b). The guidelines have a clear emphasis on enjoying a wide variety of nutritious foods from the five food groups, namely vegetables and legumes, fruit, cereals, dairy, and meat or meat alternatives. They also recommend that care should be taken to limit saturated fat and restrict total fat intake, to choose foods low in salt and to limit sugar intake. The guidelines also highlight the importance of breastfeeding, and preparing and storing food safely. The *Australian Guide to Healthy Eating* (Smith et al. 1998) recommends amounts based on the dietary guidelines, and provides a basis for evaluating Australian eating patterns.

The various dietary guidelines are currently under review and are expected to be reissued in mid-2011. They will include guidelines for children, adults, older Australians and, for the first time, for pregnant and breastfeeding females.

Detailed national information on food and nutrient intakes for Australian adults was last collected in 1995 through the National Nutrition Survey. More recently, a nutrition and physical activity survey for children aged 2–16 years was undertaken (2007 Australian National Children's Nutrition and Physical Activity Survey). The regular NHS collects limited information on nutrition-related behaviours and there are also data available from state and territory health surveys.

Planning is currently underway for an ongoing survey covering nutrition, physical activity and various biomedical risk factors. The survey proposes to collect data on the food intake, physical activity participation and physical measurements of the Australian population.

Fruit and vegetable consumption

Fruit and vegetable consumption is strongly linked to the prevention of chronic disease and to better health (NHMRC 2003a). Inadequate fruit and vegetable consumption was estimated to be responsible for 2.1% of the total burden of disease in Australia in 2003, ranking seventh of 14 risk factors studied (Begg et al. 2007).

The *Australian Guide to Healthy Eating* recommends that adults consume two to four serves of fruit and four to eight serves of vegetables per day—see Box 3.9 for examples of serves. Self-reported data from the 2007–08 NHS survey show that just over half (51%) of the population aged 15 years and over consumed two or more serves of fruit per day, while 1 in 11 (9%) consumed five or more serves of vegetables. Females had a slightly higher fruit and vegetable intake than males (ABS 2009d).

Results from the 2007 Australian National Children's Nutrition and Physical Activity Survey indicate that older children were less likely than younger ones to meet the recommended serves from the *Australian Guide to Healthy Eating* (1–3 serves of fruit; 2–4 serves of vegetables) (CSIRO & University of South Australia 2008). Around 9 in 10 children aged 2–13 years (between 90% and 93%) met the recommendation for fruit serves compared with about one-quarter (24%) of children aged 14–16 years (Figure 3.8). This decreased substantially when fruit juice was excluded from the analysis: then, only 1% of children aged 14–16 years met the recommendation, much less than 9–13 year olds (51%) and younger children (2–3 years: 68%; 4–8 years: 61%).

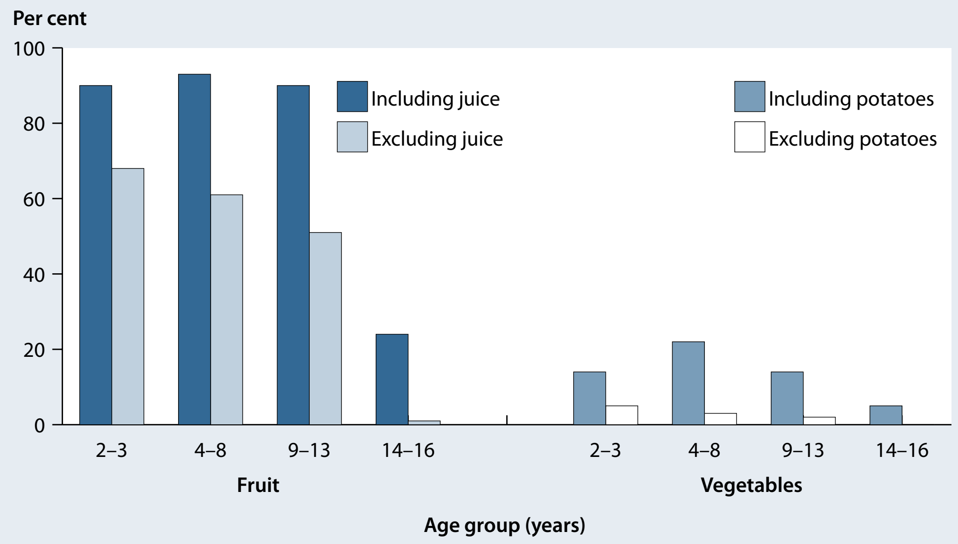
Box 3.9: How much is a serve?

By convention, a serve of fruit is 150 g, and a serve of vegetables is 75 g. The table below sets out some examples of everyday fruit and vegetables in terms of a 'serve'.

Fruit	Vegetables
1 medium apple, orange, banana	1 medium potato, ½ medium sweet potato
2 items of small fruit such as apricots, plums	1 cup of salad vegetables
About 8 strawberries	½ cup tomatoes, capsicum, cucumber
1 cup of canned fruit	½ cup carrots, swede, turnip
½ cup of fruit juice	½ cup peas, broad beans, lentils, green beans
About 4 dried apricots, 1½ tablespoons of sultanas	½ cup spinach, cabbage, broccoli
About 20 grapes or cherries	

Source: adapted from DoHA & NHMRC 2003.

The recommended serves of vegetables were met by 22% of children aged 4–8 years, 14% of children aged 2–3 and 9–13 years, and 5% of children aged 14–16 years. When potatoes were excluded from the analysis, no children aged 14–16 years met the recommendation; for the other age groups 5% or less met the recommendations.



Source: CSIRO & University of South Australia 2008.

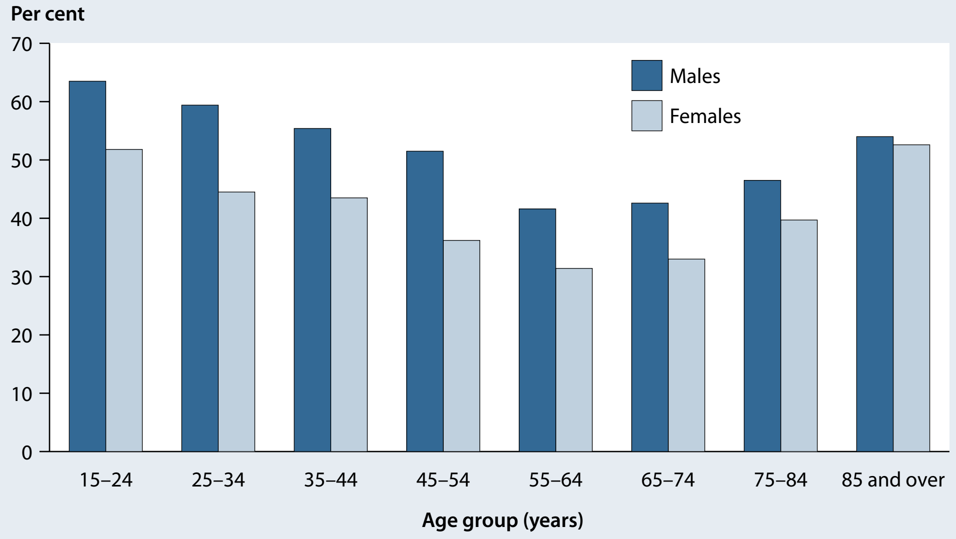
Figure 3.8: Proportion of children meeting the recommended serves of fruit and vegetables, 2007

Fat intake

The three main types of fats are saturated, polyunsaturated and monounsaturated. Saturated fats are usually solid at room temperature and are the main types of fats found in milk, cream, butter and cheese, some meats, and palm and coconut oil. A diet high in saturated fats increases the risk of coronary heart disease through their effect of raising the blood cholesterol level, notably its low-density lipoprotein component (NHMRC 2003a) (see Section 3.6 and Box 3.12).

Dairy products provide a major source of nutrients in the Australian diet and are one of the most complete of all foods. However, dairy products contribute over a quarter of the saturated fat in the diet of Australian adults; therefore reduced or low-fat varieties are generally recommended (NHMRC 2003a).

Data from the 2007–08 NHS indicate that, of the population aged 15 years and over, almost one in two (47%) usually consumed whole milk, and males were more likely than females to be whole milk drinkers (53% compared with 41%). Among males, the highest level of whole milk consumption was among 15–24 year olds (63%), while for females it was among those aged 85 years and over (53%). The lowest level of whole milk consumption was among 55–64 year olds for both males and females (42% and 31% respectively) (Figure 3.9). Results from the 2007 Australian National Children's Nutrition and Physical Activity Survey indicate that saturated fat accounted for around 13% of total energy intake among 2–16 year olds (CSIRO & University of South Australia 2008), higher than the maximum recommended level of 10% (NHMRC & NZMoH 2006).



Notes

1. Includes only those who consume milk (cow's, soy and 'other'—cow's milk is consumed by around 92% of the population).
2. Includes consumers of milk where the fat content was unknown.

Source: AIHW analysis of the 2007–08 National Health Survey.

Figure 3.9: Proportion consuming whole (full-cream) milk by age and sex, 2007–08

Trans fats are a type of unsaturated fat but they have an effect on blood cholesterol level similar to saturated fats. They are found naturally in products such as meat and milk, and are also formed when liquid vegetable oils are processed for use as fat spreads, for deep-frying and as shortening for baking. The WHO recommends obtaining no more than 1% of daily energy from trans fats, and Australians are currently below this mark at 0.6% (FSANZ 2007a). Food Standards Australia New Zealand are monitoring the intake of trans fats and whether changes in the levels in processed foods have led to changes in the saturated fat content.

Nutrient inadequacies

There is concern in Australia about deficiencies in three vital nutrients: iodine, folate and vitamin D. Recent evidence shows the re-emergence of iodine deficiency in Australia, with the population in south-eastern Australia experiencing mild iodine deficiency (APHDPC 2007). Iodine is required for the body to make thyroid hormones, which are important in the early growth and development of most organs, especially the brain during fetal and postnatal life (Delange 2000).

Folate, a B group vitamin, is another important nutrient for the development of healthy babies. Folic acid is the synthetic form of folate and is used in supplements or added to food (fortified). It is recommended that females who are capable of becoming pregnant consume 400 µg of folic acid per day, as a supplement or from fortified food, to help prevent neural tube defects such as spina bifida (NHMRC & NZMoH 2006). It is estimated that the current intake of folic acid by females of child-bearing age (16–44 years) in Australia is 108 µg per day (FSANZ 2007b), which is well below the recommended level.

To assist in overcoming these two deficiencies, from September 2009 most bread in Australia has contained added iodine and folic acid—so-called mandatory fortification. By reading the ingredient list, consumers are able to see if a bread product contains added iodine and folic acid.

Another growing area of concern in Australia is vitamin D deficiency, which can result in reduced bone-mineral density and osteoporosis. Vitamin D is primarily obtained through exposure to sunlight but it can also be obtained from foods such as fish (especially high fat fish), meat, milk and eggs. Margarine contains significant amounts through food fortification. The most 'at risk' populations for vitamin D deficiency are those with limited exposure to sunlight such as the elderly (particularly those in residential care), people with skin conditions who must limit sun exposure, and those whose clothes cover nearly all of their body (Nowson et al. 2004).

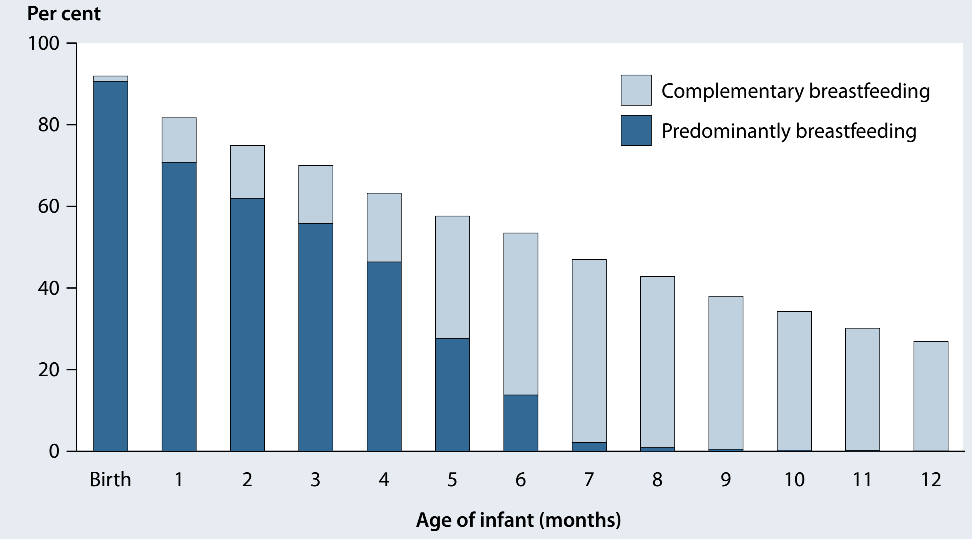
It is essential to find the balance between maintaining adequate vitamin D through sun exposure and minimising the risk of skin cancer. In summer in the southern parts of Australia, and year-round in northern Australia, a few minutes of sun exposure each day on the face, arms and hands is sufficient for most people to maintain adequate vitamin D. In winter in the southern parts of Australia, 2–3 hours spread over a week is recommended (Cancer Council Australia 2008).

Breastfeeding

Australian recommendations for breastfeeding reflect the international recommendations of exclusive breastfeeding up to 6 months of age, with the introduction of complementary foods and continued breastfeeding from around 6 months of age (NHMRC 2003b). These recommendations are based on the nutritional, health, social and economic benefits of breastfeeding. There is accumulating evidence of the protective role that breastfeeding has on several chronic diseases, including Type 1 diabetes, inflammatory bowel disease and allergic diseases (NHMRC 2003b).

In the 2007 Australian National Children's Nutrition and Physical Activity Survey, mothers of children included in the survey were asked whether they had 'ever breastfed' their children during infancy. Most children (around 90%) had been breastfed at sometime during their infancy (CSIRO & University of South Australia 2008).

The Growing Up in Australia longitudinal study of Australian children provides information on breastfeeding for a cohort of around 5,000 infants that were aged less than 12 months in 2004. Of this cohort, 91% were predominantly breastfed at birth (that is, receiving breast milk as the main source of nutrition; under this definition the infant may also receive water or water-based drinks). However, rates decreased steadily from month to month: by the time the children were 1 month old 71% were predominantly breastfed. At 3 months this rate had decreased to 56%, and it was 14% at 6 months. At 12 months, 28% of children were still fed breast milk as a complementary food source (Figure 3.10).



Source: AIFS 2008.

Figure 3.10: Breastfeeding experience of infants aged 0–12 months, 2004

Food security

The term 'food security' refers to the availability of healthy, affordable foods and the capacity of individuals and communities to obtain them. Surveys in New South Wales and Victoria have asked respondents whether there were times in the past 12 months when they ran out of food and could not afford to buy more. In New South Wales in 2007, around 1 in 20 (4.4%) adults reported that they had experienced food insecurity; however, the rate was higher among females (5.9%) than males (2.8%). Food insecurity was more common in the younger adult population than in the older population (Centre for Epidemiology and Research 2008). In Victoria in 2007, food insecurity was also experienced by around 1 in 20 (5.1%) adults and the rate was similar between sexes. As with New South Wales, food insecurity was more common in the younger adult population (DHS 2008).

Sexual behaviours

The risks associated with unprotected sexual activity include infections (such as chlamydia, gonorrhoea, HIV and syphilis), unwanted pregnancies and some cancers (such as cervical and anal cancer). In 2003, unsafe sexual practices accounted for an estimated 0.6% of the overall disease burden in Australia; most of this burden was associated with HIV/AIDS and cervical cancer (Begg et al. 2007). Important actions that can reduce these health risks include greater use of condoms and fewer sexual partners.

Over the past decade, rates of STIs have been steadily increasing. Data from the National Notifiable Diseases Surveillance System indicate a substantial increase in chlamydia—the most frequently reported STI—between 1999 (74 infections notified per 100,000 population) and 2008 (272 per 100,000 population). The large majority of notifications in 2008 were for 15–29 year old males and females—72% and 85% respectively. Sizeable increases in syphilis notifications are also evident. In 2008, there were 6.0 notifications of new (infectious) cases per 100,000 population, compared with 3.2 in 2004.

Results from the Australian Study of Health and Relationships—a national telephone survey of people aged 16–59 years that was run in 2001–02—indicated that fewer than half of respondents who had been sexually active in the previous year had used a condom during that time (de Visser et al. 2003). Use of condoms during heterosexual encounters was associated with younger age, higher education, living in major cities, lower income and having more than one sexual partner in the previous year (de Visser et al. 2003). Among the 16–24 year olds, males and females who identified as non-heterosexual were significantly more likely than heterosexual respondents to have engaged in unprotected sexual activity with a casual partner in the 6 months before interview (de Visser et al. 2006). Among young males, 29% of non-heterosexual males participated in unprotected intercourse with a casual partner compared with 5% of heterosexual males, while, among young females 17% of non-heterosexual females and 5% of heterosexual females engaged in casual unprotected intercourse.

Surveys gathering information from homosexually active men estimate that the proportion having unprotected anal intercourse with a casual partner increased between 2003 and 2007 in Adelaide (from 18% to 19%) and in Queensland (21% to 25%) (Imrie & Frankland 2008). However, the estimate decreased during the same period in Sydney (from 23% to 19%) and in Melbourne (21% to 19%).

Vaccination behaviours

Vaccination is the administration of a vaccine to stimulate the immune system and protect individuals against specific infectious diseases. Vaccination effectively protects an individual from disease, but also, if enough people in a population are vaccinated it limits the spread of infection, thereby controlling or even eliminating the disease. This concept is known as 'herd immunity'.

In 1980, the WHO declared that smallpox was eradicated worldwide and since that time routine smallpox vaccination has been discontinued (WHO 2002b). Similar eradication efforts for poliomyelitis are in progress, even though most parts of the world—including the western Pacific region—are free of polio. In 2008 there were four countries still considered polio-endemic, dramatically down from 125 in 1988 (WHO 2008). However, universal vaccination is maintained because otherwise these endemic areas could reintroduce polio to the rest of the world.

The NHMRC recommends specific vaccinations for all children, all older persons and others (including Indigenous Australians) who are at a high risk of contracting vaccine-preventable diseases. The Australian Government provides free vaccines for 16 vaccine-preventable diseases (DoHA 2009b), and these are set out in the National Immunisation Program Schedule (NIPS).

Vaccination for children

For children, the NIPS specifies hepatitis B, diphtheria, tetanus, pertussis (whooping cough), *Haemophilus influenzae* type b (Hib), poliomyelitis, pneumococcal disease, rotavirus, measles, mumps, rubella, meningococcal type C and varicella (chickenpox). For Aboriginal and Torres Strait Islander children living in high-risk areas, the schedule includes hepatitis A and additional coverage for pneumococcal disease. In 2007, vaccination against human papillomavirus (HPV) was introduced to the NIPS for 12–13 year old females, with a catch-up program for all females then aged 12–26 years.

The Australian Childhood Immunisation Register records vaccinations administered to children and monitors coverage for the conditions in NIPS. To be considered fully immunised, children should have received all the vaccinations appropriate to their age. In most age groups, fully immunised rates are lower than the rates for individual diseases because some children may not have received the entire schedule to which they are entitled by time the rate was calculated. Vaccination rates have remained stable since around 2001 for children up to 1 year old and since 2003 for up to 2 years old (AIHW 2008c).

For children aged 12–15 months (at 31 March 2009), 91.3% were fully immunised (Table 3.17). The highest coverage was for Hib, with 94.5% of children this age vaccinated against this condition. The fully-immunised rate for children of this age varied from 88.9% in Western Australia to 93.6% in the Australian Capital Territory.

In 2009, 92.9% of children aged 24–27 months were fully immunised, the coverage being highest for hepatitis B at 95.8%. Full coverage varied from 91.8% in Western Australia to 94.6% in the Northern Territory. Among older children (60–63 months) 82.4% were fully vaccinated; the highest rate was in Victoria (85.8%) and the lowest was in South Australia (75.6%). For this age group, coverage was highest against diphtheria, tetanus and pertussis.

Table 3.17: Vaccination status for children, selected diseases, by age group, June 2009 (per cent)

	Age in months[(a)]		
Measure	**12–15**	**24–27**	**60–63[(b)]**
Diphtheria, tetanus and pertussis	91.7	95.0	83.2
Poliomyelitis	91.6	95.0	83.1
Haemophilus influenzae type b	94.5	94.6	. .
Hepatitis B	94.4	95.8	. .
Measles, mumps and rubella	. .	94.0	82.9
Fully immunised	**91.3**	**92.9**	**82.4**

. . Not applicable.

(a) Age at 31 March 2009.

(b) Since 31 March 2008, coverage is measured for the 60–<63-month age cohort. In previous years, coverage was measured among the 72–<75-month age cohort.

Source: Medicare Australia 2009.

Human papillomavirus vaccination for girls and young women

Since 2007, the Australian Government has funded the National HPV Vaccination Program to protect against the types of HPV that cause around 70% of all cases of cervical cancer. The program offers a course of three injections to be given over a 6-month period, largely using school-based programs for females aged 12–18 years, and general practice and community care services for those aged 18–26 years. The HPV vaccine is now part of the NIPS and is given to girls in their first year of high school (that is, those aged 12–13 years).

The National HPV Vaccination Program Register was established under Commonwealth legislation to record administered HPV vaccines. The register provides a means to monitor and evaluate the program, derive coverage rates and also maintain records for notification should a booster dose be required. The register receives notification of each HPV vaccine administered through the school-based program and other vaccine providers. Although notification by GPs is not compulsory, there is a financial incentive for GPs to register each dose of HPV vaccine they administer. As at February 2010, 94% of GPs had registered to notify HPV vaccinations.

During the initial phase of program implementation, school-based programs varied by jurisdiction in that they were aimed at different school years. In the first year of the program, New South Wales, the Northern Territory, Queensland and Western Australia provided vaccinations to schoolgirls in years 10, 11 and 12; the Australian Capital Territory and Victoria to girls in years 7, 10, 11 and 12; South Australia to girls in years 8, 9, 10, 11 and 12; and Tasmania to all girls in years 6 to 12 (Brotherton et al. 2008).

Coverage rates for the first year of the program represent minimum estimates and include only doses provided in school-based programs. These estimates may not cover all catch-up vaccinations given to school-aged girls through a non-school program. For any school year, full coverage (all three doses) was highest (77%) among Year 8 girls in South Australia (Table 3.18). Full coverage among girls in years 10 to 12 was highest in New South Wales (75% for Year 10 and Year 12 girls and 72% for Year 11 girls).

Regardless of whether an individual is fully immunised against HPV, females are encouraged to practice safe sexual behaviours. The National Cervical Screening Program recommends that those aged 18–69 years who have ever been sexually active should continue having Pap smears to screen for cervical cancer.

Table 3.18: Preliminary coverage[(a)] estimates of HPV vaccination in school-based programs, by school year and state and territory, 2007 (per cent)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Year 6	. .	. .	. .	. .	. .	64	. .	. .
Year 7	. .	75	. .	. .	. .	61	68	. .
Year 8	. .	. .	. .	. .	77	58	. .	. .
Year 9	. .	. .	. .	. .	65	55	. .	. .
Year 10	75	69			64	57		
Year 11	72	70			57	50		
Year 12	75	71			55	44		
Years 10–12			62	60			61	64

. . Not applicable as this school year was not targeted by the state and territory in 2007.

(a) Coverage refers to full coverage, indicated by having received all three doses of the vaccine.

Notes

1. Coverage does not include catch-up doses delivered to school-aged girls outside the school-based programs, except for South Australia where these are partially recorded.
2. Data are for years 10 to 12 combined for Queensland, Western Australia, the Australian Capital Territory and the Northern Territory.

Source: Brotherton et al. 2008.

Influenza and pneumococcal vaccination for adults

Vaccination against influenza and pneumococcal infection (which typically causes pneumonia) is available in Australia and is free for all Indigenous Australians aged 50 years and over, for all others aged 65 years and over, and for Indigenous Australians aged 15–49 years in high-risk groups. The influenza vaccines summarised here are for those strains of flu that occur seasonally and not the types that are established in animals other than humans (such as bird flu and swine flu).

Results from a national telephone survey on adult vaccination produced estimates that, in 2006, 77.5% of Australians aged 65 years and over were vaccinated against influenza that year. After accounting for aged-care residents, the national coverage estimate increased to 78.0% (AIHW 2008c). Australia has the highest coverage of any OECD country for influenza vaccine (based upon estimates obtained by OECD countries between 2003 and 2007) (OECD 2009c).

For pneumococcal disease, the estimated vaccination coverage of Australians aged 65 years and over in 2006 was 62.2%, compared with 51.1% in 2004. More of this target group may have been vaccinated, but the currency of their vaccination could not be fully determined from the survey (AIHW 2008c).

Sun protection

Excessive exposure to UV radiation can lead to several forms of skin cancer, eye disease and premature ageing (WHO 2009). Since the 1980s, cancer councils and health departments have delivered public education messages urging Australians to reduce their exposure to the sun with the ultimate aim of reducing the burden of skin cancer in Australia.

Despite the level of public awareness, many Australians have not adhered to sun safety messages. Compliance is particularly low among those in adolescence—a life stage where high sun exposure greatly increases the lifetime risk of developing skin cancer (DoHA 2008a). Findings from the National Sun Protection Survey in 2006–07 show that 24% of Australian adolescents aged 12–17 years and 14% of Australian adults aged 18–69 years were sunburnt on an average summer weekend (Cancer Council of South Australia 2008). During the summer, 29% of adolescents and 50% of adults generally wore a hat when outdoors in the peak UV hours (11 am to 3 pm). Overall, 37% of both adolescents and adults used sunscreen, while 19% of adults and only 9% of adolescents wore a three-quarter or long-sleeved top while outdoors during this time.

There are strong social norms driving sun tanning and sun exposure behaviour among Australians. Having a suntan is often seen as desirable and closely associated with beauty and health (DoHA 2006). Most adolescents have a preference for getting a tan—from the New South Wales School Students' Health Behaviours Survey in 2005, 70% of boys and 80% of girls want to have tanned skin (Centre for Epidemiology and Research 2007). Findings from the National Sun Protection Survey show that 22% of Australian adolescents—15% of boys and 29% of girls—deliberately tanned in the summer of 2006–07. Adults were less likely to attempt a tan than adolescents—11% of Australian adults indicated that they deliberately tanned.

Although too much sun exposure can damage skin and eyes, too little can lead to a deficiency in vitamin D, which can weaken bones and affect overall health. See 'Dietary behaviours' for more information on vitamin D deficiency in Australia.

3.6 Biomedical factors

Unlike behaviours and other determinants discussed earlier in this chapter, biomedical factors represent actual bodily states. Biomedical factors such as high blood pressure and high blood cholesterol can be regarded as relatively 'downstream' in the process of causing ill health. They carry relatively direct and specific risks for health, and they are often influenced by behavioural factors, which are in turn influenced by other 'upstream' determinants.

Health behaviours tend to interact with each other and influence a variety of biomedical factors. Both physical activity and diet, for example, can affect body weight, blood pressure and blood cholesterol. They can each do this independently, or, with greater effect, they can act together. Further, behavioural and biomedical risk factors tend to increase each other's effects when they occur together in an individual.

Note that several of the biomedical risk factors discussed here are often highly interrelated in causing disease. Excess body weight, high blood pressure and high blood cholesterol, for example, can all contribute to the risk of heart disease and amplify each other's effects if they occur together. In addition, obesity can in itself contribute to high blood pressure and high blood cholesterol.

Similarly, Type 2 diabetes is often regarded as a biomedical risk factor, as it is essentially defined by an abnormal biomedical process (see 'Glucose regulation' later in this chapter), and because an individual with diabetes is more at risk of other diseases, particularly cardiovascular disease (Barr et al. 2007). Diabetes is discussed in more detail in Chapter 4.

Also, it is important to note that biomedical factors are commonly managed in clinical practice as well as being a target of some population-based interventions. High blood pressure and high cholesterol, for example, are often controlled by prescription medication, typically in conjunction with diet and exercise.

A national health survey covering biomedical indicators of chronic disease, as well as nutrition and physical activity, is being planned for the near future.

The next section describes the levels, patterns and trends of the four major biomedical determinants of health: body weight, blood pressure, blood cholesterol and glucose regulation.

Body weight

There are health problems associated with being either underweight or having excess weight (overweight and obesity) (see Box 3.10 for definitions).

Being significantly underweight may lead to malnutrition and a range of health problems such as osteoporosis and the inability to fight infections. Although underweight is mainly a problem in developing countries, eating disorders—for example anorexia and bulimia—among people in developed countries such as Australia also result in poor health, including dental problems, dehydration, fertility problems, impaired kidney function and sometimes death. As Table 3.19 shows, measurements in the 2007–08 NHS suggest that about 1 in 50 Australian adults are underweight, with the proportion being considerably higher among young adults, especially females.

Although underweight can be a serious risk to health, the material presented here focuses on excess body weight in the Australian population, as the scale of this problem is markedly greater than that of underweight.

Excess weight, especially obesity, is a risk factor for cardiovascular disease, Type 2 diabetes, some musculoskeletal conditions and some cancers. As the level of excess weight increases, so does the risk of developing these conditions. In addition, being overweight can hamper the ability to control or manage chronic disorders.

Rates of overweight and obesity are continuing to increase in Australia and overseas (OECD 2009d). The WHO has estimated that by 2015 there will be 2.3 billion adults who are overweight, and more than 700 million who will be obese (WHO 2006).

Once considered a problem only in wealthier countries, obesity is now an increasing concern in low- or middle-income countries, where problems associated with it often exist along with the effects of undernutrition.

In 2008, Australian health ministers announced obesity as a National Health Priority Area, and charged the recently formed National Preventative Health Taskforce with the development of a strategy for tackling the burden of chronic disease caused by risk factors such as obesity (NPHT 2009).

Box 3.10: Classifying body weight

Body mass index (BMI) and waist circumference are the two main measures used for monitoring body weight. The BMI assesses people's weight in relation to their height, and is more commonly used in surveys than the waist circumference. This is especially so if the survey relies on self-reported information, because people are more likely to know their height and weight than their waist circumference. The BMI 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 recommended by the World Health Organization for adults is based on the association between BMI and illness and mortality (WHO 2000), and is as follows:

- underweight: $BMI < 18.5$
- healthy weight: $BMI \geq 18.5$ and $BMI < 25$
- overweight but not obese: $BMI \geq 25$ and $BMI < 30$
- obese $BMI \geq 30$.

This classification may not be suitable for all ethnic groups and it is unsuitable for children. Compared with the rest of the population, some groups may have equivalent levels of risk at lower BMI (for example Asians) or higher BMI (for example Polynesians).

For children and adolescents aged 2–17 years, Cole and colleagues (2000, 2007) have developed a separate classification of overweight, obesity and thinness, based on age and sex.

For adults, a waist circumference of 94 cm or more in males and 80 cm or more in females indicates increased risk (referred to here as abdominal overweight). A waist circumference of 102 cm or more in males and 88 cm or more in females indicates substantially increased risk. This classification is not applicable for people aged under 18 years and the cut-off points may not be suitable for all ethnic groups.

Height and weight data may be collected in surveys as measured or self-reported data. Some people tend to overestimate their height and underestimate their weight, leading to an underestimate of BMI. Thus rates of overweight and obesity based on self-reported data are likely to be underestimates of the true rates, and should not be directly compared with rates based on measured data.

Excess weight arises through an energy imbalance over a sustained period. Although many factors may influence a person's weight, weight gain is essentially due to the energy intake from the diet being greater than the energy expended. Energy expenditure occurs in three ways: basal metabolism (that is, the energy used to maintain vital body processes), thermic processes (that is, the energy taken to digest and absorb food), and physical activity. Physical activity is the most variable component of energy expenditure, and the only component a person has any direct control over. In a normally active person, physical activity contributes about 20% to daily energy expenditure (BHC 2008b). For related information, see 'Dietary behaviours' and 'Physical inactivity' in this chapter.

Prevalence

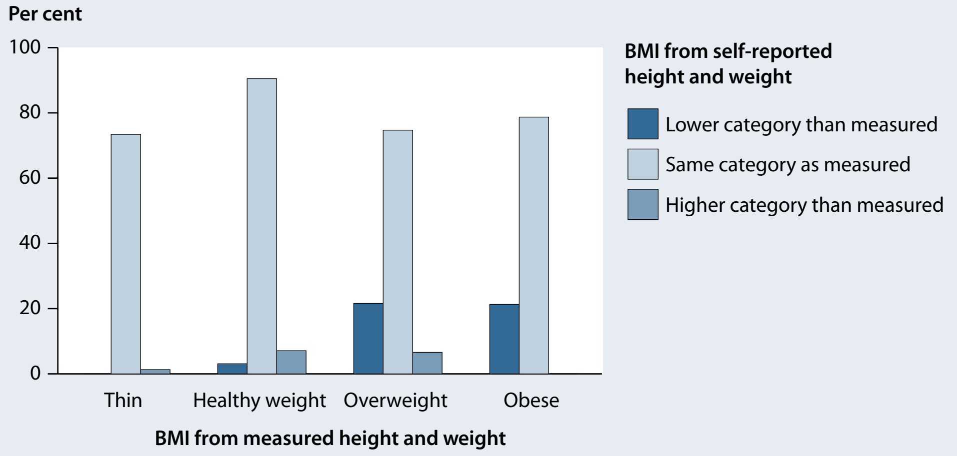
In the 2007–08 NHS, the majority of adults (61%) had a body mass index (BMI) (based on measured data) that indicated they were either overweight or obese. A larger proportion of males than females were overweight or obese (68% compared with 55%) (Table 3.19).

Table 3.19: Body mass index based on measured data, by age and sex, persons aged 18 years and over, 2007–08 (per cent)

Sex and BMI	18–24	25–34	35–44	45–54	55–64	65–74	75 and over	Total 18 and over
Males								
Underweight	3.6	2.3	0.8	0.5	0.1	0.4	1.0	1.2
Normal	56.6	35.8	28.5	22.8	25.0	20.7	24.7	31.1
Overweight	28.0	42.4	44.2	47.0	40.0	45.1	52.8	42.2
Obese	11.9	19.5	26.6	29.8	34.9	33.8	21.5	25.4
Total males	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Females								
Underweight	7.2	3.4	1.9	2.0	1.2	1.3	2.8	2.8
Normal	57.7	52.2	42.8	39.2	30.9	27.5	40.5	42.5
Overweight	20.7	26.5	32.5	32.5	34.7	41.9	32.5	31.1
Obese	14.4	18.0	22.8	26.4	33.2	29.3	24.2	23.7
Total females	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Source: AIHW analysis of the 2007–08 NHS.

Most people's self-reported BMI was similar to their BMI based on measured height and weight (Figure 3.11). The largest inconsistency between self-reported and measured BMI was for people who measured overweight or obese; 21% of these people self-reported lower than the measured BMI.



BMI Body mass index.

Note: Excludes people who did not report their height or weight or did not have their height or weight measured.

Source: AIHW analysis of the 2007–08 NHS.

Figure 3.11: BMI from self-reported height and weight compared with BMI from measured height and weight, persons aged 18 years and over, 2007–08

A person's waist circumference can be used to measure what is known as abdominal obesity. Waist circumference is regarded as an independent risk factor for Type 2 diabetes and the risk increases with increasing waist circumference (see Box 3.10). In 2007–08, almost 60% of Australian adults had a waist circumference that put them at increased risk of poor health, including 35% at a substantially increased risk (Table 3.20). The proportion of people at increased risk of poor health due to their waist circumference increases with age for both males and females.

Table 3.20: Persons aged 18 years and over, waist circumference by risk level, 2007–08 (per cent)

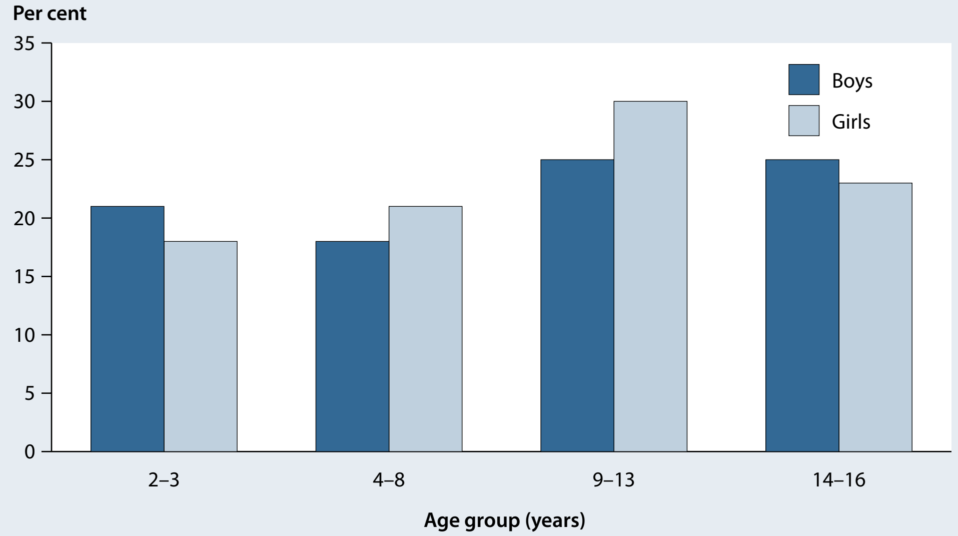
Sex and risk level	18–24	25–34	35–44	45–54	55–64	65–74	75 and over	18 and over
Males								
Not at risk	79.6	59.7	42.8	37.1	28.4	22.1	25.1	46.4
Increased risk	11.1	19.4	27.5	28.4	28.7	31.9	29.9	24.0
Substantially increased risk	9.2	20.9	29.7	34.6	42.9	46.1	45.1	29.6
Females								
Not at risk	66.7	45.7	37.7	33.2	22.0	16.6	20.6	29.0
Increased risk	14.6	22.2	23.8	24.2	22.0	28.3	22.3	31.0
Substantially increased risk	18.7	32.1	38.5	42.6	55.9	55.1	57.2	40.0
Persons								
Not at risk	72.3	53.1	40.2	35.2	25.3	19.4	22.6	42.2
Increased risk	12.9	20.7	25.7	26.3	25.5	30.1	25.7	23.1
Substantially increased risk	13.9	26.2	34.1	38.5	49.2	50.6	51.6	34.8

Source: AIHW analysis of the 2007–08 NHS.

Body weight of children

Excess weight in children increases the risk of poor health, both during childhood and later in adulthood. Children who are overweight or obese are at greater risk of developing chronic conditions such as asthma and Type 2 diabetes than those who are not. In addition, children who are overweight or obese can experience discrimination, victimisation and teasing that can affect their psychological wellbeing.

Recent estimates show that among children aged 5–17 years, 17% were overweight and 8% were obese. The proportion of children who have excess weight is similar in boys and girls, both peaking in the 9–13 years age group (Figure 3.12).



Note: From measured height and weight.

Source: DoHA 2008a.

Figure 3.12: Children aged 2–16 years who are overweight or obese, by age group, 2007

Between 1985 and 1995, levels of excess body weight in children almost doubled for both boys and girls (Magarey et al. 2001). Since 1995, the levels continued to increase, but not as dramatically (Table 3.21). There is currently a debate in Australia as to whether these increases are still continuing or whether the levels of excess weight in children have stabilised (Gill et al. 2009; Roberts et al. 2009). However, the evidence is somewhat blurred by the absence of directly comparable information over time.

Table 3.21: Excess body weight in children by year of survey (per cent)

Sex and excess weight	1985 Australian Health and Fitness Survey[(a)]	1995 National Nutrition Survey[(b)]	2007 Australian National Children's Nutrition and Physical Activity Survey[(c)]	2007–08 NHS[(b)]
Boys				
Overweight only	9.3	16.0	17.0	16.1
Obese only	1.4	4.5	5.0	9.7
Overweight or obese	10.7	20.5	21.0	25.8
Girls				
Overweight only	10.6	15.3	18.0	18.2
Obese only	1.2	5.8	6.0	5.8
Overweight or obese	11.8	21.1	24.0	23.0

(a) Children aged 7–15 years.
(b) Children aged 5–17 years.
(c) Children aged 2–16 years.

Note: From measured height and weight.

Sources: ABS 2009d; DoHA 2008a; Magarey et al. 2001.

Blood pressure

High blood pressure (often referred to as hypertension; see Box 3.11) is a major risk factor for coronary heart disease, stroke, heart failure and chronic kidney disease. Studies have shown that the lower the blood pressure, the lower the risk of cardiovascular disease, chronic kidney disease and death (NHFA 2009b). When high blood pressure is controlled, the risk is reduced, but not necessarily to the levels of unaffected people (WHO-ISH 1999).

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). In Australia, nearly 8% of the burden of disease in 2003 was attributed to high blood pressure. It ranked as a close second to tobacco use on this score, with coronary heart disease and stroke accounting for 93% of the burden of high blood pressure. Four-fifths of the burden of high blood pressure related to premature death and the remainder to disability.

Major causes of high blood pressure include diet (particularly a high salt intake), obesity, excessive alcohol consumption and insufficient physical activity. Attention to health determinants such as body weight, physical activity and nutrition plays an important role in maintaining healthy blood pressure.

Despite the definition of high blood pressure in Box 3.11, blood pressure is a continuum with no threshold level of risk as it rises. Starting from quite low levels, as blood pressure increases so does the risk of stroke, heart attack and heart failure. This means that, for people's usual, day-to-day blood pressure, the lower the better. This is true with rare exceptions.

Box 3.11: 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. This makes the definition of high blood pressure somewhat arbitrary. The World Health Organization 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: Whitworth JA; WHO, International Society of Hypertension Writing Group 2003.

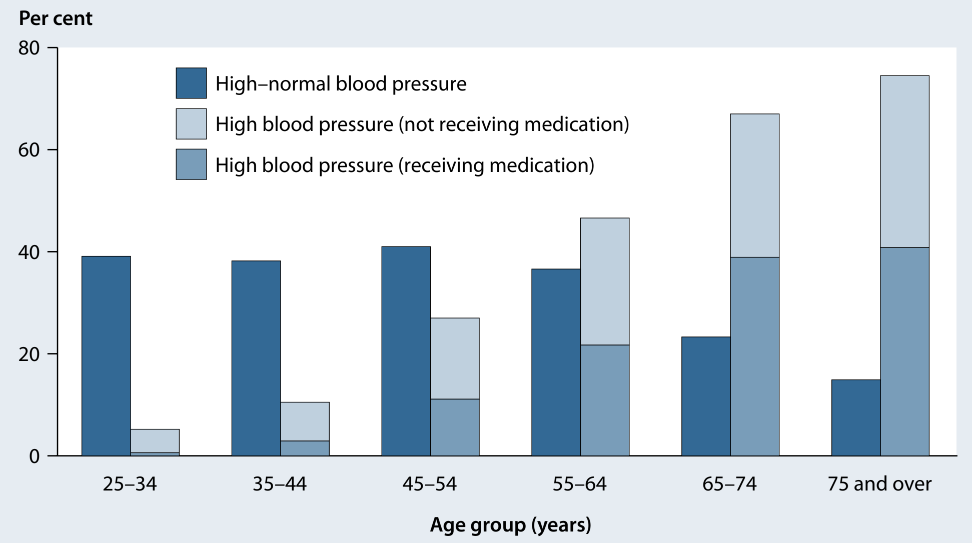
Prevalence

The 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) measured people's blood pressure. The results indicated that 30% of Australians aged 25 years and over (3.7 million) had high systolic or diastolic blood pressure or were on medication for high blood pressure—32% of males and 27% of females. The proportion of people with high blood pressure increased markedly with age (Figure 3.13).

Figure 3.13 also shows the proportion of people who were classified as having 'high-normal' blood pressure, which is defined as systolic blood pressure of 120–139 mmHg and/or diastolic blood pressure of 80–89 mmHg (NHFA 2009b). People in this category therefore have blood pressure levels that are in between what is classified as normal and high—in other words, they are on the border of having high blood pressure. Lifestyle modification such as regular physical activity and quitting smoking is advised for people with blood pressure levels in this category (NHFA 2008). The AusDiab found that, although a smaller proportion of people aged 25–54 years had clinical hypertension compared with those aged 55 years and over, around 40% of people in each of these age groups were classified as having high-normal blood pressure (Figure 3.13). This places them at risk of clinical hypertension in the future if lifestyle modification is not pursued or if it is ineffective in controlling their blood pressure.

Figure 3.13 also shows that a large proportion of Australians with high blood pressure were not receiving medication to lower their blood pressure. In 1999–2000, about half of those with high blood pressure aged 55 years and above were not receiving medication. Although fewer people in the younger age groups had high blood pressure, a greater proportion of those who did were not receiving any medication for it. Over the past decade, however, much effort has been put into more aggressively treating people with high blood pressure. Hence, it is likely that these figures underestimate the current proportion of people on blood pressure lowering medicines.

More recent Pharmaceutical Benefit Scheme (PBS) data show that during the 2007–08 financial year, almost 3 million people in Australia filled prescriptions for medicines with a blood pressure lowering effect. The actual number of users of these medicines is likely to be higher as this figure includes only people receiving medicines subsidised under the PBS. It is important to note that a number of these medicines, while very commonly used to lower blood pressure, can also be used for other conditions.



Notes

1. Based on NHFA (2009b) high blood pressure guidelines and WHO definition of high blood pressure (see Box 3.11).
2. High-normal blood pressure is defined as systolic blood pressure of 120–139 mmHg and/or diastolic blood pressure of 80–89 mmHg, putting the person on the border of having high blood pressure.

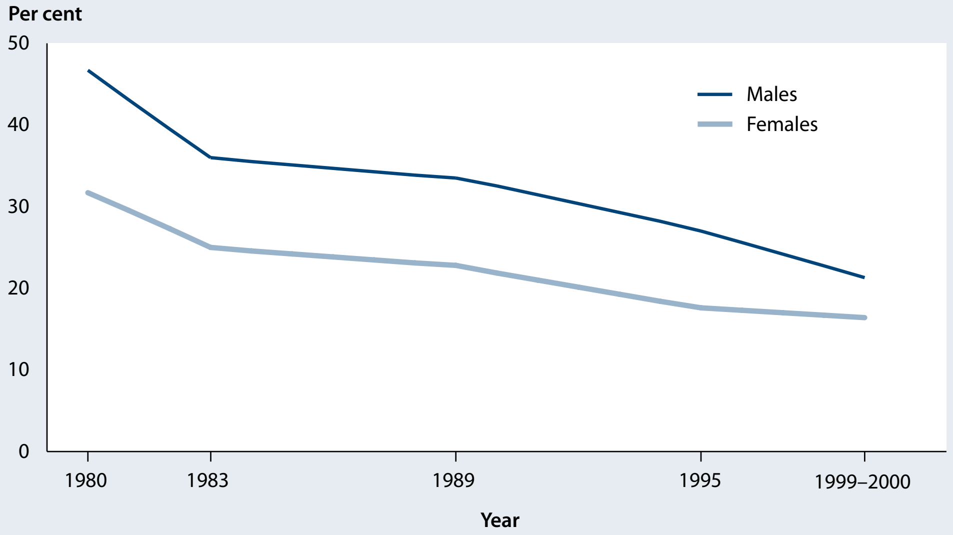
Source: AIHW analysis of the 1999–2000 AusDiab.

Figure 3.13: Proportion of adults with high-normal and high blood pressure, 1999–2000

Trends

Between 1995 and 1999–2000 the prevalence of measured high blood pressure among Australians aged 25 years and over remained about the same—31% in 1995 and 30% in 1999–2000. However, looking at just the urban population aged 25–64 years—the population for which longer term trends are available—the prevalence of high blood pressure decreased appreciably over the final two decades of the 20th century for both males and females (Figure 3.14). The proportion of males aged 25–64 years with high blood pressure more than halved, from 47% in 1980 to 21% in 1999–2000. It similarly halved for females, from 32% to 16%.

There have been no national surveys of blood pressure levels (or of blood cholesterol levels) since 1999–2000, so there are no data to show if these patterns have continued or not.



Notes

1. Age-standardised to the 2001 Australian population.
2. People aged 25–64 years, in urban areas only.
3. Based on the WHO definition of high blood pressure (see Box 3.11).

Sources: AIHW analysis of the 1980, 1983 and 1989 Risk Factor Prevalence Study surveys, the 1995 National Nutrition Survey and the 1999–2000 AusDiab.

Figure 3.14: Proportion of adults with high blood pressure, 1980 to 1999–2000

Blood cholesterol

High blood cholesterol (see Box 3.12) is a major risk factor for coronary heart disease and ischaemic stroke. It 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.

High blood cholesterol was estimated to have caused about 6% of the total burden of disease among Australians in 2003, with coronary heart disease and stroke accounting for the whole of cholesterol's burden. About 80% of the burden was related to premature deaths and 20% to disability.

For most people, saturated fat in the diet is the main factor that raises blood cholesterol levels. Genetic factors can also affect blood cholesterol, severely in some individuals. Physical activity and diet play an important role in maintaining a healthy blood cholesterol level.

Box 3.12: High blood fats—cholesterol and triglyceride

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 provide material for cell walls and for steroid hormones. If levels in the blood are too high, this can lead to artery-clogging plaques that can bring on heart attacks, angina or stroke. The risk of heart disease increases steadily from a low base 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.

Two important parts of blood cholesterol are:

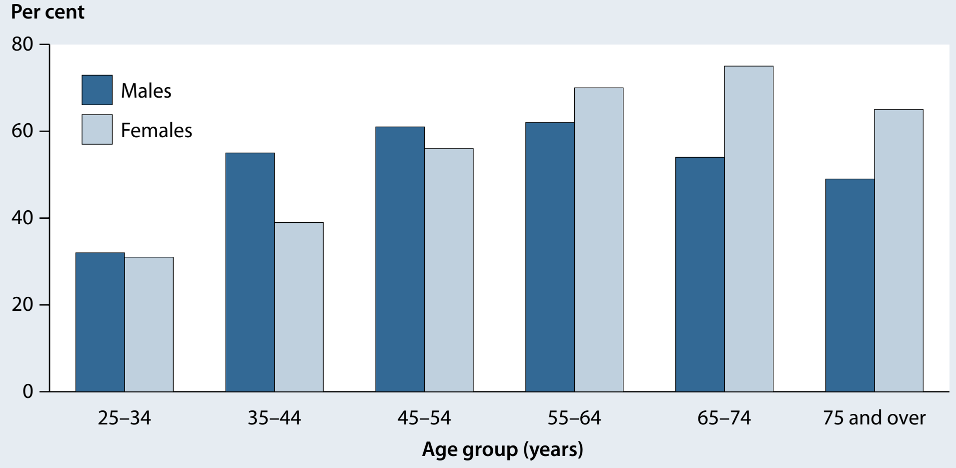
- low-density lipoprotein (LDL) cholesterol, often known as 'bad' cholesterol. Excess levels of LDL cholesterol are the main way that cholesterol contributes to plaque
- high-density lipoprotein (HDL) cholesterol, often known as 'good' cholesterol. High levels have a protective effect against heart disease by helping to reduce plaque.

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.

In this report, levels of high blood cholesterol are based on a total cholesterol level of 5.5 mmol/L or more.

Prevalence

The 1999–2000 AusDiab study estimated that around half of those aged 25 years and over had blood cholesterol levels of 5.5 mmol/L or more, corresponding to nearly 6.5 million Australians. The prevalence of high blood cholesterol increased with age to a peak for females aged 65–74 years and for males aged 55–64 years. In the younger age groups there was a greater proportion of males with high blood cholesterol than females; however, at 55 years of age females overtook males (Figure 3.15).



Note: High blood cholesterol is defined as a total cholesterol level of 5.5 mmol/L or more.

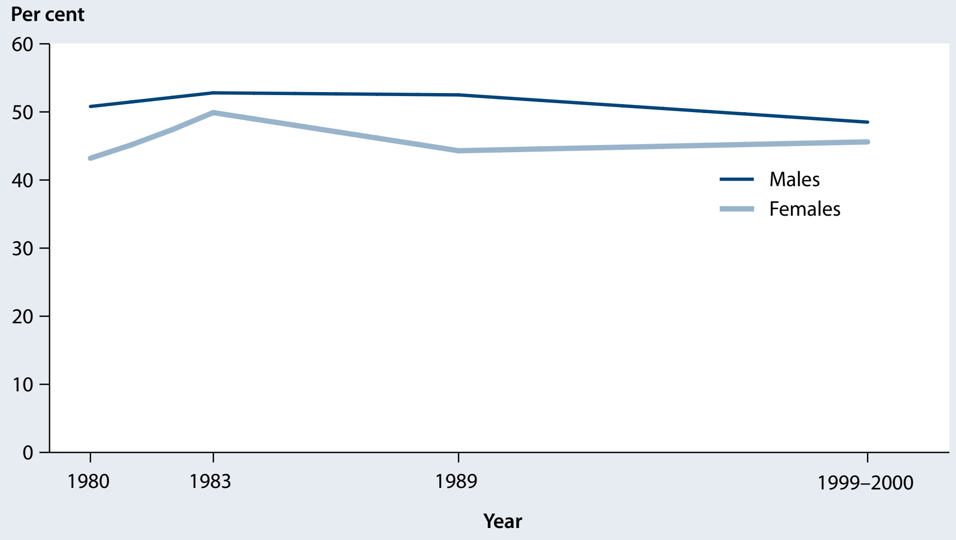
Source: AIHW analysis of the 1999–2000 AusDiab.

Figure 3.15: Proportion of adults with high blood cholesterol, 1999–2000

Recent PBS data show that, during the 2007–08 financial year, just over 2 million people in Australia filled prescriptions for medicines with a blood cholesterol lowering effect. The actual numbers of users of these medicines is likely to be higher as this figure includes only people receiving medicines supplied through the PBS.

Trends

Data on trends in average blood cholesterol and high blood cholesterol prevalence are available only to the year 2000 and for people aged 25–64 years living in capital cities. Average blood cholesterol levels of adults in 1999–2000 were very similar to those 20 years earlier. Consistent with the trends in average levels, there was no apparent reduction in the prevalence of people with high blood cholesterol over that period (Figure 3.16).



Notes

1. Age-standardised to the 2001 Australian population.
2. People aged 25–64 years in capital cities only.
3. High blood cholesterol is a total cholesterol level of 5.5 mmol/L or more.

Source: AIHW analysis of 1980, 1983, 1989 Risk Factor Prevalence Study surveys and the 1999–2000 AusDiab.

Figure 3.16: Proportion of adults with high blood cholesterol, 1980 to 1999–2000

Glucose regulation

Every cell in the body depends on glucose for energy. Insulin is a hormone that helps regulate the movement of glucose from the bloodstream and into the cells. Changes in the production and action of insulin can affect glucose regulation.

Impaired glucose regulation is the metabolic state between normal glucose regulation and the state of failed regulation known as diabetes (WHO 1999). For more information on diabetes, see Chapter 5. There are two categories of impaired glucose regulation: impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) (see Box 3.13).

IFG and IGT are not considered to be clinical entities in their own right but rather risk factors for the future development of diabetes and cardiovascular disease (Dunstan et al. 2001; NHMRC 2001). Studies have found that about 60% of people who developed diabetes had either IGT or IFG 5 years before they were diagnosed with diabetes (Unwin et al. 2002).

Box 3.13: Defining impaired glucose regulation

Impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) are measured using an oral glucose tolerance test (OGTT)—the same test that is used to assess for diabetes. In the OGTT a blood glucose measurement is taken after a period of about 8 hours of fasting; then an additional measurement is taken 2 hours after consuming 75 g 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 eating 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 2 hours after consuming the glucose 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.

Risk and prevention

Impaired glucose regulation is most common in people who also have other risk factors for diabetes or cardiovascular disease, including being overweight or obese, being physically inactive, and having high levels of triglyceride, low HDL (high-density lipoprotein) cholesterol, high total cholesterol 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 and colleagues (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.

Prevalence

Based on measured data from the 1999–2000 AusDiab, it is estimated that about 1 in 6 (16%) Australians aged 25 years or over had impaired glucose regulation, with IGT more common than IFG—11% and 6% respectively (Table 3.22). In contrast to these measured data, only 1 in 600 respondents (less than 0.2%) reported having been told they had ‘high sugar levels’ in the 2007–08 NHS (ABS 2009d).

Table 3.22: Prevalence of impaired glucose regulation among adults aged 25 years and over, 1999–2000 (per cent)

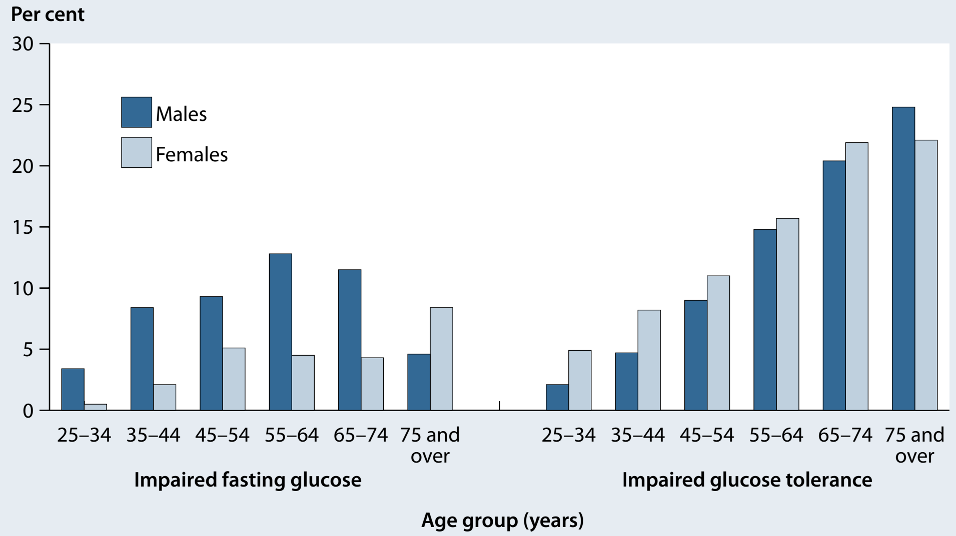
Measure	Males	Females	Persons
Impaired fasting glucose	8.1	3.4	5.8
Impaired glucose tolerance	9.2	11.9	10.6
Total impaired glucose regulation	**17.4**	**15.4**	**16.4**

Note: Column totals may not add up due to rounding.

Source: AIHW analysis of the 1999–2000 AusDiab.

Variations by age and sex

The two types of impaired glucose regulation, IFG and IGT, have very different age and sex distributions. Results from the 1999–2000 AusDiab suggested that the overall prevalence of IFG was significantly higher in males (8%) than in females (3%), and that the prevalence of IGT was significantly higher among females (12%) than males (9%) (Table 3.22). The age-specific rates for IFG were highest among males aged 55–64 years and females aged 75 years and over. While there was no consistent trend in the prevalence of IFG with age, the prevalence of IGT generally increased with age (Figure 3.17).



Source: AIHW analysis of the 1999–2000 AusDiab.

Figure 3.17: Prevalence of impaired fasting glucose and impaired glucose tolerance among adults aged 25 years and over, by age group and sex, 1999–2000

References

Abelson P, Potter Forbes M & Hall G 2006. The annual cost of foodborne illness in Australia. Canberra: Department of Health and Ageing.

ABS (Australian Bureau of Statistics) 2006a. Personal Safety Survey, Australia, 2005. Reissue. ABS cat. no. 4906.0. Canberra: ABS.

ABS 2006b. Water account, Australia 2004–05. ABS cat. no. 4610.0. Canberra: ABS.

ABS 2007a. Environmental issues: people's views and practices. ABS cat. no. 4602.0. Canberra: ABS.

ABS 2007b. Household income and income distribution, Australia 2005–06. ABS cat. no. 6523.0. Canberra: ABS.

ABS 2007c. Adult Literacy and Life Skills Survey: user guide. ABS cat. no. 4228.0.55.002. Canberra: ABS.

ABS 2008a. Year book Australia 2008. ABS cat. no. 1301.0. Canberra: ABS.

ABS 2008b. 2006 Census of Population and Housing (CDATA Online). Viewed 31 August 2009, < www.abs.gov.au/CDataOnline>.

ABS 2008c. Education and work, Australia. ABS cat. no. 6227.0. Canberra: ABS.

ABS 2008d. Health literacy, Australia, 2006. ABS cat. no. 4233.0. Canberra: ABS.

ABS 2009a. Environmental views and behaviour. ABS cat. no. 4626.0.55.001. Canberra: ABS.

ABS 2009b. Australian social trends, data cube—education and training. ABS cat. no. 4102.0. Canberra: ABS.

ABS 2009c. Household income and income distribution, Australia 2007–08. ABS cat. no. 6523.0. Canberra: ABS.

ABS 2009d. 2007–08 National health survey: summary of results, Australia. ABS cat. no. 4364.0. Reissue. Canberra: ABS.

AIFS (Australian Institute of Family Studies) 2008. Growing up in Australia: the longitudinal study of Australian children: 2006–07 annual report. Melbourne: AIFS.

AIHW (Australian Institute of Health and Welfare) 2005a. Statistics on drug use in Australia 2004. Drug statistics series no. 15. Cat. no. PHE 62. Canberra: AIHW.

AIHW 2005b. 2004 National drug strategy household survey: detailed findings. Drug statistics series no. 16. Cat. no. PHE 66. Canberra: AIHW.

AIHW 2006a. Mortality over the twentieth century in Australia: trends and patterns in major causes of death. Mortality surveillance series no. 4. Cat. no. PHE 73. Canberra: AIHW.

AIHW 2006b. Australia's health 2006. Cat. no. AUS 73. Canberra: AIHW.

AIHW 2007. Comorbidity of cardiovascular disease, diabetes and chronic kidney disease in Australia. Cardiovascular disease series no. 28. Cat. no. CVD 37. Canberra: AIHW.

AIHW 2008a. Indicators for chronic diseases and their determinants 2008. Cat. no. PHE 75. Canberra: AIHW.

AIHW 2008b. 2007 National Drug Strategy Household Survey: detailed findings. Drug statistics series no. 22. Cat. no. PHE 107. Canberra: AIHW.

AIHW 2008c. Australia's health 2008. Cat. no. AUS 99. Canberra: AIHW.

AIHW 2008d. 2007 National Drug Strategy Household Survey: first results. Drug statistics series no. 20. Cat. no. PHE 98. Canberra: AIHW.

Anderson HR, Atkinson R, Peacock J, Marston L & Konstantinou K 2004. Meta-analysis of timeseries studies and panel studies of Particulate Matter (PM) and Ozone (O_3). Geneva: World Health Organization.

APHDPC (Australian Population Health Development Principal Committee) 2007. The prevalence and severity of iodine deficiency in Australia. Report to the Australian Health Ministers' Advisory Council.

Barr ELM, Zimmet PZ, Welborn TA, Jolley D, Magliano DJ, Dunstan DW et al. 2007. Risk of cardiovascular and all-cause mortality in individuals with diabetes mellitus, impaired fasting glucose, and impaired glucose tolerance: The Australian Diabetes, Obesity, and Lifestyle Study (AusDiab). Circulation 116:151–7. Viewed 14 March 2010, <http://circ.ahajournals.org/cgi/content/full/116/2/151>.

Begg S, Vos T, Barker B, Stevenson C, Stanley L & Lopez AD 2007. The burden of disease and injury in Australia 2003. AIHW cat. no. PHE 82. Canberra: Australian Institute of Health and Welfare.

BHC (Better Health Channel) 2008a. Health information on the internet. Melbourne: State Government of Victoria. Viewed 17 August 2009, <http://www.betterhealth.vic.gov.au>.

BHC 2008b. Fact sheet: metabolism explained. Melbourne: State Government of Victoria. Viewed 10 August 2009, <http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Metabolism_explained?open>.

Briffa T, Maiorana A, Allan R et al. on behalf of the Executive Working Group and National Forum Participants 2006. National Heart Foundation of Australia physical activity recommendations for people with cardiovascular disease. Sydney: National Heart Foundation of Australia.

Brisbane City Council 2009. Water treatment. Brisbane: Brisbane City Council. Viewed 20 November 2009, <http://www.brisbane.qld. gov.au/BCC:BASE::pc=PC_1427>.

Britt H, Miller GC, Charles J, Henderson J, Bayram C, Harrison C et al. 2008. General practice activity in Australia 1998–99 to 2007–08: 10 year data tables. General practice series no. 23. AIHW cat. no. GEP 23. Canberra: Australian Institute of Health and Welfare.

Brotherton JML, Deeks SL, Campbell-Lloyd S et al. 2008. Interim estimates of human papillomavirus vaccination coverage in the school-based program in Australia. Communicable Diseases Intelligence 32:457–61.

Brown WJ, Bauman AE & Owen N 2009. Stand up, sit down, keep moving: turning circles in physical activity research? British Journal of Sports Medicine 43(2):86–8. doi:10.1136/bjsm.2008.055285.

BTRE (Bureau of Transport and Regional Economics) 2005. Health impacts of transport emissions in Australia: economic costs. Canberra: BTRE.

Bureau of Meteorology 2009. Bureau of Meteorology. Viewed 23 November 2009, <www.bom.gov.au>.

Cancer Council Australia 2008. How much sun is enough? Getting the balance right: vitamin D and sun protection. Sydney: Cancer Council Australia.

Cancer Council of South Australia 2008. National Sun Protection Survey 2006–07. Viewed 7 August 2009, <www.cancersa.org.au/cms_resources/media/Survey_Summary0607.pdf>.

Centre for Epidemiology and Research 2007. New South Wales School Students Health Behaviours Survey: 2005 report. Sydney: NSW Department of Health.

Centre for Epidemiology and Research 2008. 2007 report on adult health from the New South Wales Population Health Survey. Sydney: NSW Department of Health.

Centre for Epidemiology and Research 2009. 2008 report on adult health from the New South Wales Population Health Survey. Sydney: NSW Department of Health.

Cole TJ, Bellizzi MC, Flegal KM & Dietz WH 2000. Establishing a standard definition for child overweight and obesity worldwide; international survey. British Medical Journal 320(7244):1240–3.

Cole TJ, Flegal KM, Nichols D & Jackson AA 2007. Body mass index cut offs to determine thinness in children and adolescents: international survey. British Medical Journal 335(7612):194–202.

Collins D & Lapsley H 2008. The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05. National drug strategy monograph series no. 64. Canberra: Department of Health and Ageing.

Confalonieri, U, Menne B, Akhtar R, Ebi KL, Hauengue M, Kovats RS et al. 2007. Human health. In: Parry ML, Canziani OF, Palutikof JP, van der Linden PJ & Hanson CE (eds). Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press, 391–431.

Corvalan C, Hales S & McMichael A 2005. Ecosystems and human well-being: health synthesis. A report of the Millenium Ecosystem Assessment. Switzerland: WHO Press.

Costello A, Abbas M, Allen A, Ball S, Bell S, Bellamy R et al. 2009. Managing the health effects of climate change. Lancet 373(9676):1693–733.

Cotter T, Perez D, Dessaix A, Crawford J, Denney J, Murphy M & Bishop JF 2008. NSW smokers' attitudes and beliefs: changes over three years. Sydney: Cancer Institute NSW.

CSIRO (Commonwealth Scientific and Industrial Research Organisation) & University of South Australia 2008. 2007 Australian National Children's Nutrition and Physical Activity Survey—main findings. Canberra: Commonwealth of Australia.

de Visser R 2005. One size fits all? Promoting condom use for sexually transmitted infection prevention among heterosexual young adults. Health Education Research 20:557–66.

de Visser RO, Rissel CE, Smith AMA & Richters J 2006. Sociodemographic correlates of selected health risk behaviours in a representative sample of Australian young people. International Journal of Behavioral Medicine 13(2):153–62.

de Visser RO, Smith AMA, Rissel CE, Richters J & Grulich AE 2003. Sex in Australia: safer sex and condom use among a representative sample of adults. Australian and New Zealand Journal of Public Health 27(2):223–9.

DECC (Department of Environment and Climate Change) 2007. Current and projected air quality in NSW: a technical paper supporting the Clean Air Forum 2007. Sydney: Department of Environment and Climate Change NSW.

DEH (Department of the Environment and Heritage) 2005. National standards for criteria air pollutants in Australia. Canberra: Department of the Environment and Heritage.

Delange F 2000. The role of iodine in brain development. Proceedings of the Nutrition Society 59:75–9.

DHAC (Commonwealth Government Department of Health and Aged Care) 1999. National physical activity guidelines for Australians. Canberra: DHAC.

DHS (Department of Human Services) 2008. Victorian Population Health Survey 2007. Melbourne: DHS.

DHS 2009. January 2009 heatwave in Victoria: an assessment of health impacts. Melbourne: DHS.

DoHA (Australian Government Department of Health and Ageing) 2004a. Active kids are healthy kids. Australia's physical activity recommendations for 5–12 year olds. Canberra: DoHA.

DoHA 2004b. Get out and get active. Australia's physical activity recommendations for 12–18 year olds. Canberra: DoHA.

DoHA 2006. Developmental research for national skin cancer awareness campaign. Canberra: Eureka Strategic Research.

DoHA 2008a. 2007 Australian National Children's Nutrition and Physical Activity Survey: main findings. Canberra: DoHA. Viewed 8 October 2009, <http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-nutrition-childrens-survey>.

DoHA 2008b. National skin cancer awareness campaign fact sheets: risk factors. Canberra: DoHA. Viewed 10 August 2009, <www.skincancer.gov.au>.

DoHA 2009a. Recommendations on physical activity for health for older Australians. Canberra: DoHA. Viewed 10 February 2010, <http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-physicalrec-older-guidelines>.

DoHA 2009b. National immunisation program. Canberra: DoHA. Viewed 3 September 2009, <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/about-the-program>.

DoHA & NHMRC (National Health and Medical Research Council) 2003. Food for health—dietary guidelines for Australians. Canberra: DoHA & NHMRC.

Dunn J, Greenbank S, McDowell M et al. 2008. Community knowledge, attitudes and behaviours about environmental tobacco smoke in homes and cars. Health Promotion Journal of Australia 19(2):113–17.

Dunstan D, Zimmet P, Welborn T, Sicree R, Armstrong T, Atkins R et al. 2001. Diabesity and associated disorders in Australia—2000: the accelerating epidemic. The Australian Diabetes, Obesity and Lifestyle Study (AusDiab). Melbourne: International Diabetes Institute.

Econtech 2007. Economic modelling of the net costs associated with non-participation in sport and physical activity. Report prepared for Medibank Private. Viewed 24 June 2009, <www.medibank.com.au>.

Fisk WJ, Lei-Gomez Q & Mendell MJ 2007. Meta-analyses of the association of respiratory health effects with dampness and mold in homes. Indoor Air 17:284–96.

FSANZ (Food Standards Australia New Zealand) 2007a. Trans fatty acids in the Australian and New Zealand food supply. Canberra: FSANZ.

FSANZ 2007b. First Review Report: Proposal P295—Consideration of mandatory fortification with folic acid. Canberra: FSANZ.

FSANZ 2008. The 22nd Australian Total Diet Study. Canberra: FSANZ.

Gebel K, King L, Bauman A, Vita P, Gill T, Rigby A et al. 2005. Creating healthy environments: a review of links between the physical environment, physical activity and obesity. Sydney: NSW Health Department & NSW Centre for Overweight and Obesity.

GHF (Global Humanitarian Forum) 2009. Human impact report: climate change—the anatomy of a silent crisis. Geneva: GHF.

Gill TP, Baur LA, Bauman AE, Steinbeck KS, Storlien LH, Singh MAF et al. 2009. Childhood obesity in Australia remains a widespread health concern that warrants population-wide prevention programs. Medical Journal of Australia 190(3):146–8.

Guest CS, Willson K, Woodward AJ, Hennessy K, Kalkstein LS, Skinner C et al. 1999. Climate and mortality in Australia: retrospective study, 1979–1990, and predicted impacts in five major cities in 2030. Climate Research 13(1):1–15.

Hall G, D'Souza R & Kirk MD 2002. Foodborne disease in the new millennium: out of the frying pan and into the fire. Medical Journal of Australia 177:614–18.

Hall G, Kirk M, Becker N, Gregory J, Unicomb L, Millard G et al. 2005. Estimating foodborne gastroenteritis, Australia. Emerging Infectious Diseases 11:1257–64.

Hennessy K, Fawcett R, Kirono D, Mpelasoka F, Jones D, Bathols J et al. 2008. An assessment of the impact of climate change on the nature and frequency of exceptional climatic events. Melbourne: Commonwealth Scientific and Industrial Research Organisation & Bureau of Meteorology.

Hill D, White V & Effendi Y 2002. Changes in the use of tobacco among Australian secondary students: results of the 1999 prevalence study and comparisons with earlier years. Australian and New Zealand Journal of Public Health 26 (2):156–63.

Imrie J & Frankland A (eds) 2008. HIV/AIDS, hepatitis and sexually transmissible infections in Australia: annual report of trends in behaviour 2008. Monograph 2/2008. Sydney: National Centre in HIV Social Research, The University of New South Wales.

IPCC (Intergovernmental Panel on Climate Change) 2007. The physical science basis. In: Solomon S, Qin D, Manning M, Chen Z, Marquis M, Averyt KB et al. (eds). Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge: Cambridge University Press.

Irving H, Samokhvalov A & Rehm J 2009. Alcohol as a risk factor for pancreatitis. A systematic review and meta-analysis. Journal of the Pancreas (Online) 10(4):387–92.

Katsouyanni K 2003. Ambient air pollution and health. British Medical Bulletin 68:143–56.

Katzmarzyk PT, Church TS, Craig CL & Bouchard C 2009. Sitting time and mortality from all causes, cardiovascular disease, and cancer. Medicine and Science in Sports and Exercise 41(5):998–1005.

Lê Q & Lê T 2006. Cultural attitudes of Vietnamese migrants on health issues. AARE conference papers—2005. Coldstream, Victoria: Australian Association for Research in Education. Viewed 17 August 2009, <www.aare.edu.au>.

Lopez AD, Mathers CD, Ezzati M, Jamison DT & Murray CJL 2006. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. Lancet 367:1747–57.

Lucas C, Hennessy K, Mills G & Bathols J 2007. Bushfire weather in southeast Australia: recent trends and projected climate change impacts. Consultancy report prepared for The Climate Institute of Australia. Melbourne: Bushfire Cooperative Research Centre & Australian Bureau of Meteorology.

Margery AM, Daniels LA & Boulton TJC 2001. Prevalence of overweight and obesity in Australian children and adolescents: reassessment of the 1985 and 1995 data against new standard international definitions. Medical Journal of Australia 174:561–4.

Mathers C 1995. Health differentials among Australian children. AIHW health monitoring series no. 3. Canberra: AGPS.

McMichael AJ, Woodruff R & Hales S 2006. Climate change and human health: present and future risks. Lancet 367:859–69.

Medicare Australia 2009. Australian Childhood Immunisation Register (ACIR) statistics. Canberra: Medicare Australia. Viewed 31August 2009, <http://www.medicareaustralia.gov.au/provider/patients/acir/statistics.jsp>.

National Water Commission 2009. National performance report 2007–08: urban water utilities. Canberra: National Water Commission.

NCHECR (National Centre in HIV Epidemiology and Clinical Research) 2008. HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia annual surveillance report 2008. Sydney: NCHECR, The University of New South Wales. Viewed 1 September 2009, <www.nchecr.unsw.edu.au>.

NCHECR 2009. Australian NSP Survey national data report 2004–2008: prevalence of HIV, HCV and injecting and sexual behaviour among IDUs at needle and syringe programs. Sydney: NCHECR, The University of New South Wales. Viewed 1 September 2009, <www.nchecr. unsw.edu.au>.

NHFA (National Heart Foundation of Australia) 2009a. Position statement: built environment and walking. Melbourne: NHFA. Viewed 1 September 2009, <www.heartfoundation.org.au/Professional_Information/Lifestyle_risk/Physical_Activity/Active_by_Design>.

NHFA 2009b. National Blood Pressure and Vascular Disease Advisory Committee. Guide to management of hypertension 2008: assessing and managing raised blood pressure in adults. Updated August 2009. Melbourne: NHFA. Viewed 5 November 2009, <http://www.heartfoundation.org.au/SiteCollectionDocuments/A_Hypert_Guidelines2008_2009Update_FINAL.pdf>.

NHMRC (National Health and Medical Research Council) 2001. National evidence based guidelines for management of Type 2 diabetes mellitus. Part 3—Primary prevention of Type 2 diabetes. Canberra: NHMRC. Viewed 3 October 2009, <http://www.nhmrc.gov.au>.

NHMRC 2003a. Dietary guidelines for Australian adults. Canberra: NHMRC.

NHMRC 2003b. Dietary guidelines for children and adolescents in Australia, incorporating the infant feeding guidelines for health workers. Canberra: NHMRC.

NHMRC 2009. Australian guidelines to reduce health risk from drinking alcohol. Canberra: NHMRC.

NHMRC & NZMoH (New Zealand Ministry of Health) 2006. Nutrient reference values for Australia and New Zealand including recommended dietary intakes. Canberra: NHMRC.

NPHT (National Preventative Health Taskforce) 2009. Australia: the healthiest country by 2020—National Preventative Health Strategy—the roadmap for action. Canberra: NPHT. Viewed 6 August 2009, <http://preventativehealth.org.au/internet/preventativehealth/publishing.nsf/Content/national-preventative-health-strategy-1lp>.

NPHTTWG (National Preventative Health Taskforce Tobacco Working Group) 2009. Australia: the healthiest country by 2020. Technical report no. 2. Tobacco control in Australia: making smoking history including addendum for October 2008 to June 2009. Canberra: National Preventative Health Taskforce. Viewed 6 August 2009, <http://preventativehealth.org.au/internet/preventativehealth/publishing.nsf/Content/national-preventative-health-strategy-1lp>.

Nowson C, Diamond T, Pasco J, Mason R, Sambrook P & Eisman J 2004. Vitamin D in Australia. Issues and recommendations. Australian Family Physician 33:133–8.

OECD (Organisation for Economic Co-operation and Development) 2009a. OECD Factbook 2009: Economic, environmental and social statistics. Paris: OECD.

OECD 2009b. OECD health data: statistics and indicators for 30 countries, CD-ROM and online version. Paris: OECD.

OECD 2009c. Health at a glance 2009: OECD indicators. Paris: OECD.

OECD 2009d. The obesity epidemic: analysis of past and projected future trends in selected OECD countries. OECD Health working papers no. 45. Paris: OECD.

Olds T, Ridley K, Wake M, Hesketh K, Waters E, Patton G et al. 2007. How should activity guidelines for young people be operationlised? International Journal of Behavioural Nutrition and Physical Activity 4(1):43. Viewed 30 July 2009, <http://www.ijbnpa.org/content/4/1/43>.

OzFoodNet 2008. Monitoring the incidence and causes of diseases potentially transmitted by food in Australia: annual report of the OzFoodNet network, 2007. Communicable Diseases Intelligence 32:400–24.

Perusco A, Rickard-Bell G, Mohsin M, Millen E, Sabry M, Poder N et al. 2007. Tobacco control priorities for Arabic speakers: key findings from a baseline telephone survey of Arabic speakers residing in Sydney's south-west. Health Promotion Journal of Australia 18:121–6.

Roberts LM, Letcher TR, Gason AA & Lobstein T 2009. Letter to the editor. Medical Journal of Australia 191:46–7.

Rosengren A, Hawken S, Ôunpuu S, Sliwa K, Zubaid M, Almahmeed WA et al 2004. Association of psychosocial risk factors with risk of acute myocardial infarction in 11 119 cases and 13 648 controls from 52 countries (the INTERHEART study): case-control study. The Lancet 364:953–62.

Smith A, Agius P, Mitchell A, Barrett C & Pitts M 2009. Secondary students and sexual health 2008. Monograph series no. 70. Melbourne: Australian Research Centre in Sex, Health & Society, La Trobe University.

Smith A, Kellett E & Schmerlaib Y 1998. The Australian guide to healthy eating. Canberra: Department of Health and Family Services.

Spencer N 2005. Does material disadvantage explain the increased risk of adverse health, educational, and behavioural outcomes among children in lone parent households in Britain? A cross sectional study. Journal of Epidemiology and Community Health 59:152–7.

Tuomilehto J, Lindstrom J & Eriksson J et al. 2001. Prevention of Type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. New England Journal of Medicine 344:1343–50.

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

United Nations 2007. Security Council holds first-ever debate on impact of climate change: on peace, security, hearing over 50 speakers. Security Council 5663rd meeting, 17 April. New York: United Nations.

UNODC (United Nations Office on Drugs and Crime) 2009. World drug report 2009. Consumption annex. Vienna: UNODC.

Unwin N, Shaw J, Zimmet P & Alberti KGMM 2002. Impaired glucose tolerance and impaired fasting glycaemia: the current status on definition and intervention. Diabetic Medicine 19:708–23.

Wen LM, Orr N, Millett C & Rissel C 2006. Driving to work and overweight and obesity: findings from the 2003 New South Wales Health Survey, Australia. International Journal of Obesity 30:782–6.

Whetton PH, McInnes KL, Jones RN, Hennessy KJ, Suppiah R, Page CM et al. 2005. Australian climate change projections for impact assessment and policy application: a review. Marine and atmospheric research paper 001. Melbourne: CSIRO Marine and Atmospheric Research.

White V & Hayman J 2006. Smoking behaviours of Australian secondary students in 2005. National Drug Strategy monograph no. 59. Canberra: Department of Health and Ageing.

WHO (World Health Organization) 1999. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: Diagnosis and classification of diabetes mellitus. Geneva: Department of Noncommunicable Disease Surveillance, WHO.

WHO 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO technical report series 894. Geneva:WHO.

WHO 2002a. World health report 2002: reducing risk, promoting healthy life. Geneva: WHO.

WHO 2002b. Smallpox vaccine. Geneva: WHO. Viewed 11 August 2009, <http://www.who.int/vaccines/en/smallpox.shtml>.

WHO 2006. Obesity and overweight. Fact sheet no. 311. Geneva: WHO. Viewed 6 August 2009, <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>.

WHO 2008. Poliomyelitis. Fact sheet no. 114. Geneva: WHO. Viewed 11 August 2009, <http://www.who.int/mediacentre/factsheets/fs114/en/index.html>.

WHO 2009. Health effects of UV radiation. Geneva: WHO. Viewed 7 August 2009, <www.who.int/uv/health>.

WHO-ISH (World Health Organization–International Society of Hypertension) 1999. 1999 World Health Organization–International Society of Hypertension Guidelines for the Management of Hypertension. Journal of Hypertension 17:151–83.

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

Diseases and injury

4

KEY POINTS

- Cancer is Australia's leading broad cause of disease burden (19% of the total), followed by cardiovascular disease (16%) and mental disorders (13%).
- Death rates are falling for many of our major health problems such as cancer, cardiovascular disease, chronic obstructive pulmonary disease, asthma and injuries.
- The rate of heart attacks continues to fall, and survival from them continues to improve.
- Around 1 in 5 Australians aged 16–85 years has a mental disorder at some time in a 12-month period, including 1 in 4 of those aged 16–24 years.
- The prevalence of diabetes continues to increase markedly, having trebled over the last two decades, based on self-reported data.
- The incidence of treated end-stage kidney disease is increasing, with diabetes as the main cause.
- In 2008, chlamydia continued to be the most notified infection in Australia, with over 58,000 new notifications.
- The first influenza pandemic in 40 years occurred in 2009. Children and young adults were disproportionately affected.

Diseases and injury are important components of ill health. They cause much suffering, disability and premature mortality. They also impose significant costs on society through health system use (see chapters 7 and 8), days off work because of illness or caring for people who are ill, and reduced quality of life.

Despite diseases and injury remaining large problems, the situation is improving in many areas. For example, death rates continue to fall for cancer, cardiovascular disease (CVD), chronic lung disease and injury. This is partly because fewer of these problems arise in the first place or arise later in people's lives, and partly because survival is better when they do occur. However, the increases in the number of people with certain diseases—notably diabetes and end-stage kidney disease (ESKD)—is cause for concern.

This chapter covers Australia's main health problems, namely those that cause the greatest overall disability, premature death or both. The combined extent of disability and premature death—known as 'burden of disease'—caused by the conditions covered in this chapter is over three-quarters of the total burden of disease (see Box 4.1 and Section 2.7).

Box 4.1: Burden of disease for conditions described in this chapter

Over three-quarters of Australia's total burden of disease (see Chapter 2) is covered by the conditions described in this chapter. The largest contributions come from cancer, cardiovascular disease and mental disorders.

The conditions vary in whether the burden is mainly because of premature death or years lived with disability or illness. Cancer, cardiovascular disease and injury have over 70% of their burden coming from premature death, whereas asthma, musculoskeletal disease and mental disorders have more than 90% of their burden coming from the disability or illness component.

Projected burden of disease for conditions in this chapter, 2010

Broad cause group	Specific categories	Proportion of burden (per cent)	Fatal component[a] (per cent)
Cancer		18.9	83
Cardiovascular disease		16.1	76
Diabetes		6.6	20
Chronic kidney disease[b]		n.a.	n.a.
Mental disorders		13.0	7
Neurological and sense disorders	Dementia	4.3	26
Chronic respiratory disease	Chronic obstructive pulmonary disease (COPD)	3.0	57
	Asthma	2.3	8
Musculoskeletal disease		4.4	6
Injury		6.5	75
Infectious diseases		1.7	69
Total in this chapter		*76.9*	
All diseases		**100.0**	

n.a. Not available.

(a) Proportion of burden due to premature death, with the remainder being due to years lived with disability.

(b) Chronic kidney disease is not quantified separately in the Burden of Disease study.

Source: AIHW Burden of Disease database.

4.1 Cancer

Cancer is a diverse group of diseases in which some of the body's cells become defective and multiply out of control. They can invade and damage the tissue around them, and can also spread (metastasise) to other parts of the body to cause further damage. The number and types of cancer diagnosed vary notably by age and sex, with young people at considerably less risk of developing cancer than older people. Overall, cancer is projected to remain the leading cause of the burden of disease and injury in Australia in 2010, with four-fifths of cancer's burden being due to premature death. In the decade to 2006, improvements in early detection and treatment have resulted in improved survival and a clear decline in mortality rates for many cancers, despite the overall cancer incidence rate increasing by 4%.

This section describes cancer incidence and mortality for all cancers combined and for National Health Priority Area (NHPA) cancers. The NHPA cancers are colorectal cancer, lung cancer, melanoma of the skin, non-melanoma skin cancer (NMSC), breast cancer in females, cancer of the cervix, prostate cancer and non-Hodgkin lymphoma.

Information on new cases of cancer is collected by state and territory cancer registries, and compiled into the Australian Cancer Database by the Australian Institute of Health and Welfare (AIHW) at the National Cancer Statistics Clearing House (see Box 4.2). Information on screening for cancer is included in Chapter 7.

Box 4.2: Cancer surveillance and monitoring

Registration of all cancers, excluding basal and squamous cell carcinomas of the skin (BCCs and SCCs), 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, excluding BCCs and SCCs, to the National Cancer Statistics Clearing House (NCSCH). The NCSCH is operated by the Australian Institute of Health and Welfare collaboratively with the Australasian Association of Cancer Registries. Both the *Australian Institute of Health and Welfare Act 1987* and the *Privacy Act 1988* provide for the confidentiality of records supplied to the NCSCH.

Incidence

The incidence of cancer is the number of new cases in a given period, usually one year. Excluding the two main types of NMSC (basal and squamous cell carcinomas), 104,592 new cases of cancer (59,058 males and 45,534 females) were diagnosed in Australia in 2006. The corresponding incidence rate of 480 cases per 100,000 persons was higher than the rate of 462 a decade earlier and much higher than the rate of 395 in 1986 (Table 4.1).

Table 4.1: Trends in incidence, selected cancers, 1986 to 2006

Type of cancer	1986	1991	1996	2001	2006
			Number of new cases		
All cancers[a]	53,888	66,322	79,169	89,777	104,592
NHPA cancers					
Prostate cancer	4,310	6,755	10,304	11,389	17,444
Colorectal cancer	8,018	9,596	10,871	12,702	13,591
Breast cancer in females	6,079	8,042	9,745	11,803	12,614
Melanoma of skin	4,710	5,964	7,819	8,943	10,326
Lung cancer	6,460	7,161	7,799	8,388	9,563
Non-Hodgkin lymphoma	1,815	2,503	3,087	3,517	3,982
Cervical cancer	1,020	1,092	941	739	715
			Incidence rate[b]		
All cancers[a]	394.7	432.9	461.6	462.5	480.4
NHPA cancers					
Prostate cancer[c]	83.0	110.1	137.6	131.0	170.0
Colorectal cancer	60.1	63.6	64.0	65.4	62.2
Breast cancer in females[c]	85.1	100.4	109.3	117.3	112.4
Melanoma of skin	32.8	37.6	44.9	46.1	47.9
Lung cancer	46.6	46.3	45.5	43.2	43.8
Non-Hodgkin lymphoma	13.2	16.2	17.9	18.1	18.3
Cervical cancer[c]	14.0	13.2	10.4	7.4	6.6

NHPA National Health Priority Area.

(a) ICD-10 codes C00–C96, D45–D46, D47.1 & D47.3 but excluding basal and squamous cell carcinomas of the skin (part of C44).

(b) Incidence rates, given as number of new cases per 100,000 persons, were age-standardised to the Australian population as at 30 June 2001.

(c) Rates for these cancers use the relevant male or female population numbers in denominators.

Source: AIHW Australian Cancer Database.

The overall cancer incidence rate was higher among males than females. The imbalance was greatest for cancer of the larynx, where the rate for males was 12 times as high as the female rate. This excess rate is probably due to higher male rates of smoking and alcohol consumption in the previous two to three decades.

The situation is that, by the age of 75 years, 1 in 3 Australian males and 1 in 4 females will have been diagnosed with cancer at some stage of their life. The risk by age 85 years increases to 1 in 2 for males and 1 in 3 for females.

It is projected that the number of new cases of cancer in 2010 will be around 115,000, a 10% increase on 2006. Most of the projected increase is because of growth in the population aged 60 years and over. In 2006 the average age at diagnosis was 67 years for males and 64 years for females.

Most common cancers

Among males in 2006, prostate cancer was the most common type of newly diagnosed cancer (excluding BCCs and SCCs), with 17,444 cases diagnosed in that year. The increase in the incidence of prostate cancer in recent years correlates strongly with an increased use of prostate-specific antigen tests in screening for prostate cancer. Colorectal cancer (7,432 new cases), melanoma (6,051), lung cancer (6,030) and lymphoma (2,518) were the next most commonly diagnosed cancers among males (excluding BCCs and SCCs). Together these five accounted for 67% of all cancers registered in males in 2006.

In 2006, breast cancer (12,614 new cases) was the most commonly registered cancer in females, followed by colorectal cancer (6,159 new cases), melanoma (4,275), lung cancer (3,533) and lymphoma (1,961). These five accounted for 63% of all cancers registered in females in 2006.

Non-melanoma skin cancers

Only two kinds of cancer are not legally notifiable diseases in Australia—basal cell carcinoma of the skin and squamous cell carcinoma of the skin. These are the two most common kinds of NMSC. The national incidence of NMSC is estimated from periodic national household surveys (NCCI 2003; Staples et al. 2006). Based on the most recent survey (in 2002) around 451,000 new cases of NMSC are expected to be diagnosed in 2010 (AIHW & CA 2008).

In 2007, 448 persons died from NMSC in Australia. Although NMSC only accounts for just over 1% of cancer deaths in Australia, about four are diagnosed annually for every one of the other invasive cancers. Around two-thirds of Australians will develop at least one NMSC before the age of 70 years.

It is clear from hospital inpatient data and surveys of general practitioners (GPs) that health service use for NMSCs is increasing. There were an estimated 950,000 GP encounters per year for NMSC between April 2005 and March 2007, representing an increase of 14% from the same period in 1998–2000. There were also 78,000 inpatient hospitalisations with a principal diagnosis of NMSC in the 2006–07 financial year, more than double the figure for 1993–94 (AIHW & CA 2008).

Mortality

Cancer is a major cause of death, accounting for 29% of all deaths in 2007. From the perspective of total numbers, the falling death rate from cancer is being offset by increased population growth in the 65 years and over age group, as this group has the highest rates of cancer incidence and mortality.

In 2007 there were 39,884 deaths from cancer (Table 4.2). Of these, 22,562 were of males (32% of all male deaths) and 17,322 were of females (26% of all female deaths). The average age at death was 72 years for both males and females. It is projected that there will be around 43,700 deaths from cancer in 2010 (AIHW & AACR 2008).

Despite the increase in numbers, however, the age-standardised death rate for cancers overall fell from 209 per 100,000 persons in 1987 to 176 in 2007—a 16% fall over two decades. Among the NHPA cancers, the fall in death rates since 1987 has been highest for cervical cancer, at 60%, where the National Cervical Screening Program using Pap tests has been successful in detecting and treating pre-cancerous abnormalities before they develop into cancer. The death rates have also fallen steadily and substantially for colorectal (43% fall), breast (28%) and lung cancers (17%) (Table 4.2).

Table 4.2: Trends in deaths, selected cancers, 1987 to 2007

Type of cancer	1987	1992	1997	2002	2007
			Number of deaths[a]		
All cancers[b]	28,401	32,196	35,112	38,093	39,884
NHPA cancers					
Lung cancer	5,752	6,400	6,588	7,303	7,626
Colorectal cancer	4,120	4,218	4,632	4,584	4,047
Prostate cancer	1,744	2,370	2,446	2,852	2,938
Breast cancer in females	2,258	2,438	2,609	2,698	2,680
Non-Hodgkin lymphoma	953	1,261	1,551	1,528	1,325
Melanoma of skin	792	871	908	1,055	1,279
Non-melanoma skin cancer	215	364	342	407	448
Cervical cancer	336	326	294	227	208
			Death rate[c]		
All cancers[b]	209.2	210.4	202.1	191.2	176.1
NHPA cancers					
Lung cancer	41.0	40.8	37.6	36.7	34.0
Colorectal cancer	31.0	27.9	26.8	23.0	17.8
Prostate cancer[d]	36.6	41.8	36.8	35.6	31.0
Breast cancer in females[d]	30.6	29.4	27.8	25.2	22.1
Non-Hodgkin lymphoma	7.0	8.3	8.9	7.7	5.8
Melanoma of skin	5.7	5.6	5.1	5.3	5.7
Non-melanoma skin cancer	1.7	2.4	2.0	2.0	1.9
Cervical cancer[d]	4.4	3.8	3.1	2.1	1.8

NHPA National Health Priority Area.

(a) The number of deaths is given as at the year of registration of death, which in a small percentage of cases is later than the year of occurrence of death.

(b) ICD-10 codes C00–C97, D45–D46, D47.1 & D47.3.

(c) Death rates, given as number of deaths per 100,000 persons, were age-standardised to the Australian population as at 30 June 2001.

(d) Rates for these cancers use the relevant male or female population numbers in denominators.

Source: AIHW National Mortality Database.

Lung cancer was by far the most common cause of cancer death in 2007 (7,626 deaths), and in fact was also the leading cause for both males (4,715) and females (2,911). It has been the leading cause of cancer death for the whole period shown in Table 4.2, with the gap between it and the other causes actually widening. Colorectal cancer had the second highest number of deaths overall in 2007, but with only around half the number of lung cancer deaths. Next came two sex-specific cancers—prostate cancer in males followed by breast cancer in females. These two were the second most common causes of cancer deaths for males and females respectively (ahead of colorectal cancer, which was third in both cases).

The current risk of dying from a cancer before the age of 75 years is 1 in 8 for males and 1 in 12 for females. The risk of dying from cancer before the age of 85 years is double these proportions: 1 in 4 for males and 1 in 6 for females.

Relative survival

Many types of cancer can shorten people's lives, so it is important to know how long those with cancer are surviving with it and whether the length of survival is improving as care and early detection improves. The standard measure of cancer survival is 5-year relative survival. A 5-year relative survival figure of, say, 70% means that a person diagnosed with cancer has a 70% chance of still being alive 5 years after their diagnosis, relative to other Australians of the same sex and age (AIHW et al. 2008).

For cancers as a whole, 5-year relative survival improved markedly from 41% for males diagnosed in 1982–1986 to 58% for those diagnosed in 1998–2004 (Table 4.3). There was a similar improvement for females diagnosed in these periods—from 53% to 64%. In most cases shown below the improvements have been clearly progressive over the years.

Table 4.3: Trends in 5-year relative survival for selected cancers, diagnoses from 1982–1986 to 1998–2004 (per cent)

Type of cancer	1982–1986	1987–1991	1992–1997	1998–2004
Males				
All cancers[(a)]	41.3	45.9	54.8	58.4
Stomach	16.2	18.9	20.5	24.4
Colorectal	47.7	52.0	56.8	61.3
Lung	7.9	9.1	9.7	10.7
Melanoma	82.2	86.3	89.3	89.7
Prostate	57.4	63.2	81.7	85.3
Testicular	90.8	95.0	95.3	96.8
Kidney	45.2	49.8	58.6	65.6
Brain	20.8	19.7	18.7	18.5
Thyroid	79.1	78.3	85.3	87.7
Hodgkin lymphoma	72.0	76.8	81.5	84.8
Non-Hodgkin lymphoma	46.3	48.2	52.3	61.6
Leukaemia	37.9	42.6	43.0	48.2
Females				
All cancers[(a)]	53.2	57.1	60.8	64.1
Stomach	18.2	18.9	22.3	25.3
Colorectal	49.7	53.2	57.4	62.4
Lung	10.5	10.8	12.6	14.0
Melanoma	90.5	92.8	93.9	94.1
Breast	71.8	77.5	83.7	87.8
Uterine	75.6	78.0	80.2	82.1
Cervical	68.3	71.2	73.6	71.8
Ovarian	32.7	35.7	37.9	39.8
Kidney	48.8	52.5	58.7	66.0
Brain	19.9	20.4	18.3	19.4
Thyroid	85.3	89.9	94.3	95.3
Hodgkin lymphoma	71.3	77.5	83.6	85.8
Non-Hodgkin lymphoma	47.6	52.4	54.0	62.6
Leukaemia	37.2	42.9	42.8	47.3

(a) ICD-10 codes C00–C97, D45–D46, D47.1 & D47.3.

Note: Relative survival calculated using the methodology of Dickman (2004).

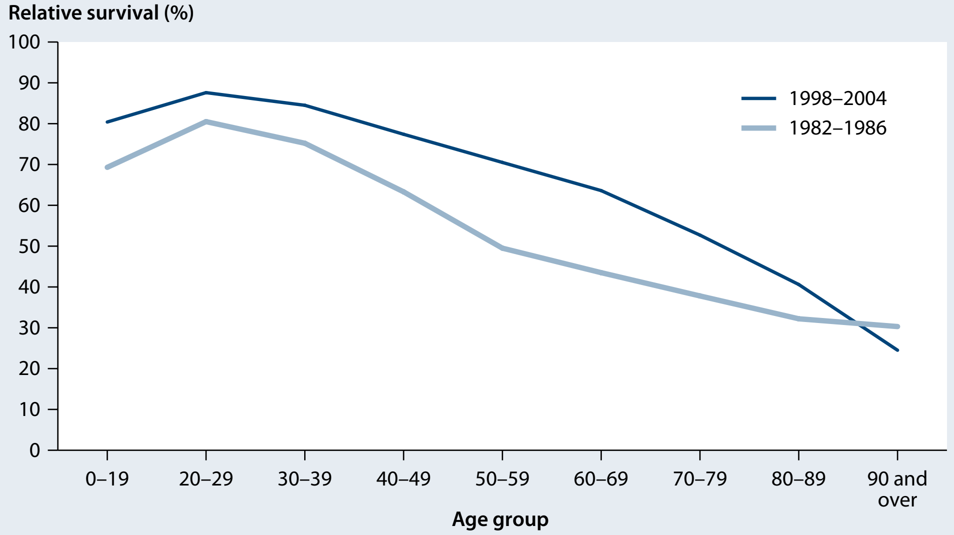
Source: AIHW et al. 2008.

These gains have largely been attributed by the Cancer Council Australia to better diagnostic methods, earlier detection and improvements in treatment. But the gains have not been consistent across all types of cancer. For example, brain cancer has relatively poor survival, and its 5-year relative survival remained between 19% and 21% for the 20 years to 2004 for both males and females. Also, as well as continuing to cause far more deaths than any other cancer, lung cancer still has a poor relative survival that has improved only a little over the previous 20 years—12% for males and females combined for diagnoses in the period 1998–2004. In contrast, early detection through the BreastScreen Australia screening program and improvements in treatment have contributed to the 5-year relative survival for breast cancer in females improving from 72% for those diagnosed in 1982–1986 to 88% for those diagnosed in 1998–2004.

There has also been success with the National Cervical Screening Program (also see Chapter 7). It has achieved improvements in early detection and treatment of pre-cancerous abnormalities, thereby considerably reducing both incidence and resulting mortality from cervical cancer since the early 1990s. Despite this preventive success, however, once cervical cancer has been diagnosed its 5-year relative survival remained at around 70% for the two decades to 2004.

Five-year relative survival for persons diagnosed with cancer in 1998–2004 was highest for those aged 20–29 years, at 88%, and next highest for those aged 30–39 years, at 85% (Figure 4.1). It then continued to decline steadily with age to 25% for those aged 90 years and over.

The greatest gains in survival for persons diagnosed in 1998–2004, compared with those diagnosed in 1982–1986, were in the 50–59 year age group, from 50% to 71%, and in the 60–69 year age group, from 44% to 64%.



Source: AIHW et al. 2008.

Figure 4.1: All-cancer 5-year relative survival by age for persons diagnosed in 1982–1986 and 1998–2004

Burden of disease

Cancer is projected to be the leading cause of the burden of disease and injury in Australia in 2010, as it has been at least since 2003. It is estimated that it will account for 19% of the total burden, compared with 16% for CVD which is the second leading cause. Four-fifths (83%) of the cancer burden comes from years of life lost due to premature death (YLL) and the remainder from the non-fatal burden of years of life lost due to disability (YLD). (See Chapter 2 for information about the burden of disease generally.)

In 2010 males are expected to account for 53% of the burden from cancer and females 47%. Among males in 2010, the cancers expected to have the highest burden, measured by disability-adjusted life years (DALYs), are lung cancer (56,800 DALYs), prostate cancer (42,500), colorectal cancer (37,800) and melanoma (15,200). Among females the highest burden is expected to be due to breast cancer (61,100 DALYs), lung cancer (41,300), and colorectal cancer (30,300).

4.2 Cardiovascular disease

Despite major gains against CVD over the past 40 years it continues to have a major effect on the health of Australians in terms of prevalence, mortality, morbidity, burden of disease and expenditure. CVD remains Australia's biggest killer, mostly because of the deaths it causes among older people. It is also the second largest contributor to the burden of disease in Australia, after cancer.

The term cardiovascular disease covers all diseases and conditions of the heart and blood vessels (see Box 4.3). Coronary heart disease, stroke, heart failure and peripheral vascular disease are the major contributors to the burden of CVD. Congenital heart and vascular diseases constitute one of the leading causes of death in the first year of life. Rheumatic fever and chronic rheumatic heart disease are a problem among Aboriginal and Torres Strait Islander people.

Box 4.3: Definition of cardiovascular disease

The definition of 'cardiovascular disease' differs between organisations and data collections. In this report, as in other material prepared by the Australian Institute of Health and Welfare (AIHW), the terms 'cardiovascular disease', 'circulatory disease' and 'heart, stroke and vascular diseases' are used interchangeably to convey the same meaning. They include all diseases in Chapter 9 (codes I00–I99) of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM).

It should be noted that the AIHW and the Australian Bureau of Statistics (ABS) use the term 'heart, stroke and vascular diseases' somewhat differently. For the ABS, the term represents a subgroup of 'diseases of the circulatory system' (ABS 2009a).

For the most common forms of CVD, the main underlying causal mechanism is plaque formation, a process marked by abnormal build-ups of fat, cholesterol and other substances in the inner lining of the arteries. Plaque is most serious when it leads to a reduced or blocked blood supply to the heart (causing angina or heart attack) or to the brain (causing a stroke).

The major preventable risk factors for CVD are tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition and diabetes. Atrial fibrillation, transient ischaemic attack and a high intake of alcohol also increase the risk of stroke.

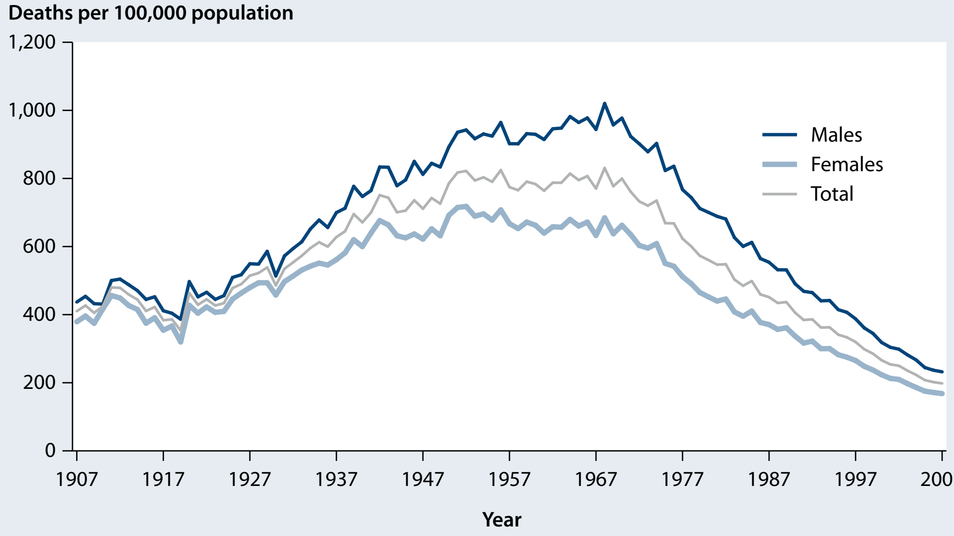
This section provides a brief statistical profile of CVD as a whole, followed by sections on its main component diseases. Information is also presented on the use of health services. CVD in Indigenous Australians is discussed in Chapter 5.

Cardiovascular disease as a whole

In 2007, CVD was recorded as the primary cause of death for 46,623 Australians, accounting for just over a third of all deaths in that year. Half of these deaths (22,727) were due to coronary heart disease, and 8,623 to stroke. Over 78% of the CVD deaths were of people aged 75 years and over, and more than half were female (52.7%).

Over the past few decades Australia has achieved major gains in the fight against CVD, due to a combination of improvements in prevention, detection and clinical management. Death rates have fallen considerably from the peak levels seen in the late 1960s and early 1970s, when CVD was responsible for around 60,000 deaths annually, or roughly 55% of all deaths each year. The age-adjusted rate of death from CVD declined from 830.6 per 100,000 population in 1968 to 198.1 per 100,000 in 2007—a 76% fall (Figure 4.2).

If the death rates for CVD had remained at their 1968 peak, the number of deaths due to these diseases in 2006 would have been around 4 times as high as the actual number. In 2006, 187,000 Australian lives would have been lost to CVD rather than the 45,670 actual deaths, representing a saving of over 140,000 lives in that year. By way of comparison, the total number of deaths from any cause in 2006 was 133,739 (AIHW 2009a).

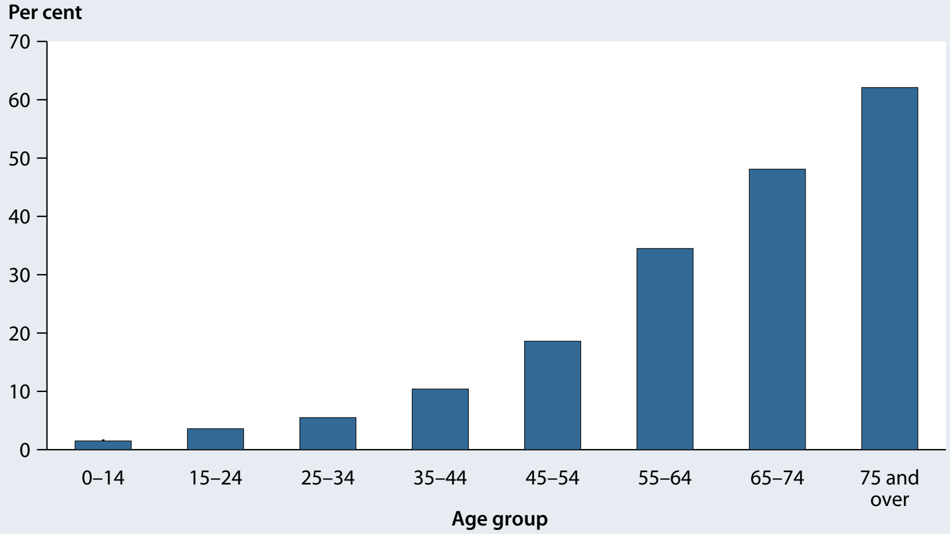


Source: AIHW et al. 2008.

Figure 4.2: Age-adjusted death rates from CVD, by sex, 1907 to 2006

Both males and females have benefited from the decline. However, age-adjusted death rates for CVD among males are still markedly higher than among females (in 2007, 232.1 per 100,000 compared with 168.2). The rates for males reached a higher peak (1,020.1 compared with 717.8 for females) and began to decline later (in the late 1960s compared with the early 1950s) (AIHW 2009b).

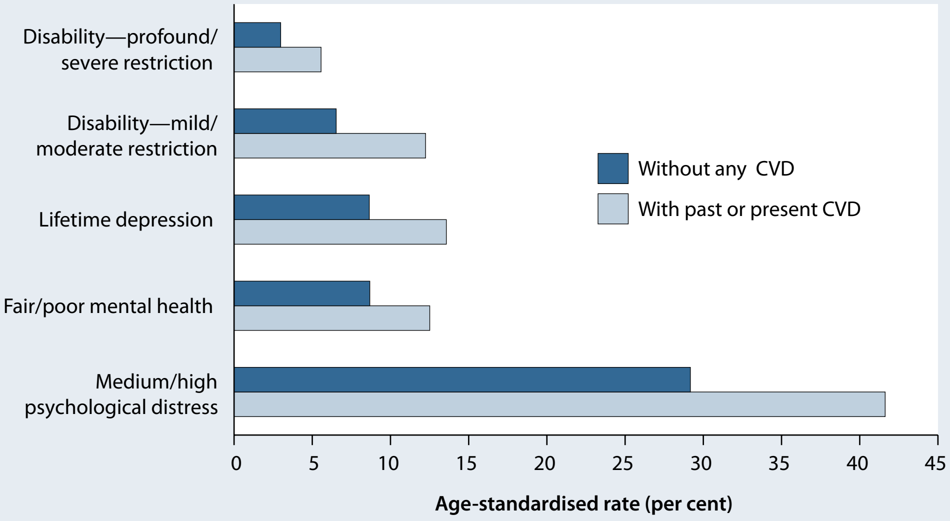
Based on the 2007–08 National Health Survey (NHS), an estimated 3.4 million Australians (16.5% of the population) had one or more long-term diseases of the circulatory system that year (ABS 2009a). A higher proportion of females in the survey (17.6%) reported having CVD than males (15.3%) and the prevalence increased with age (Figure 4.3). It should be noted that these estimates are based on self-reporting by respondents, and do not include people in institutionalised care (such as hospitals and nursing homes). Therefore, some care should be taken in interpreting the figures in comparison with other surveys and over time.



Source: AIHW analysis via Remote Access Data Laboratory of the basic confidentialised unit record file of the ABS 2007–08 NHS.

Figure 4.3: Proportion of the population reporting a long-term CVD condition, by age group, 2007–08

Similar estimates of the prevalence of CVD (defined as a long-term condition of stroke, heart or circulatory condition) can be derived from the 2007 National Survey of Mental Health and Wellbeing (SMHWB) (ABS 2008). From this survey it is estimated that 3.5 million Australians aged 16–85 years had a long-term chronic condition of CVD that year. As with the NHS, estimates are based on self-reported responses. Of those reporting CVD, 23.1% (corresponding to 800,000 people) reported also having a disability that led to a mild-to-profound restriction to core activities such as self-care, mobility and communication. Compared with those without CVD, and after adjusting for age, those reporting a CVD condition were more likely to report that they had a disability, medium or high levels of psychological distress, fair or poor mental and physical health, depression or a schooling or employment restriction. All these differences were statistically significant (Figure 4.4).



Notes

1. Age-standardised to the 2001 ABS Australian standard population.
2. Missing data have been excluded.

Source: AIHW analysis via Remote Access Data Laboratory of the confidentialised unit record file of the ABS 2007 SMHWB.

Figure 4.4: Self-reported disability and mental health status of people aged 16–85 years, with and without CVD, 2007

Combining both the burden from the extent of its disability and from premature death, CVD is projected to account for 16% of the overall disease burden in Australia in 2010, with coronary heart disease and stroke contributing over four-fifths of this burden. Most of the CVD burden comes from premature death. For 2010, it is estimated that CVD will be responsible for 26% of total YLL in Australia, second only to cancer (34%), and 7% of Australia's total YLD. The CVD burden increases markedly with age, particularly from 60 years onwards.

CVD is the most expensive disease group in Australia in terms of direct health-care expenditure. In 2004–05 it cost $5.94 billion—11% of overall recurrent health system expenditure that could be allocated to various diseases (AIHW 2008a).

Coronary heart disease

Coronary heart disease (CHD), also known as ischaemic heart disease, is the most common form of heart disease. There are two major clinical forms—heart attack (often known as acute myocardial infarction or AMI) 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. The chief symptom is a severe and continuous chest pain. In the most serious cases the person can collapse and die if the artery blockage cannot be corrected. 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. These episodes of angina occur when one of the heart's arteries is already significantly narrowed by plaque and cannot meet an extra demand for blood flow, such as with exercise or strong emotion.

Estimates of the burden of disease for 2010 indicate that CHD will be the leading specific cause of disease burden overall (9%), ahead of anxiety and depression (7%) and Type 2 diabetes (6%). Over 80% of the CHD burden is due to premature death.

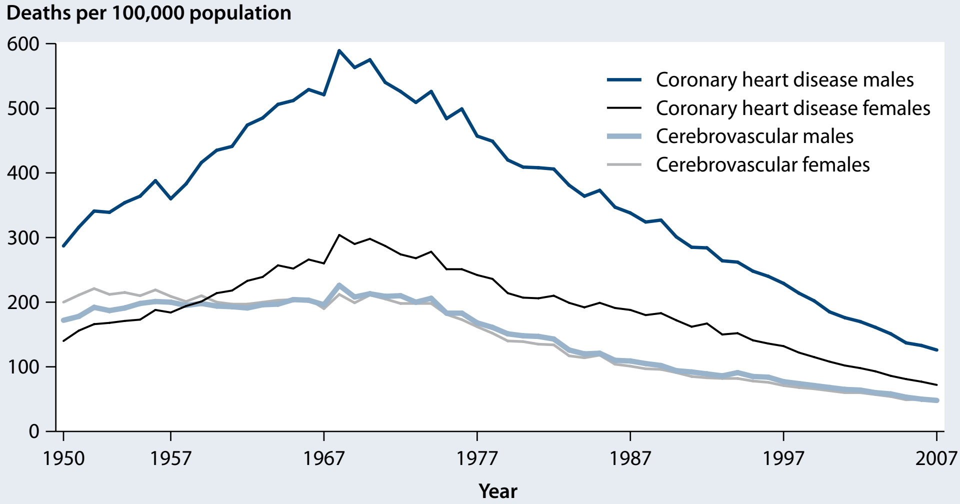
Based on the NHS, an estimated 684,800 Australians had a long-term condition of CHD in 2007–08—353,000 for angina and 449,000 for other ischaemic heart diseases or heart attack—note that a person may report more than one disease. The prevalence of CHD was nearly twice as high for males as for females, at 4.4% and 2.3% respectively. These differences remained after adjusting for differences in age structure.

The prevalence of CHD increases markedly with age. Based on self-reported information in the 2007–08 NHS, around 6.8% of Australians aged 55–64 years had long-term CHD but this increased to 19.9% among those aged 75 years and over.

While there are currently no reliable data on the incidence of CHD in Australia, a proxy measure which counts 'major coronary events' (acute myocardial infarctions (AMIs) or heart attacks) can be calculated from CHD deaths and non-fatal AMI hospitalisations (Jamrozik et al. 2001). It is estimated that both the rate of events and the proportion of people dying after a major coronary event have declined over the past decade (see Chapter 9).

CHD is a major cause of disability in Australia as well as of death. In the 2003 Survey of Disability, Ageing and Carers (SDAC), 1.5% of respondents reported one or more disabling conditions associated with CHD, corresponding to about 303,500 Australians. Of these, almost half (49%) needed help or had difficulties with self-care, mobility or communication.

As with CVD overall, death rates from CHD have fallen rapidly since the late 1960s (Figure 4.5). In the latest decade with available data (1998–2007), the age-standardised CHD death rate fell by around 40% for both males and females. These declines are due to both a reduction in heart attacks and better survival after an event.



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 4.5: Death rates for coronary heart disease and cerebrovascular disease, 1950 to 2007

Despite these gains, CHD remains the largest single cause of death in Australia, accounting for 22,727 deaths (16.5% of all deaths) in 2007. This is mainly due to deaths among older people, with three-quarters of all CHD deaths occurring among those aged 75 years and over, and less than 5% occurring among those aged under 55 years. The male age-standardised CHD death rate in 2007 (126.3 per 100,000 population) was almost 75% higher than the female rate (72.5).

Australia's CHD death rates compare favourably with those of countries such as the United Kingdom, the United States and New Zealand, but they are still almost 3 times as high as in Japan and 2.2 times as high as in France (OECD 2009).

Cerebrovascular disease

Cerebrovascular disease refers to any disorder of the blood vessels supplying the brain and its covering membranes. Most cases of cerebrovascular death are due to stroke. Stroke occurs when a blood vessel to the brain is suddenly blocked by a clot (an ischaemic stroke) or bleeds (a haemorrhagic stroke). This may result in part of the brain dying, leading to a loss of brain function or impairment in a range of activities including movement, thinking and communication, and it may also lead to death. Ischaemic strokes are more common, but haemorrhagic strokes have a higher fatality rate. There can also be temporary strokes (where symptoms disappear within 24 hours), known as transient ischaemic attacks.

This section uses the terms 'cerebrovascular disease' (ICD-10 codes I60–I69) and 'stroke' (ICD-10 codes I60–I64) in their strict meanings as explained above. However, sometimes others have used 'stroke' to mean the wider 'cerebrovascular disease', as shorthand. Thus, the figures presented here may not be comparable to those shown elsewhere.

Cerebrovascular disease is projected to be the sixth leading specific cause of disease burden overall in 2010 (4% of overall burden). Around 70% of the cerebrovascular disease burden comes from premature death.

An estimated 60,000 stroke events occur in Australia every year—one about every 10 minutes (NSF 2010). Most of these (70%) are first-ever strokes (AIHW 2004). Based on self-reported data from the 2003 SDAC, 346,700 Australians in 2003 had had a stroke at some time in their lives. This estimate includes residents in cared accommodation, such as hospitals, hostels and nursing homes, as well as in private dwellings.

The latest estimates of stroke prevalence can be derived from the 2007 SMHWB (ABS 2008). It should be noted when interpreting estimates based on this survey, however, that the scope is smaller than that of the SDAC, being restricted to people aged 16 to 85 years of age and only to residents of private dwellings. This survey indicates that an estimated 322,540 people aged 16–85 years in 2007 had had a stroke at some time. Of those who reported having had a stroke, 72% were aged 60–85 years and almost all the remainder were aged 40–59 years.

Stroke is a significant cause of disability. From the SDAC, about 282,600 persons had a disability in 2003 along with a history of stroke, representing 7% of all people with disability. In about half of these cases, the disability was mainly attributed to the stroke. Stroke survivors with disability were much more likely to have a profound core activity limitation than the average person with disability (AIHW: Senes 2006). This means that the person is unable to achieve, or always needs help with, communication, mobility or self-care.

Estimates from the 2007 SMHWB indicate that 42.5% of people who had had a stroke also had a disability resulting in a mild to profound core activity restriction. As with the SDAC, stroke survivors with a disability were much more likely to report a severe or profound core activity limitation (50.3%) than the average person with disability (29.1%).

Cerebrovascular disease accounted for 11,491 deaths (8.3% of all deaths) in 2007. Stroke (8,623 deaths) and its resulting disorders (2,398) accounted for 96% (11,021) of these deaths. Most of the deaths from cerebrovascular disease (83.9%) occurred among those aged 75 years or over. While a higher number of females died from cerebrovascular disease than males (6,975 compared with 4,516 in 2007), the age-standardised death rate was slightly higher among males (48.4 per 100,000 population compared with 47.6), reflecting the higher death rates for males in most age groups except the very oldest.

As with overall CVD and coronary heart disease, Australia's mortality from cerebrovascular disease has been declining since the early 1970s (Figure 4.5). Age-standardised death rates for cerebrovascular disease fell by 34.2% (males) and 30.3% (females) over the period 1998–2007.

In 2004, cerebrovascular death rates in Australia were low compared with other OECD (Organisation for Economic Co-operation and Development) countries such as Hungary, Portugal, Italy and the United Kingdom, but they were 1.4 times as high as in Switzerland, which had the lowest rates overall, and slightly higher than the rate in the United States (OECD 2009).

Heart failure and cardiomyopathy

Heart failure occurs when the heart functions less effectively in 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. It usually develops slowly, often over many years. People with mild heart failure may have few symptoms, but in more severe cases it can result in chronic tiredness, reduced capacity for physical activity and shortness of breath.

Cardiomyopathy refers to when the entire heart muscle or a large part of it is weakened due to various causes, which include viral infections and severe alcohol abuse. The heart can become enlarged, thickened or dilated. Symptoms include shortness of breath, fatigue, lethargy, palpitations and sometimes chest pains.

Based on 2007–08 NHS self-reports, 277,800 Australians (1.4% of the population) had heart failure or oedema (swelling, which can be a sign of heart failure when it occurs in the lower legs). Around 64% of those with the disease were females, with a prevalence of 1.7% compared with 1.0% for males. The estimated prevalence of heart failure or oedema increased with age from 2.6% in people aged 55–64 years to 8.2% in those aged 75 years and over.

Heart failure and cardiomyopathy accounted for 4,055 deaths in 2007. However, due to the nature of these diseases, they are more likely to be listed as an associated cause of death rather than an underlying cause (see Section 2.6 for more information about underlying and associated causes of death). In 2007, heart failure or cardiomyopathy was the underlying or associated cause of death in 19,967 cases. Most of these deaths occur among people aged 75 years and over (80.9% where it was as an underlying cause and 83.5% where it was recorded as any cause of death in 2007).

More females than males die of heart failure and cardiomyopathy because they generally live longer than males. However, the age-standardised death rate from these diseases is higher for males than females (99.2 deaths per 100,000 population compared with 72.4 for females, based on combined underlying and associated cause of death). Heart failure occurs frequently as an associated cause when the underlying cause of death is kidney failure, coronary heart disease, diabetes or chronic lower respiratory disease.

In recent years there has been a major decline in mortality from heart failure and cardiomyopathy in Australia. Age-standardised death rates for heart failure as an underlying or associated cause of death fell by 26.0% between 1998 and 2007. The decline was similar for males and females. It is not clear whether this trend reflects a fall in the incidence of heart failure as a result of reduced incidence of coronary heart disease or improved care of people with coronary heart disease, or better management of people with heart failure resulting in reduced case-fatality.

Acute rheumatic fever and chronic rheumatic heart disease

Both acute rheumatic fever and rheumatic heart disease are preventable causes of ill health and death. They are particularly a problem in the Indigenous Australian population of northern and central Australia. Acute rheumatic fever is a delayed complication of untreated throat infection with Group A *Streptococcus* bacteria, but may also follow streptococcal skin sores. The infection and illness occur mainly in children and young adults. Rheumatic heart disease is caused by the long-term damage done to the heart muscle or heart valves by acute rheumatic fever. Acute rheumatic fever is believed to be under-reported, partly because it is difficult to diagnose (AIHW: Field 2004).

In 2007, there were 255 deaths with acute rheumatic fever and rheumatic heart disease recorded as the underlying cause of death. They were mentioned as an associated cause of death on another 399 death certificates. The death rates for Indigenous Australian males and females from rheumatic heart disease are far higher than for other Australians (see Box 5.3).

Use of health services

The treatment and care of people with CVD covers a variety of settings and types of care. This section presents data on the care provided by GPs, hospitalisations and the use of medicines. It should be noted that the type and level of treatment for CVD will depend on a number of factors, including the severity of the disease, patient preferences and their ability to access care, and the capacity of the health system to provide different levels of care.

Visits to general practitioners

GPs play an important role in identifying and managing people at risk of CVD, as well as in treating people living with CVD.

CVD is a major reason for people going to see their GP. Based on a survey of 95,898 GP encounters, collected from 953 GPs in Australia in 2007–08, it was the third most common group of problems managed at GP-patient encounters, behind respiratory diseases and general or unspecified conditions (Britt et al. 2008a). CVD accounted for 11.6% of the problems managed by GPs in 2007–08. Within the CVD group of diseases, the most common problem managed was hypertension (high blood pressure), followed by cardiovascular check-up, coronary heart disease and atrial fibrillation/flutter.

Overall, GPs managed cardiovascular problems at a rate of 17.6 per 100 encounters with their patients in 2007–08. Hypertension (high blood pressure) was the problem most commonly managed overall by GPs in 2007–08, at a rate of 9.9 per 100 encounters. Lipid disorders (abnormal blood levels of cholesterol or related substances) were also a common problem managed by GPs (a rate of 3.4 per 100 encounters).

In 2007–08, the proportion of GP encounters where CVD was managed increased substantially with age, but with some levelling off for the oldest age group. Among females, 79% of encounters involving CVD care were for those aged 55 years or more. Males in the 25–64 year age groups had significantly higher rates of GP encounters for CVD problems than females. There was no significant difference in the other age groups (Table 4.4).

Table 4.4: Cardiovascular disease problem rates, April 2007 to March 2008

	Males		Females	
Age group (years)	**Problems per 100 encounters**	**95% CIs**[(a)]	**Problems per 100 encounters**	**95% CIs**
18–24	1.81	1.19–2.44	1.71	1.29–2.13
25–34	4.85	4.03–5.67	2.95	2.51–3.4
35–44	11.37	10.16–12.58	6.82	6.11–7.53
45–54	21.88	20.45–23.31	15.63	14.6–16.66
55–64	30.81	29.1–32.52	26.88	25.47–28.29
65–74	37.60	35.8–39.39	35.87	34.16–37.57
75 and over	37.98	36.04–39.91	39.17	37.49–40.85

(a) Confidence intervals (CIs) are computed for a level of certainty of 95% that the estimated rates vary within the limits of these intervals.

Source: AIHW analysis of BEACH survey of general practice.

Between 1998–99 and 2007–08, there were significant increases in the management rate of hypertension (from 8.3 problems managed per 100 GP encounters to 9.9) and lipid disorders (from 2.5 to 3.7) (Britt et al. 2009).

Hospitalisations

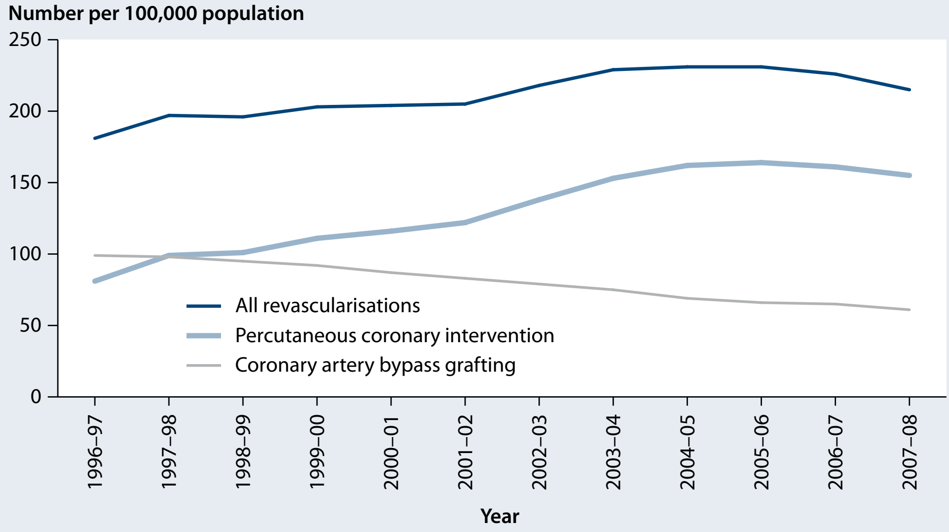
CVD was the principal diagnosis for 475,200 hospitalisations (6.0% of all hospitalisations) in 2007–08. Of these, 34.0% were due to coronary heart disease, 10.4% to heart failure or cardiomyopathy, 7.4% to stroke, 3.1% to transient ischaemic attacks and 0.6% to acute rheumatic fever and chronic rheumatic heart disease. CVD was also recorded as an additional diagnosis in a further 796,500 hospitalisations in that year.

The number and the rate of hospitalisations for CVD increase rapidly with age, with those aged 55 years and over accounting for 78% of hospitalisations. The rate of hospitalisations for CVD is higher for males than females at all ages. The age-standardised rate for males in 2007–08 (2,598 per 100,000 population) was 1.6 times that for females (1,651).

The rate of hospitalisations with CVD as the principal diagnosis has been slowly declining over the past decade. The age-standardised rate declined from 2,337 per 100,000 population in 1998–99 to 2,099 in 2007–08.

Despite this trend in hospitalisations, the number of hospital procedures to diagnose and treat people with CVD has continued to increase. Prominent among these are coronary angiography, percutaneous coronary interventions (PCIs) and coronary artery bypass grafting (CABG). (See Box 4.4 for a description of these procedures.)

Over the period 1996–97 to 2007–08, the rate of PCI procedures almost doubled from 81 to 155 per 100,000 population. In contrast, the rate of CABG procedures declined from 99 to 61 per 100,000 population (Figure 4.6). However, for the first time, the combined rate of these 'revascularisation' procedures declined over the period from 2005–06 to 2007–08.



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Hospital Morbidity Database.

Figure 4.6: Trends in cardiovascular procedures, 1996–97 to 2007–08

Box 4.4: Main procedures used for coronary heart disease

Coronary angiography (also known as coronary arteriography) gives a picture of the heart's arteries, known as the coronary arteries, to find out if and where the coronary arteries are narrowed or blocked. A catheter is inserted into an artery, usually in the groin, then guided back to the heart, where a special dye is injected into the coronary arteries before X-rays are taken. The resulting X-ray images provide detailed information about the health of the heart and arteries. This is an important diagnostic test that medical professionals use to plan treatment options.

Percutaneous coronary interventions (PCIs) are used to restore adequate blood flow to blocked coronary arteries. There are two types of procedure used: (a) coronary angioplasty without stent; and (b) coronary stenting. In coronary angioplasty a small balloon is placed inside the coronary artery at the place of blockage, then it is opened out to clear the blockage. Coronary stenting is similar but involves stents (expandable mesh tubes) that are inserted into the affected part of the artery, expanded and then left there to keep it open.

Coronary artery bypass grafting (CABG) is a surgical procedure using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood flow to the heart muscle. The surgery involves taking a blood vessel from the patient's leg, arm or inner chest and using it to attach to vessels on the outside of the heart in order to bypass a blocked artery.

Use of medicines

Most people with cardiovascular conditions need medicines to treat them—61.9% of the people who reported a cardiovascular condition in the 2007–08 NHS also reported using medicines for it (ABS 2009a).

In 2007–08 there were over 70 million government-subsidised prescriptions for medicines used to prevent or treat CVD, dispensed to over 3.8 million patients. This is an increase of 8.2% in the number dispensed in 2004–05. It should be noted that these figures refer only to those CVD medicines subsidised through the Pharmaceutical Benefits Scheme (PBS) or the Repatriation Pharmaceutical Benefits Scheme (RPBS). Not all patients are eligible to receive a subsidy for all medicines through these schemes. In addition, medicines are available under other schemes (such as the S100 scheme for Indigenous people in remote regions) and other arrangements (such as for admitted patients in hospital).

The most common government-subsidised prescriptions for CVD medicines in 2007–08 were for renin-angiotensin system agents (used to reduce high blood pressure) and lipid-reducing agents (commonly prescribed to control blood cholesterol levels) (Table 4.5). The number of prescriptions for lipid-reducing agents increased by 27.2% between 2004–05 and 2007–08, while prescriptions for antithrombotic medicines (used to prevent or dissolve blood clots) increased by 20.9% (AIHW 2010a).

Table 4.5: Medicines for cardiovascular conditions subsidised through the PBS and RPBS[(a)], 2007–08

ATC	Number of patients	Number of prescriptions dispensed
Antithrombotic medicines	1,096,571	7,191,285
Cardiac therapy medicines	569,958	3,531,732
Antihypertensive medicines	173,854	846,068
Diuretic medicines	695,839	2,479,389
Peripheral vasodilators	572	2,633
Beta-blocking agents	838,427	5,854,199
Calcium-channel blocking agents	883,733	7,657,120
Renin-angiotensin system agents (ACE inhibitors)	2,091,499	20,853,697
Serum-lipid-reducing agents	2,310,334	21,853,719
Total	3,843,268[(b)]	70,269,842

ATC Anatomical Therapeutical Chemical classification.

(a) Excludes those prescriptions and patients with a missing or invalid pin number.

(b) The total is not the sum of each type of medication as patients may be on more than one medication.

Source: AIHW 2010a.

The figures on prescriptions provided above reflect both the large numbers of Australians at risk of or with CVD and the chronic nature of the disease: once people start on these medicines, they usually need to use them for life. However, many people stop taking medicines—in an analysis of adherence to prescribed cardiovascular medicines, 10–25% had discontinued their medicines at 6 months from the start of therapy, rising to 21–47% at 24 months (AIHW: Senes & Penm 2007). The reasons for this may include cost, medicine side effects, treating conditions with no symptoms, patients not understanding their condition or the benefits of treatment, and the complexity of therapy.

4.3 Diabetes

Diabetes mellitus (diabetes) is a chronic condition marked by high levels of glucose in the blood. This condition is caused by the inability to produce insulin (a hormone produced by the pancreas to control blood glucose levels), the insulin that is produced becoming less effective, or both (WHO 1999). Diabetes is on the rise in Australia and across the world, and some authors refer to it as an epidemic (Barr et al. 2006; Colagiuri et al. 2006; Colagiuri et al. 2005). The increase in the number of people with diabetes is thought to be intertwined with Australia's marked increase in the prevalence of obesity (Colagiuri et al. 2006). See Chapter 3 for information on obesity trends.

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). Together with these complications, diabetes places a large burden on individuals with the condition, their families and the community (Begg et al. 2007).

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 4.5).

Box 4.5: Main types of diabetes

Type 1 diabetes is an auto-immune condition that mainly occurs in children or young adults, although it can occur 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 thought to be triggered by a combination of genetic and environmental factors, and currently there is no known way to prevent the disease. Type 1 accounts for around 10–15% of all diabetes cases.

Type 2 diabetes is the most common form of diabetes, occurring mostly in people aged 50 years and over, and accounting for 85–90% of all cases. Although still uncommon in childhood, Type 2 diabetes is becoming increasingly recognised in that group. People with Type 2 diabetes produce insulin but may not produce enough or cannot use it effectively. Type 2 diabetes may be managed with changes to diet and exercise, oral glucose-lowering drugs, insulin injections or a combination of these.

Gestational diabetes is a form of diabetes that develops during pregnancy in some females. It involves higher blood sugar levels appearing for the first time during pregnancy in females not previously diagnosed with other forms of diabetes. This type of diabetes is short-term and, although it usually disappears after the baby is born, can recur in later pregnancies. Gestational diabetes is also a marker of increased risk of developing Type 2 diabetes later in life. Some cases of gestational diabetes are managed with changes to diet and exercise, and some require insulin treatment.

Risk factors differ by type of diabetes. Type 1 diabetes is believed to be caused by particular biological interactions and exposure to environmental agents among genetically predisposed people (Atkinson & Eisenbarth 2001). For Type 2 diabetes, strong risk factors include age, having a family history of the condition and certain ethnic backgrounds, such as Southern Asian, Middle Eastern, Polynesian, or Aboriginal and Torres Strait Islander. While these risk factors cannot be changed, there are also a number of modifiable risk factors for Type 2 diabetes—notably obesity, physical inactivity and an unhealthy diet (Shaw & Chisholm 2003). Therefore, Type 2 diabetes is highly preventable. The metabolic syndrome—the clustering of a number of risk factors including abdominal obesity, abnormal blood glucose levels, raised blood pressure and abnormal blood lipids—substantially increases the risk of Type 2 diabetes (Chew et al. 2006). The risk factors for gestational diabetes are similar to those for Type 2 diabetes, with females being at higher risk of the condition if they are obese or aged over 30 years when pregnant (Virjee et al. 2001).

Incidence

Because Type 2 diabetes usually has no clear-cut beginning and is often under-diagnosed, it is difficult to estimate how frequently it is arising each year and if this incidence is increasing. However, good information on the incidence of Type 1 diabetes is available from the National Diabetes Register (NDR; see Box 4.6). The register also provides information on other types of diabetes but only for the cases where insulin is used to treat the disease. In 2007, 987 new cases of Type 1 diabetes in children aged under 15 years were recorded (AIHW 2009c). This equates to an annual incidence of 24.2 cases per 100,000 children (around 1 in 4,000) and represents a 30% increase in the rate of new cases compared with that in 2000 (19.1 per 100,000 population). This increase in the incidence of Type 1 diabetes in Australian children is consistent with international trends (DIAMOND Project Group 2006) as well as with the findings of previous Australian studies (Chong et al. 2007; Haynes et al. 2004; Taplin et al. 2005).

The NDR also records new cases of Type 1 diabetes among adults. In 2007, there were 443 new cases of Type 1 diabetes in people aged 15–24 years, equating to an incidence rate of 15.1 cases per 100,000 population. A further 489 (10.9 cases per 100,000) and 437 (4.6 cases per 100,000 population) occurred in people aged 25–39 years and 40 years and over respectively.

Box 4.6: National Diabetes Register

The National Diabetes Register (NDR) is a confidential database established in 1999 to collect information about new cases of insulin-treated diabetes—that is, all new cases of Type 1 diabetes and all other new cases of individuals needing insulin treatment, whether Type 2, gestational or other types of diabetes. The register is operated by the Australian Institute of Health and Welfare, using data from the National Diabetes Services Scheme and the Australasian Paediatric Endocrine Group.

The NDR holds diabetes-related information on all cases for which the insulin treatment began on or after 1 January 1999, and who have consented to be included. The register aims to cover all new cases of Type 1 diabetes since 1999 because they all require insulin treatment. However, not all Type 2 and gestational diabetes cases require insulin treatment so those that do not are excluded from the register.

For children aged 0–14 years, the NDR receives information about new cases of insulin-treated diabetes from two sources, providing reliable estimates of Type 1 diabetes incidence in this age group, with an estimated coverage rate of 97%. With ethics approval, researchers are able to use the register as an important source for clinical and population studies of the causes, complications and patterns of diabetes.

Of the people who were registered on the NDR between 2000 and 2007, around 69% were found to have Type 2 diabetes and 15% Type 1. At diagnosis, 65% of registrants were aged 45 years or over and 10% were aged under 25 years (AIHW 2009c).

Between 2000 and 2007, an estimated 128,400 Australians began using insulin to treat their Type 2 diabetes. This estimate does not include people with Type 2 diabetes who are not using insulin to manage their diabetes.

Estimates of the incidence of gestational diabetes can be obtained from data on hospitalisations (AIHW: Templeton & Pieris-Caldwell 2008). During 2007–08, about 14,400 (5.0%) of females aged 15–49 years who gave birth in hospital had been diagnosed with gestational diabetes, with more than one-third of cases occurring among females aged 35 years and over. The incidence of gestational diabetes increased by more than 30% between 2000–01 and 2006–07, but the upward trend did not continue through to 2007–08.

Prevalence

There are three main sources of national data for monitoring diabetes prevalence in Australia. The first is the NHS, in which prevalence estimates are based on self-reported information. The second is the National Diabetes Services Scheme (NDSS) database, in which prevalence estimates are based on doctor- or nurse-certified diabetes status for people registering with the scheme. The third national source, the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab study), estimated diabetes prevalence from measured blood glucose levels (Dunstan et al. 2001).

Measured data such as those collected in the AusDiab study can be used to estimate the total prevalence of diabetes, which includes those with diagnosed diabetes (also captured in the NHS and NDSS) and those who have not previously been diagnosed with the condition. The accuracy of self-reported data, such as those collected in the NHS, relies on respondents being aware of and accurately reporting their health status, and that of the certified diabetes status data from the NDSS relies on people visiting a doctor and voluntarily registering with the scheme. Undiagnosed cases of diabetes will not be counted in these data sources.

Although they do not capture total diabetes prevalence, the NHS and NDSS, which are updated regularly, provide recent information and are useful for producing trends on the prevalence of diagnosed diabetes in Australia (AIHW 2009d).

It is estimated that over 818,200 persons (4.0% of the population) in 2007–08 had been told by a doctor or nurse that they had diabetes (excluding those with gestational diabetes). The age-standardised rate of 3.8% is an increase from the age-standardised rate reported in the 2004–05 NHS (3.3%). Type 2 diabetes accounted for 88% of all people with diabetes, 10% reported Type 1, and 2% reported they did not know the type. Males had higher rates of diabetes than females (5% and 3% respectively) (ABS 2009b). The prevalence of diagnosed diabetes according to the 2007–08 NDSS is similar at 3.9% (AIHW 2009d).

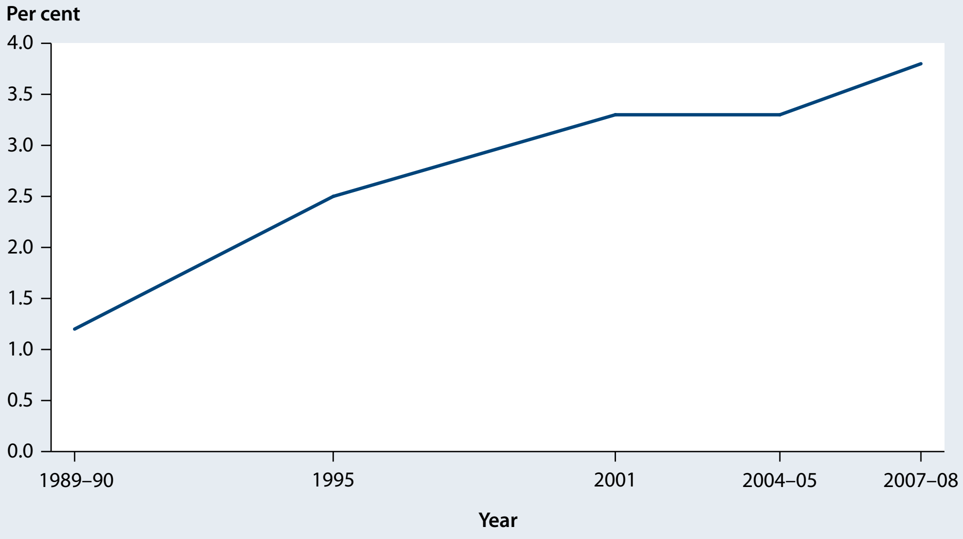
There are no current data available to estimate the prevalence of undiagnosed diabetes, with the most recent data coming from the 1999–2000 AusDiab study.

Population groups

Some population groups are at higher risk of diabetes than the general Australian population. Data from the 2007–08 NHS show that there are higher rates of diabetes reported among Australians born overseas (4.2%), the most socioeconomically disadvantaged fifth of the population (5.9%) and people living in outer regional, remote and very remote areas (4.1%) compared with the general Australian population (4.0%). Estimates from the 2004–05 National Aboriginal and Torres Strait Islander Health Survey showed that the age-standardised prevalence of diabetes among Indigenous Australians was nearly 3 times that of non-Indigenous Australians (11% and 4% respectively) (AIHW 2008b). This can be mostly attributed to Type 2 diabetes.

Trends

The prevalence of diagnosed diabetes based on self-reported information has trebled since 1989–90 (Figure 4.7). In 1989–90, it was estimated that nearly 193,000 (1.3%) Australians had diagnosed diabetes. This increased to more than 818,000 (3.9%) in 2007–08. Although an increase in the incidence of Type 2 diabetes is likely to have played a major role in these trends, rising awareness in the community, better detection and better survival may have also contributed to the increase.



Notes

1. Directly age-standardised to the Australian population as at 30 June 2001.
2. Based on self-reported data.

Source: AIHW analysis of the ABS NHSs: 1989–90 (basic confidentialised unit record file—CURF), 1995 (basic CURF), 2001 (expanded V2 CURF), 2004–05 (expanded CURF) and 2007–08 (expanded CURF).

Figure 4.7: Trend in the prevalence of diagnosed diabetes, 1989–90 to 2007–08

Complications of diabetes

Diabetes complications can arise early in the course of the disease or develop over a number of years. Short-term complications are considered a medical emergency and may lead to coma and death in a short time. These include a condition known as diabetic ketoacidosis that can occur from a severe lack of insulin in those with Type 1 diabetes and another condition called hypoglycaemia (low blood glucose) that is a complication of insulin treatment. There is limited statistical information about short-term complications, although it has been found that 4.6% of Australians with diabetes who attended specialist diabetes services in 2006 had suffered at least one episode of severe hypoglycaemia in the previous 12 months (Flack & Colagiuri 2005).

Long-term complications include disease of the large blood vessels (macrovascular disease) that leads 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 (CKD), nerve damage and retinopathy (loss of vision).

Estimates from the 2007–08 NHS show that the prevalence rate of stroke among people with diabetes was 5 times the rate of those without diabetes. The prevalence of heart attack among people with diabetes was more than 10 times the rate among those without diabetes, and the rate of angina was around 3 times as high. Specific eye health problems such as glaucoma, cataract and blindness were also much more commonly reported by people with diabetes than by those without it (12, 16 and 19 times as high respectively).

Type 2 diabetes is the most common cause of severe kidney disease in Australia. In 2007, diabetic nephropathy was the primary reason for 713 Australians (representing 31% of all new cases) starting kidney replacement therapy (dialysis or kidney transplant) (McDonald et al. 2008). Ninety per cent of these cases were Type 2 diabetes. As well as being a cause of severe kidney disease, diabetes often occurs alongside it; that is, the two diseases are comorbid conditions. In 2007, 42% of Australians beginning kidney replacement therapy had diabetes and the majority had Type 2 diabetes (McDonald et al. 2008).

Disability and functioning

It is estimated from the 2003 SDAC that 56% of people with diabetes also had a disability. Of these, 42% had a profound or severe core activity limitation, indicating that they were unable to do, or always/sometimes needed help with, functions such as self-care, mobility and communication. Disability among people with diabetes was more common at older ages: 67% of those with diabetes aged 65 years and over reported a disability compared with 46% of those aged less than 65 years. Twenty-four per cent of people with diabetes and a disability reported that diabetes was the main condition causing their disability.

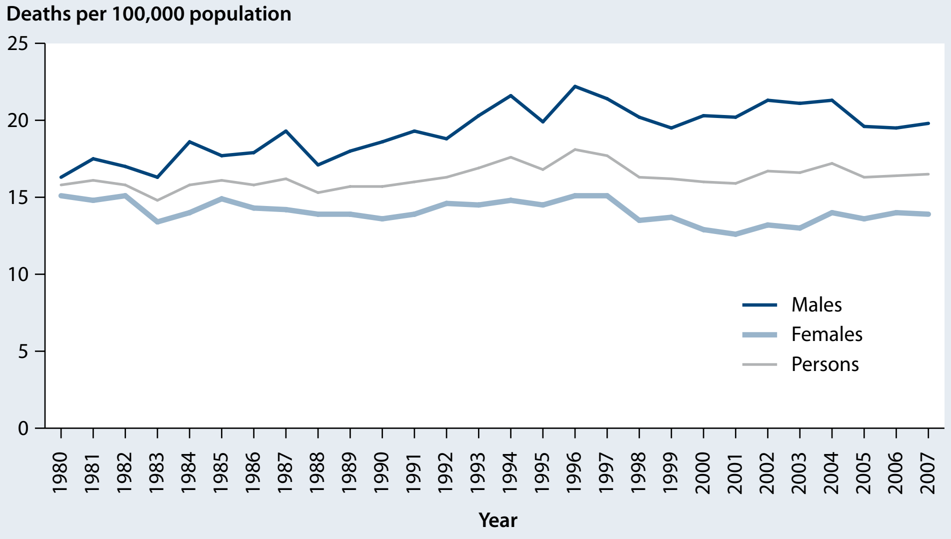
Mortality

A total of 13,101 deaths in Australia in 2007 were caused to some degree by diabetes (9.5% of all deaths). It was listed as the underlying cause of 3,810 deaths (2.8% of all deaths) and as an associated cause in 9,291 deaths (6.7% of all deaths).

Where diabetes was the underlying cause of death, common conditions listed as associated causes included coronary heart disease (in 64% of cases), kidney-related diseases (32%), heart failure (19%) and stroke (17%). When diabetes was listed as an associated cause, coronary heart disease was the most common underlying cause of death (27% of cases), followed by stroke (7%), kidney-related diseases (2%) and heart failure (2%).

Between 1980 and 2007, the age-adjusted death rate from diabetes as an underlying cause increased by 4% from 15.8 to 16.5 per 100,000 population (Figure 4.8). This change was driven by diabetes death rates among males, which increased by 21% over the 27-year period: from 16.3 to 19.8 per 100,000 population. However, most of this increase was in the first half of the period, with rates remaining fairly stable since the mid-1990s. By contrast, the corresponding rate of diabetes deaths among females decreased by 8% over the same period: from 15.1 per 100,000 population in 1980 to 13.9 per 100,000 population in 2007.

The death rate for diabetes increases progressively with age: about 87% of people who died with diabetes as an underlying or associated cause of death in 2007 were aged 65 years or over. Males were more likely to die from diabetes as any cause of death than females, with age-standardised death rates of 78 and 50 per 100,000 respectively.



Note: Directly age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 4.8: Death rates for diabetes as the underlying cause of death, 1980 to 2007

Burden of disease

Using a conservative estimate, diabetes is projected to be the sixth leading cause of burden of disease and injury in Australia in 2010, responsible for nearly 6.6% of the total disease burden. However, this estimate does not include the contribution of diabetes to coronary heart disease and stroke. When these effects are included, the burden attributable to diabetes increased from 5.5% to 8.3% in 2003 (Begg et al. 2007).

Type 2 diabetes is estimated to account for the great majority (94%) of the diabetes burden in 2010. The ranking of Type 2 diabetes as a cause of disease burden has increased over time: from sixth among the 20 leading causes of disease burden for both males and females in 1993 to second for males and third for females in 2010. Type 2 diabetes is projected to be the leading specific cause of disease burden by 2023 for males and second for females.

Use of health services

Diabetes is a complex and long-term condition that requires a variety of health services to manage it. The first aim of diabetes management is to prevent complications, mainly by maintaining normal blood glucose levels. The second is to detect and treat any complications early. This requires frequent attention and monitoring by patients, their doctors and other health professionals.

People with diabetes are therefore more likely than others to consult health professionals or use hospital services. Recent data suggest that the use of health services by those with diabetes is increasing. This may reflect the increasing number with diabetes, but may also reflect better management and increased awareness of the disease and its complications.

Visits to general practitioners

According to the 2007–08 Bettering the Evaluation and Care of Health (BEACH) survey, diabetes was the third most frequently managed chronic condition and represented 2.5% of all problems managed by GPs that year, at a rate of 3.9 per 100 encounters (Britt et al. 2008a). There has been a statistically significant increase in this rate since 1998–99, when the corresponding figure was 2.6 per 100 encounters (Britt et al. 2008b).

In 2007–08, GPs made 6.1 referrals to specialists and 5.3 referrals to allied health professionals for every 100 diabetes problems managed (Britt et al. 2008a). Of all referrals by GPs in this period, one in 200 (0.5%) were to diabetes educators.

Hospitalisations

Diabetes was the principal diagnosis for 92,740 hospitalisations in 2007–08 and an additional diagnosis for 575,511 hospitalisations. These 668,251 diabetes-associated hospitalisations accounted for 8.5% of all hospitalisations in that year. The rates increased with age, with 60% of such hospitalisations occurring among people aged 65 years and over.

Hospitalisation rates involving any diagnosis of diabetes increased by 58% between 2000–01 and 2007–08: from 19 to 30 hospitalisations per 1,000 persons. This increase is also apparent in the proportion of hospitalisations involving diabetes: in 2000–01 diabetes was a diagnosis in 6% of all hospitalisations and by 2007–08 this had risen to 8.5%. This increase is likely to be due to a number of factors, including increasing prevalence, changes in treatment patterns and the ageing of the population. There may also be some changes in how diabetes is recorded in hospital records.

As well as accounting for a large and increasing proportion of total hospitalisations, those involving any diagnosis of diabetes are likely to involve a longer stay in hospital. The average length of stay of diabetes-associated hospitalisations was 4.8 days in 2007–08, considerably longer than the overall average of 3.3 days. When diabetes was the principal diagnosis the average length of stay was 4.2 days, less than the average of 5.7 days when diabetes was an additional diagnosis.

The reasons for hospitalisation among people with diabetes are diverse. Cardiovascular diseases were the most common principal diagnoses for diabetes-related hospitalisations (6%). When diabetes was listed as the principal diagnosis, more than one-third (34%) of the cases were for eye complications of diabetes, followed by multiple complications (13%), and poor diabetes control and kidney complications (each 7%). When diabetes was listed as an additional diagnosis, multiple complications accounted for nearly half (48%) of the diabetes diagnoses.

International comparisons

Among the OECD countries (of which there are currently 30), Australia is estimated to have the seventh lowest prevalence of diabetes in 2010, with an estimated 5.7% of the population aged 20–79 years diagnosed with the condition (IDF 2009). On the other hand, the incidence of Type 1 diabetes among 0–14 year olds in Australia is estimated to be the sixth highest of all these countries, with around 22 new cases per 100,000 in 2010 (IDF 2009).

4.4 Chronic kidney disease

Chronic kidney disease is the occurrence of kidney damage and/or reduced kidney function, lasting at least 3 months. The kidneys continuously filter the bloodstream, clearing waste products and playing a vital role in controlling the body's level of water and various chemicals. They also produce certain essential hormones. CKD is categorised into five stages according to the level of reduced kidney function and evidence of kidney damage (see Box 4.7), such as blood or protein in the urine. Stage 5—end-stage kidney disease (ESKD)—is the most severe form of CKD, where kidney function deteriorates so much that kidney replacement therapy in the form of dialysis or kidney transplant is required to survive.

Many people do not know they have kidney disease because up to 90% of kidney function can be lost before symptoms appear. For this reason it is often called a 'silent killer'. Fortunately, simple tests of a person's urine and blood can identify most cases of CKD when the disease is in its early stages, enabling treatment to prevent or slow down the progression.

Box 4.7: Stages of chronic kidney disease

Stages of chronic kidney disease (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, gender and creatinine levels in the blood.

Stage 1: Kidney damage with normal kidney function (eGFR ≥ 90)

Usually no symptoms but high blood pressure is more frequent than for patients without CKD.

Stage 2: Kidney damage with mild loss in kidney function (eGFR 60–89)

Most patients have no symptoms but high blood pressure is frequent.

Stage 3: Moderate loss of kidney function (eGFR 30–59)

Possibly no symptoms, or may experience an increased need to urinate during the night (nocturia), a mild feeling of being ill and loss of appetite. Common complications include high blood pressure, mineral and bone disorders, anaemia, sleep apnoea, restless legs, cardiovascular disease, malnutrition and depression.

Stage 4: Severe loss of kidney function (eGFR 15–29)

Symptoms are as for stage 3, plus nausea, itching skin, restless legs and shortness of breath. Common complications of this stage are also as for stage 3, along with electrolyte disturbances such as raised blood levels of phosphate and potassium and increased acidity of the blood.

Stage 5: End-stage kidney disease (eGFR <15 or on dialysis)

Symptoms are as for stage 4. Additional common complications include inflammation of the tissue layers surrounding the heart, bleeding in the gastrointestinal tract, altered brain function and structure, disturbances or structural or functional changes in the peripheral nervous system.

Source: Kidney Health Australia 2007.

CKD is preventable in many cases, with the most modifiable risk factors being tobacco smoking, overweight and obesity, high blood pressure and diabetes. If a person has multiple risk factors this can considerably increase their risk of developing CKD (AIHW 2005a). The leading cause of new cases of ESKD is diabetic nephropathy—a condition where consistently high blood sugar levels damage the blood-filtering capillaries in the kidneys. The next most common causes are glomerulonephritis—inflammation of part of the filtering units of the kidney—and high blood pressure.

CKD contributes considerably to the burden of disease in Australia (see Chapter 2 for an explanation of 'burden of disease'). It can arise from a number of underlying causes, however, so the burden is often reported under these rather than grouped as CKD. For the year 2003, kidney failure accounted for 5.1% of YLL, 0.3% of YLD, and 2.6% of the total burden of disease (Begg et al. 2007). Any CKD burden not confined to kidney failure cannot currently be separately reported.

Incidence and prevalence

Estimating the incidence and prevalence of CKD and all its stages in Australia is difficult because it often goes undetected until the late stages. However, the incidence and prevalence of treated ESKD can be accurately determined using data from the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA), which compiles data on the number of people receiving kidney replacement therapy (see later section on 'Treatment of end-stage kidney disease').

The best way to estimate the total prevalence of CKD is through surveys in which blood and urine are taken for measurement. The most recent national survey that collected such information was the 1999–2000 AusDiab. The study did not collect information that could be used to assess kidney function on two occasions three months apart, so its estimates may include some cases of acute kidney disease. Despite this, it provides the best prevalence estimate of diagnosed and undiagnosed CKD in Australia to date.

The AusDiab study found that a total of 16% of participants had at least one indicator of kidney damage (Atkins et al. 2004; Chadban et al. 2003). Over 1 in 7 (13.4%) Australians aged 25 years or over had some degree of CKD (AIHW 2009e) and more than half of these were in stages 3–5. Highlighting CKD's relationship with age, 30% of those aged over 65 years had CKD stages 3–5.

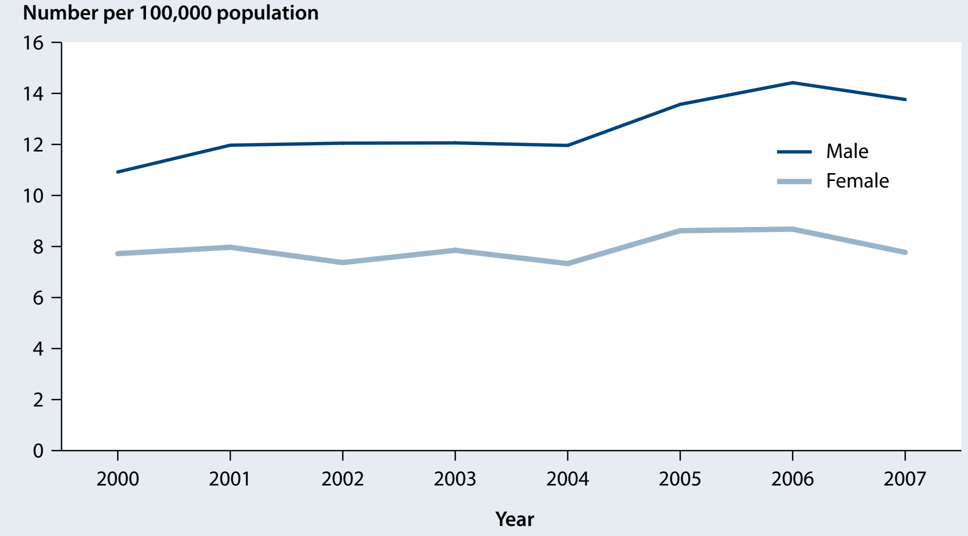
Dialysis and transplant, known as kidney replacement therapy, are used to treat people with ESKD. Virtually all patients receiving this treatment are recorded on ANZDATA. Because not all people will be suitable candidates for kidney replacement therapy, and others may choose not to take it up, the numbers presented below will be an underestimate of the incidence and prevalence of ESKD among the whole community.

In 2007, just over 2,300 people began treatment for ESKD. Among these, males outnumbered females at almost twice the rate (13.8 per 100,000 population compared with 7.8 per 100,000 population). The rate of new patients increased with age, being highest among those aged 80–84 years for males (74 per 100,000) and 75–79 for females (35 per 100,000). The average age of patients beginning treatment has steadily and markedly increased over time—from 44.5 years in 1978 to 55.2 years in 1997, and to 60.2 years in 2007 (ANZDATA 1979; Disney et al. 1999; McDonald et al. 2008).

Between 2000 and 2007 the overall incidence of treated ESKD increased by 19%, from 9.2 to 10.6 per 100,000 population; however, most of this increase was between 2004 and 2007 (Figure 4.9). Changes over time in the incidence rate of treated ESKD vary between age groups, with much of the increase occurring in those aged over 65 years (AIHW 2005a). The reasons for this are complex, and the increasing prevalence of diabetes, the high prevalence of blood pressure in the past, and the reduced cardiovascular mortality are all possible contributors. In addition, treatment programs have been increasingly willing to accept older patients (Stewart et al. 2004).

In 2004, diabetic nephropathy became the leading cause of new cases of treated ESKD, overtaking glomerulonephritis (McDonald et al. 2008). Of the new cases of treated ESKD in 2007, the major underlying disease causes were diabetic nephropathy (31%), glomerulonephritis (25%) and high blood pressure (16%). Over the period 2000 to 2007 the number of new cases of ESKD attributed to diabetic nephropathy increased by two-thirds in those aged 55 years and over. Glomerulonephritis remains the major cause of ESKD in those aged less than 55 years (AIHW 2009e).

At the end of 2007, around 9,600 Australians were receiving kidney dialysis, of which 78% were receiving haemodialysis and 22% peritoneal dialysis. There were also just over 7,100 people living with a functioning kidney transplant, of which 615 had been transplanted in 2007 (McDonald et al. 2008).

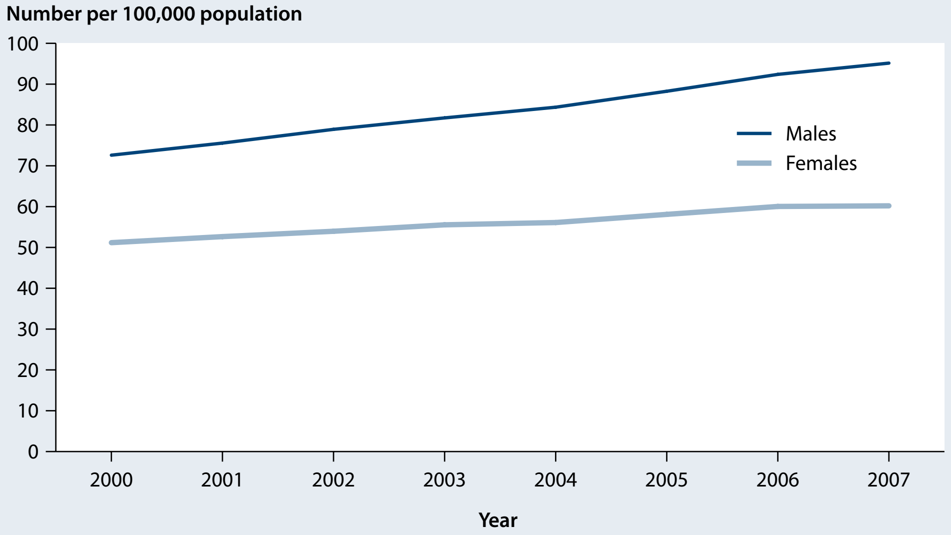


Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of ANZDATA data.

Figure 4.9: Trends in incidence of treated end-stage kidney disease, 2000–2007

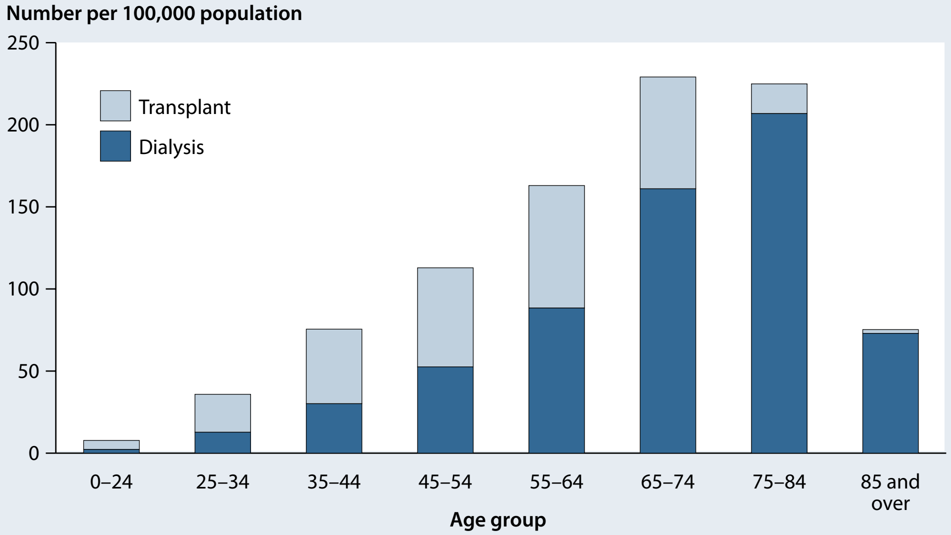
The prevalence of people receiving dialysis or with a transplant increased significantly between 2000 and 2007 (Figure 4.10), particularly in males. The increase was 31% for males (from 73 to 95 per 100,000 population) and 19% for females (from 51 to 60 per 100,000). The age profile of people receiving treatment for ESKD highlights the higher prevalence of ESKD in older Australians (Figure 4.11), with the highest population rates being among those aged 65–84 years.



Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of ANZDATA data.

Figure 4.10: Trends in prevalence of treated end-stage kidney disease, 2000–2007



Source: AIHW analysis of ANZDATA data.

Figure 4.11: Prevalence of people on dialysis or living with a functioning transplant, by age group, 2007

Deaths

CKD is a significant contributor to mortality in Australia. Those with the most severe stage of the disease will die within a matter of weeks without dialysis or transplant, and those with earlier stages of the disease are at increased risk of death from other causes such as CVD.

In 2007, CKD was recorded as contributing to over 13,000 (10%) of deaths, with 'chronic kidney failure' and 'unspecified kidney failure' the two leading types of CKD recorded as the underlying or associated cause. CKD was listed as the underlying cause in 23% of these deaths (1,367 male and 1,647 female). CVD and cancer were the two most common causes of death where CKD was recorded as an associated cause. The male and female mortality rates for CKD as the underlying cause of death remained relatively stable between 2000 and 2007.

ANZDATA collects information on the survival of people receiving kidney replacement therapy. For the period 2003–2005, the 3-year survival of patients receiving haemodialysis was 64%, changing little since 1994–1996. Conversely, there was some improvement in the survival of people receiving peritoneal dialysis, increasing from 54% to 64%. For people who have received a kidney transplant, survival outcomes are far more favourable. The most recent 5-year data for those who had a kidney transplant in 2001–2002 show a 90% survival outcome for deceased donor kidney transplants and a 95% survival for live donor kidney transplants. However, at least some of this extra survival is likely to be because patients that are eligible for transplants are healthier on average than others with ESKD (McDonald & Russ 2002).

Comorbidity

CKD often presents in combination with another disease. It can be caused by other diseases or be the cause of them. In particular, CKD is often caused by diabetes and this further increases the risk of cardiovascular events such as heart attacks. A number of risk factors for CKD also apply to other chronic diseases such as CVD and diabetes, and these conditions are in turn also risk factors for CKD.

Data from hospitals and death certificates illustrate this connection (Table 4.6). In 2007–08, 73% of hospital cases where CKD was involved also had a diagnosis of diabetes or CVD, and 42% had a diagnosis of all three. Additionally, 79% of deaths involving CKD in 2007 also had diabetes or CVD listed as a contributing factor, with 17% listing all three. It is important to note that there are some differences in coding practices for diabetes in hospital and mortality data (AIHW: Phillips 2003).

Table 4.6: Comorbidity of chronic kidney disease with cardiovascular disease and diabetes: hospitalisations and deaths (per cent)

	Hospitalisations 2007–08	Deaths 2007
CKD only	26.9	21.3
CKD and CVD (without diabetes)	24.7	58.3
CKD and diabetes (without CVD)	6.6	3.5
CKD, diabetes and CVD	41.8	16.9
Total CKD	**100.0**	**100.0**

Sources: AIHW National Hospital Morbidity Database; AIHW National Mortality Database.

Use of health services

Visits to general practitioners

GPs are the usual source of initial assessment and diagnosis of CKD. In 2008–09, CKD problems were managed at a rate of 5 per 1,000 GP encounters. This equates to just over 565,000 Medicare-paid GP consultations across Australia.

Hospitalisations

People with CKD, particularly those with ESKD, often require hospitalisation for treatment and management. The vast majority of hospitalisations are for regular (same-day admission) dialysis, which is the most common reason for hospitalisation in Australia. In 2007–08 there were nearly 987,000 hospitalisations for regular dialysis, 12.5% of all hospitalisations that year.

People with CKD are also hospitalised for other reasons besides dialysis. In 2007–08, there were almost 31,200 hospitalisations where CKD itself, not dialysis, was recorded as the principal diagnosis. In these cases the average length of stay was 4.4 days, above the average across all hospitalisations (excluding same-day admissions) of 3.2 days. Kidney tubulo-interstitial diseases were the largest diagnosis group for CKD (7,230 hospitalisations) followed by diabetic nephropathy (6,141 hospitalisations), which also had the longest average length of stay (7.8 days).

Nearly 167,600 hospitalisations occurred in 2007–08 where CKD was recorded as an additional diagnosis. Principal diagnoses recorded for these hospitalisations included CVD (35,498), endocrine, nutritional and metabolic disorders—excluding diabetic nephropathy—(14,334), and respiratory diseases (14,321).

Information from ANZDATA shows that the number of patients receiving kidney dialysis has increased since 2000 and trends in hospitalisations for dialysis reflect this. Hospitalisations for CKD that do not involve dialysis have also been increasing. From 2000–01 to 2007–08, hospitalisations where CKD (excluding dialysis) was the principal diagnosis increased by 12% from 125 to 140 per 100,000 people. Hospitalisations where CKD was an additional diagnosis increased by 48% from 515 to 735 per 100,000 people.

Treatment of end-stage kidney disease

Over half (57%) of patients receiving haemodialysis in 2007 did so at specialised dialysis units known as satellite centres (these are still captured in hospital data), while 30% received it at a hospital and the remaining 13% performed haemodialysis at home. Since 2000, the number of people having haemodialysis markedly increased—from 4,670 to 7,536 in 2007. The number using peritoneal dialysis also increased in that period, from 1,739 to 2,106. However, over the same period the proportion using peritoneal dialysis steadily declined from 27% to 22% of the dialysis population, reflecting the larger increase in haemodialysis use.

Transplantation is considered the preferred option for kidney replacement therapy by patients and health-care professionals (Mathew et al. 2005). Kidney transplantation is not a cure for ESKD, however; recipients live with the possibility of chronic rejection and the loss of the donor kidney (CARI 2007).

As at 31 December 2007, around 14% of patients receiving dialysis were on the kidney transplant waiting list. A number of factors can prevent people from being considered for kidney transplantation in Australia. They include age, other health conditions beside CKD, obesity, smoking, drug and alcohol abuse, or having a history of not taking appropriate medications while on dialysis (Ibels et al. 2009). The rate of organ donation in Australia is low compared with other developed countries, and the largest transplant waiting list by far is for a kidney transplant (ABS 2002a). Once a person is on the kidney transplant waiting list, their average waiting time for a deceased donor is around 3–4 years (Kidney Health Australia 2006). 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).

About 56% of kidney transplants performed in 2007 were from a deceased donor and the great majority (93%) were for people aged under 65 years. Most people (89%) who received a transplant had previously been on dialysis, whereas transplantation was the first mode of replacement therapy for the other 11% (pre-emptive transplants).

Although the number of deceased donor transplants decreased slightly over the 20 years from 1987 to 2007, the number of kidney transplant operations each year increased by more than 50%. This is due to a more than sixfold increase over the period in the number of live donor transplants performed each year.

Prevention and early detection

As with many chronic conditions, a healthy lifestyle is the basis for preventing many types of CKD, as well as being an important part of managing the condition when it occurs. Behaviours such as maintaining a healthy weight, undertaking regular physical activity, eating a healthy diet and not smoking help to prevent CKD, as well as preventing and controlling other conditions such as diabetes and high blood pressure that can cause CKD (Tan & Johnson 2008).

Clinical guidelines recommend that people at increased risk of CKD undergo 12-monthly urine, blood pressure and eGFR testing (Thomas 2007). This includes people who: are aged over 50 years, have diabetes and/or high blood pressure, smoke, are obese, have a family history of kidney disease, or who are of Aboriginal and Torres Strait Islander descent (Kidney Health Australia 2007). Early detection of CKD can slow or prevent its progression to ESKD by providing patients with access to disease-specific and non-specific interventions (Thomas 2007). Once cardiovascular risk factors (hypertension, high cholesterol and so forth) are diagnosed, it is especially important to modify them because CKD is also a cardiovascular risk factor (Tan & Johnson 2008).

4.5 Mental health problems and illnesses

Mental illness comprises a wide spectrum of disorders with varying degrees of severity. Examples include anxiety, depression, bipolar disorders and schizophrenia. The effect of mental illness can be severe on the individuals and families concerned, and its influence is far-reaching for society as a whole. Social problems commonly associated with mental illness include poverty, unemployment or reduced productivity, violence and crime. Those with mental illness often experience human rights problems such as isolation, discrimination and being stigmatised (WHO 2003).

Prevalence

The 2007 SMHWB (see Box 4.8) estimated that 1 in 5 Australians aged between 16 and 85 years experienced one or more of the common mental disorders in the 12 months before the survey. These were mood disorders (such as depression), anxiety disorders and substance use disorders. An additional one-quarter of those surveyed, while not experiencing one of these disorders in the 12 months beforehand, had done so at some time in the past. Thus, 45% of respondents had experienced a mental disorder in their lifetime. This equates to 7,286,600 Australians aged 16 to 85.

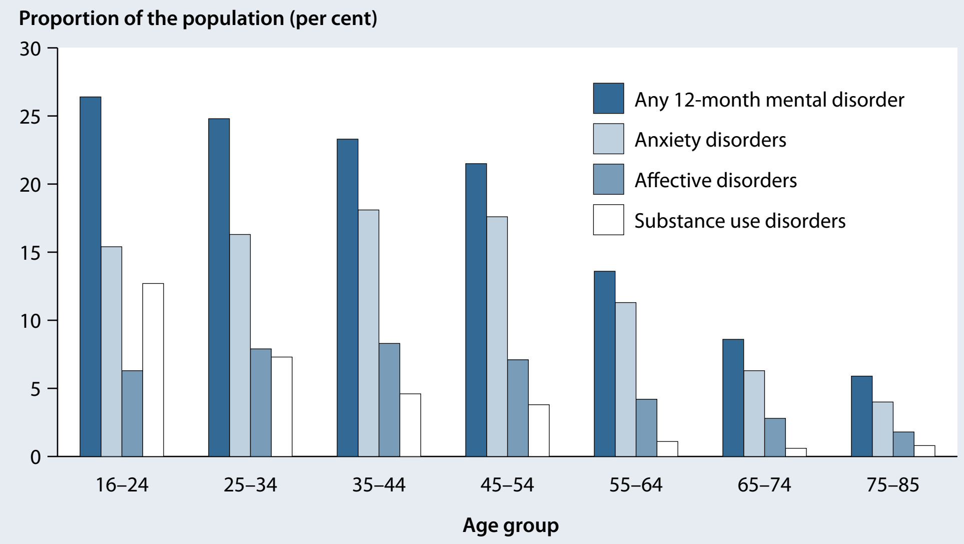
Box 4.8: Measuring the prevalence of mental health problems

Data on the prevalence of mental health problems used in this section come from two main sources:

- The second National Survey of Mental Health and Wellbeing was conducted by the Australian Bureau of Statistics (ABS) in 2007. This survey used the World Mental Health Survey Initiative version of the World Health Organization's Composite International Diagnostic Interview to identify persons aged 16 to 85 with a common ('high prevalence') mental disorder in the categories of affective (mood) disorders, anxiety disorders or substance use disorders. The survey also collected information on psychological distress using the Kessler Psychological Distress Scale–10 (K10). This is based on 10 questions about negative emotional states in the reference period (the 4 weeks before interview). Another measure was 'days out of role', used to assess the effect of mental and physical health conditions on people's ability to function in their day-to-day roles. This measure adds the number of days on which respondents were unable to work or carry out normal activities because of their health and half the number of days on which they had to reduce what they did because of their health.
- 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 K10.

Based on the 2007 SMHWB, the most common problems experienced at some time in the 12 months before the survey were anxiety disorders (14% of the population), affective (mood) disorders (6%) and substance use disorders (5%). (Note that some people have experienced more than one of these disorders so the sum of these prevalences is greater than the overall prevalence of 20% cited above.)

More than one-quarter (26%) of the youngest age group (16–24 years) had experienced a mental disorder in the preceding 12 months. Overall prevalence rates decreased as age increased (Figure 4.12). Anxiety disorders were the most common in all age groups. Substance use disorders were the least common, except in the 16–24 years age group where they were ranked second.



Source: ABS 2008.

Figure 4.12: The prevalence of mental disorders in the preceding 12 months, by age group and by disorder group, 2007

Comorbidity of mental disorders

People often experience more than one class of mental disorder at the same time: of those with a mental disorder at some time in the preceding 12 months in the SMHWB, one-quarter experienced two or more classes of disorder. The most common mental comorbidity is having both anxiety and affective disorders, especially for females, with nearly 4% of the females in the 2007 SMHWB experiencing this combination in the preceding 12 months, compared with 2% of males. On the other hand, nearly 2% of males experienced substance use disorders together with either anxiety or affective disorders, compared with 1% of females. Small percentages experienced all three classes of mental disorder in the 12 months before the survey—0.8% for males and 0.6% for females.

Mental disorders were more common among people with one of the chronic physical conditions recognised as NHPAs (diabetes, asthma, heart disease, stroke, cancer and arthritis) than for those without them (28% compared with 18%). This difference was higher for females than for males (Table 4.7).

Table 4.7: Age-standardised prevalence of mental disorders in the preceding 12 months in people with NHPA chronic physical conditions[(a)], by sex, 2007

	Males	Females	Persons
		Per cent	
Any NHPA chronic physical condition	22.1	32.9	28.0
No NHPA chronic physical condition	16.4	19.0	17.6
Total population	17.9	22.6	20.3
		Ratio	
Rate ratio[(b)]	1.3	1.7	1.6

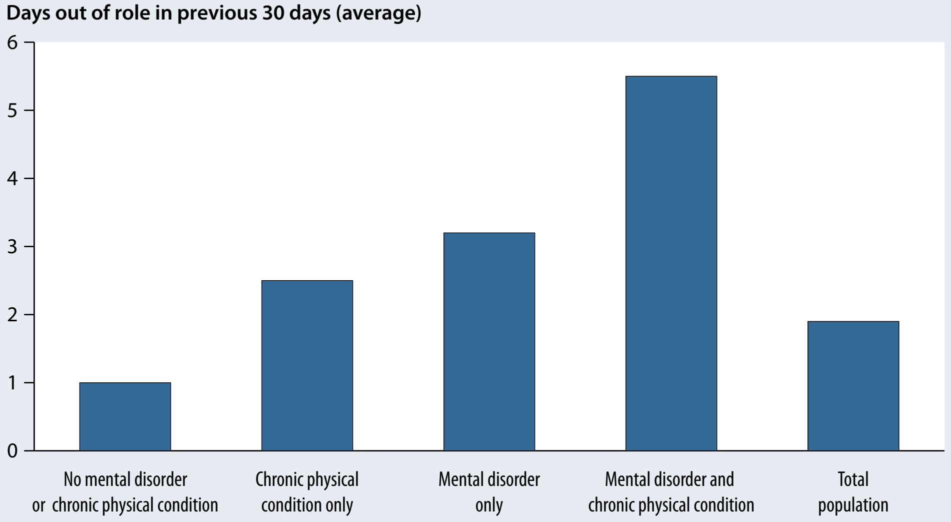
(a) The chronic physical conditions included here are those recognised as National Health Priority Areas: diabetes, asthma, coronary heart disease, stroke, cancer and arthritis.

(b) Ratio of rate for those with an NHPA physical condition to those without one.

Source: Reproduced from Slade et al. 2009: Table 7.4.

Days out of role

Figure 4.13 illustrates the effects of mental disorders and physical conditions on people's ability to function in their day-to-day activities. It shows the information from the 2007 SMHWB on days out of role (Box 4.8), according to whether respondents reported suffering a chronic physical condition, a mental disorder, neither, or both. Having either a physical condition or a mental disorder increased the number of days out of role, but having both greatly increased this effect.



Note: The chronic physical conditions included here are those recognised as National Health Priority Areas: diabetes, asthma, coronary heart disease, stroke, cancer and arthritis.

Source: Slade et al. 2009: Table 7.5.

Figure 4.13: Days out of role by comorbidity of mental disorders in the previous 12 months and NHPA chronic physical conditions, 2007

Psychological distress and mental disorders

As would be expected, the 2007 SMHWB respondents with mental disorders in the preceding 12 months were much more likely to have high or very high levels of psychological distress (see Box 4.8) than those with no such disorder—30% compared with 4% (Slade et al. 2009). Those with affective disorders were much more likely to have high or very high psychological distress levels (52%), followed by those with anxiety disorders (33%) and those with substance use disorders (25%).

Based on information in the 2007–08 NHS, an estimated 3.5% of Australians aged 18 years and over had very high levels of psychological distress in that year (Table 4.8). Earlier NHS estimates were similar—3.6% in 2001 and 3.8% in 2004–05.

Table 4.8 shows that the proportion of females with very high levels of distress was significantly higher than for males. The surveys also show that, overall, females are more likely to have psychological distress than males.

Table 4.8: Prevalence of very high psychological distress[(a)] in adults, 2001, 2004–05 and 2007–08 National Health Surveys (per cent)

	Age group						
Year	**18–24**	**25–34**	**35–44**	**45–54**	**55–64**	**65 or over**	**Total**
			Males				
2001	2.7	2.1	2.5	3.7	3.6	1.9	2.7
2004–05	3.3	2.3	3.4	4.0	4.6	2.9	3.3
2007–08	1.2*	2.7	2.7	4.0	3.4	2.6*	2.8
			Females				
2001	5.4	4.6	4.2	5.5	3.6	3.2	4.4
2004–05	3.5	3.5	5.1	5.5	4.3	3.5	4.3
2007–08	4.3*	4.2	4.0	4.8	4.9	2.8*	4.1
			Persons				
2001	4.0	3.4	3.4	4.6	3.6	2.6	3.6
2004–05	3.4	2.9	4.3	4.8	4.4	3.2	3.8
2007–08	2.7	3.4	3.4	4.4	4.2	2.7	3.5

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

(a) Measured using the Kessler Psychological Distress Scale–10 items (K10). Persons with scores of 30 to 50 are rated as having a very high level of psychological distress on the K10 scale of psychological distress.

Note: Totals are age-standardised to the Australian population as at 30 June 2001.

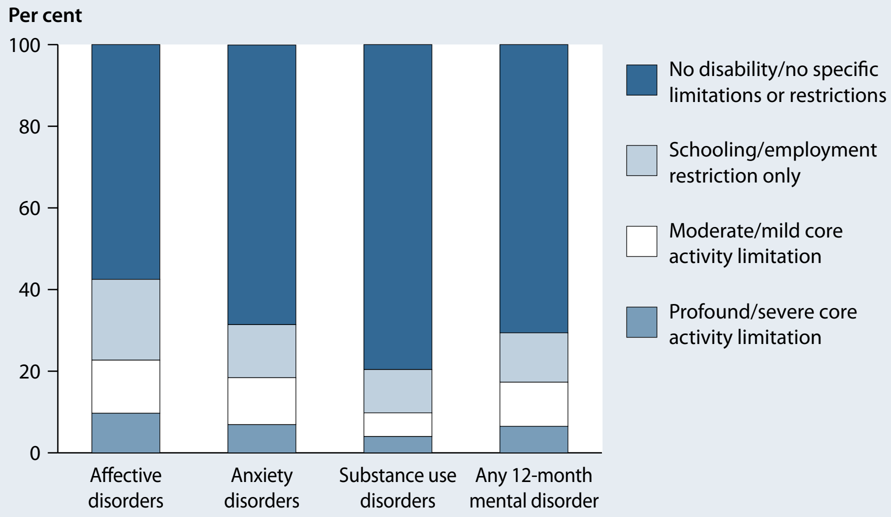
Sources: ABS 2002b; 2006; 2009a.

Psychiatric disability

As suggested by the finding on days out of role, many people with mental health problems are effectively disabled in their day-to-day functions. Based on the 2003 ABS SDAC, the prevalence of psychiatric disabling conditions was estimated at 5.2% of the Australian population in 2003, around 1 million people.

Almost half (48.4%) of those with a psychiatric disability had a severe or profound core activity limitation—that is, they sometimes or always needed help with self-care, mobility or communication activities. The estimated proportion of such females in the population was higher than for males (3.0% and 2.0% respectively).

More recently, the 2007 SMHWB has shown that 6.5% of respondents with a mental disorder in the previous 12 months had a profound or severe core activity limitation and a further 11% had a moderate or mild core activity limitation. Another 12% experienced a schooling or employment restriction. Overall, nearly 30% experienced some degree of limitation or restriction. This equates to a population estimate of 940,000 people having a mental disorder at some time in the previous 12 months together with some degree of functional limitation or restriction—roughly similar to that from the earlier (SDAC) survey, even though the surveys' methods were different. In line with the findings about mental disorder and psychological distress, disability is greatest for those experiencing affective disorders in the previous 12 months (42.5%) and lowest for those experiencing substance use disorders in the previous 12 months (20.4%) (Figure 4.14).



(a) The level of core-activity limitation (none, mild, moderate, severe or profound), and whether the person has a schooling or employment restriction.

(b) Persons who met the criteria for the diagnosis of a lifetime mental disorder and had symptoms in the 12 months before interview.

Source: ABS 2008.

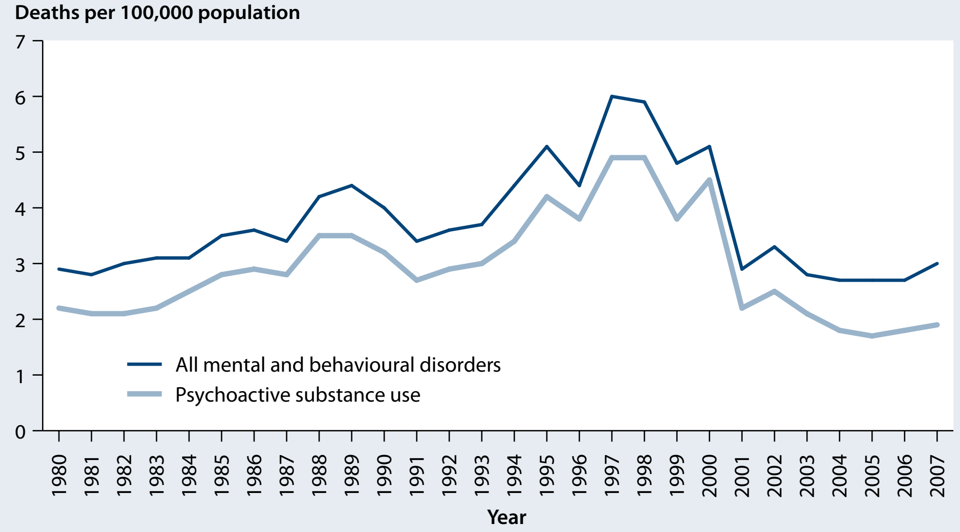
Figure 4.14: Distribution of disability status[(a)] for persons with mental disorders in the previous 12 months[(b)], 2007

It is clear that mental health problems are a leading cause of disability in Australia. Of the 714,156 Australians receiving the disability support pension as at June 2007, over a quarter (27.3%) had a psychological or psychiatric condition. In line with this, in 2006–07, nearly one in four new claims approved (24% of 62,608) were from those with a psychological or psychiatric condition (FaHCSIA 2009).

Mortality

A mental or behavioural disorder was recorded as the underlying cause of death for 667 deaths in 2007—0.5% of all deaths in that year. These deaths exclude suicide and dementia, which are included in other sections in this chapter (suicides in Section 4.9 and dementia in Section 4.6). The rate appears to have plateaued at a lower level following the peak years of the mid- to late 1990s (Figure 4.15). Most of the deaths with a mental or behavioural disorder as the underlying cause of death were due to the use of psychoactive substances such as alcohol and heroin.

The number of deaths attributed to mental and behavioural disorders in 2007 was much greater overall for males than females, although before the age of 34 years the numbers were similar for both sexes (Figure 4.16). Psychoactive substance use was a prominent underlying cause of death for males aged between 15 and 65 years and accounted for nearly all of the female deaths attributed to mental and behavioural disorders for those aged between 15 and 54 years.

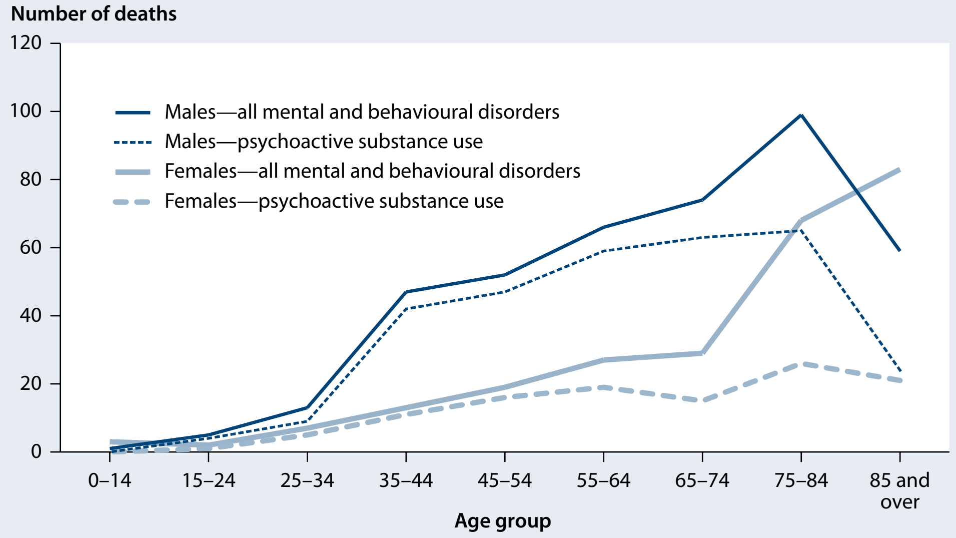


Notes

1. ICD-10 codes: all mental and behavioural disorders excluding dementia and suicide, F04–F99; psychoactive substance use, F10–F19.
2. A comparability factor was applied to enable comparison between ICD-9 (baseline) and ICD-10 (most recent) coded data.
3. Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 4.15: Death rates for mental and behavioural disorders, 1980 to 2007



Note: ICD-10 codes: all mental and behavioural disorders, F04–F99; psychoactive substance use, F10–F19.

Source: AIHW National Mortality Database.

Figure 4.16: Deaths from mental and behavioural disorders, by sex and age group, 2007

Use of health services

The 2007 SMHWB estimated that 12% of the population aged 16–85 years had used a health service for a mental health problem in the previous 12 months. This equates to 1.9 million people, of which 63% were female. Females with a mental disorder in the previous 12 months used services at a greater rate than males—41% compared with 28%. Those with affective disorders were more likely to use a service than those with anxiety or substance use disorders. Nearly two-thirds (65%) of people identified by the survey as having symptoms of a mental disorder in the past 12 months did not use a service for mental health problems. Around 90% of these reported that they did not need services (Slade et al. 2009) but, of those who did use them, most (71%) visited a GP. Psychologists were visited by 38% of the service users and 23% consulted a psychiatrist.

4.6 Dementia

Dementia can be described as a general and increasing impairment of brain functions such as memory, understanding and reasoning. It is not a specific disease but a syndrome associated with a range of diseases. Many diseases can cause dementia, the most common being Alzheimer disease. Other common forms include vascular dementia, dementia with Lewy bodies, frontotemporal dementia (including Pick disease) and mixed forms of dementia. Dementia is not a natural part of ageing, although the great majority of people with dementia are older people. While dementia is not often fatal in itself, it is highly disabling and can result in a high need for care in the long term. Among those aged 75 years and over, dementia in Australia is estimated to be the leading cause of the burden of disease among both males and females in 2010. Across all ages it is the fifth highest specific cause of disease burden, accounting for 4% of the total disease burden.

Although a cure for dementia has not yet been developed, some risk factors for both vascular dementia and Alzheimer disease—such as high blood pressure, smoking and diabetes—can be modified by changes to lifestyle and diet, and by medications where necessary. Alzheimer's Australia recommends engaging in mentally challenging activity, exercise, a balanced diet, and being socially active (Alzheimer's Australia 2009). Even if dementia cannot be prevented in many cases, the aim is to delay its symptoms by preserving and building up mental reserves.

This section provides information about dementia's prevalence and death rates, levels of disability and associated use of health services.

Prevalence

Dementia is rare up to the age of 65 but it then becomes increasingly common with age. When the results of European studies are applied to the Australian population, it can be estimated that, in 2008, less than 2% of Australians aged 65–74 years or over had the condition. The proportion increased fourfold to almost 9% for people aged 75–84. In the oldest age group (85 and over) about one in five (22%) had dementia (Table 4.9). Females have higher dementia rates than males in the older age groups. The difference was greatest in the oldest age group, where an estimated 25% of females had dementia compared with 17% of males. This can partly be explained by females in the oldest group being older on average than males in that group. There was little difference between the sexes in the younger age group (65–74 years), with rates for males only marginally higher (2%) than those for females (1.7%). (For details on incidence rates and future prevalence projections see AIHW 2007a, 2008c.)

Table 4.9: Prevalence of dementia by age and sex, 2008

	Rate (per cent)			Number		
Age group (years)	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
0–64	0.1	0.0	0.1	6,400	3,074	9,474
65–74	2.0	1.7	1.8	14,528	13,082	27,610
75–84	7.4	9.4	8.6	32,142	51,182	83,324
85 and over	16.9	24.8	22.2	20,613	59,695	80,308
Total 65 and over	*5.2*	*8.0*	*6.8*	*67,282*	*123,959*	*191,241*
Total	**0.7**	**1.2**	**0.9**	**73,682**	**127,033**	**200,716**

Source: Derived from aggregated age- and sex-specific rates from a meta-analysis of data from European studies (Lobo et al. 2000; Harvey, Skelton-Robinson et al. 2003). Percentages are of the estimated Australian resident population of that age and sex at 30 June 2008.

Prevalence in residential aged care

Since dementia is often highly disabling, where do people with dementia live? Based on the 2003 SDAC, it is estimated that more people with dementia lived in households (57%) than in cared accommodation (43%) (AIHW 2007a:56). However, nearly all of those living in households had milder dementia. The great majority (91%) of those who were moderately or severely affected required full-time care and lived in cared accommodation (AIHW 2008c:218).

There is now information about the prevalence of dementia and other health conditions among permanent residents of aged care facilities in Australia. The data were collected through an appraisal known as the Aged Care Funding Instrument (ACFI) that was introduced in March 2008. The data show that dementia is a very common condition among these permanent residents. At 30 June 2009, the majority of permanent residents (99%) had had an ACFI, and for 88% there was information about their dementia status. Of this latter group, well over half (59%) had a recorded diagnosis of dementia (Table 4.10). The proportion with dementia was highest in the age group 85 years and over (62%). However, even in the younger age group (65–74 years) almost half (47%) of the residents with information about their dementia status had dementia (Table 4.10). (For a full description of ACFI, see <http://www.health.gov.au/acfi>.)

Table 4.10: Dementia or mental illness among permanent aged care residents, 30 June 2009 (per cent)

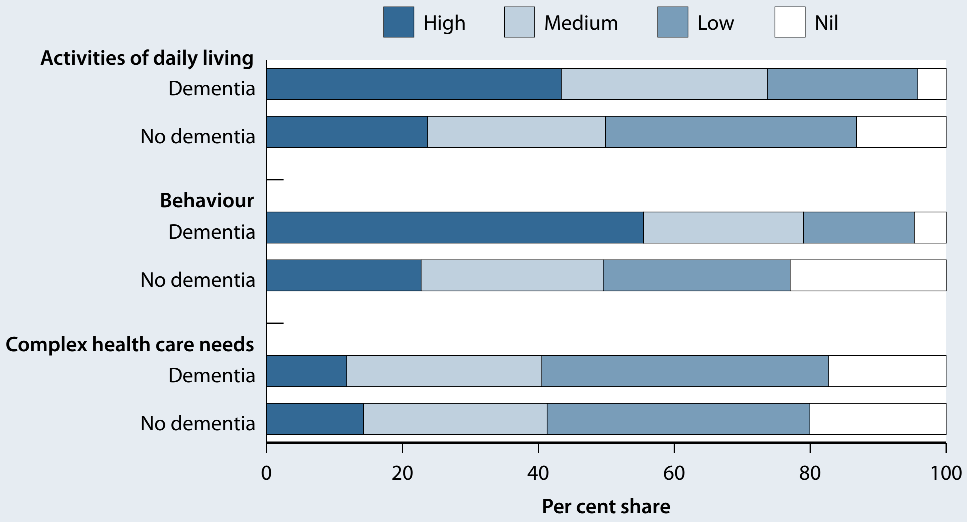
	Age group (years)					
Diagnosis	**Less than 65**	**65–74**	**75–84**	**85 and over**	**65 and over**	**Total**
Dementia and mental illness	17.5	23.2	26.1	22.3	23.7	23.4
Dementia only	12.8	23.9	35.7	39.6	36.8	35.8
Total dementia	*30.3*	*47.0*	*61.8*	*62.0*	*60.5*	*59.2*
Mental illness only	60.4	43.1	26.8	21.5	25.3	26.8
No dementia or mental illness	9.3	9.9	11.4	16.5	14.2	14.0
Total (per cent)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total (number)	**5,801**	**12,552**	**44,803**	**75,146**	**132,501**	**138,302**

Note: Excludes 19,192 cases with no information on dementia status.

Source: AIHW analysis of DoHA Aged and Community Care Management Information System (ACCMIS) database as at October 2009.

Disability and functioning

Different surveys have been used to estimate the need for care and assistance for those living in aged care facilities and for those living in households. The ACFI is used to appraise aged care residents in three areas: activities of daily living (ADL: needs with nutrition, mobility, personal hygiene, toileting and continence); behaviour (needs in relation to cognitive skills, wandering, verbal behaviour, physical behaviour and depression) and complex health-care needs (needs for medication and complex health care) (DoHA 2008). Residents with dementia needed substantially higher levels of care than residents without dementia (Figure 4.17). Almost 43% of residents with dementia needed high-level care with ADL, compared with 24% for residents without dementia. The corresponding needs for high-level care with behaviour were 55% and 23%. There was little difference in the care requirements in relation to complex health conditions for residents with or without dementia.



Note: Figure excludes missing data for 19,192 appraisals (12%).

Source: AIHW analysis of DoHA ACCMIS database as at October 2009.

Figure 4.17: Level of care across ACFI domains for permanent residents, 30 June 2009

Although more people with dementia live in households than in aged care facilities, and although their dementia is usually less severe, it is clear that nearly all of them still need assistance. Based on the 2003 SDAC, an estimated 97% of people with dementia living in households needed assistance with at least one of five personal activities. Health care and mobility were the activities most commonly requiring assistance (applying to 82% and 81% of people respectively), followed by cognition or emotion (77%) and self-care (63%). Communication required the least assistance (42%) (AIHW 2007a:94).

Mortality

Consistent with the prevalence rates, the number of deaths in 2007 with an underlying cause of dementia among those under the age of 65 was very low but increased with age. For the age group 65–74 years there were 23 deaths per 100,000, while the rate for the age group 75–84 years was 10 times as high (233 deaths per 100,000). There was a further almost sixfold increase between this age group and those aged 85 years and over, where there were 1,361 deaths per 100,000. Overall, the age-standardised death rate from dementia for females was 19% higher than that for males (32 compared with 27 deaths per 100,000). The difference was highest among those aged 85 years and over, where the rate for females was over one-third (36%) higher than the rate for males (Table 4.11).

Table 4.11: Deaths with an underlying cause of dementia[(a)], 2007[(b)]

	Males	Females	Persons	Males	Females	Persons
Age (years)	**Number**			**Number per 100,000**		
Less than 65	35	43	78	0.4	0.5	0.4
65–74	180	159	339	25.3	21.4	23.3
75–84	961	1,290	2,251	225.4	238.2	232.5
85 and over	1,239	3,413	4,652	1,098.9	1,489.9	1,360.9
				CDR 23.1	**46.3**	**34.7**
Total	**2,415**	**4,905**	**7,320**	**ASR 26.8**	**32.0**	**30.3**

ASR Age-standardised rate.

CDR Crude death rate.

(a) Dementia comprises ICD-10 codes F00–03 and G30 (dementia and Alzheimer disease).

(b) Year of registration. Since 2006, there has been a significant increase in the number of deaths coded to dementia (F01–F03). Updates to the coding instructions in ICD-10 have resulted in the assignment of some deaths shifting from cerebrovascular diseases (I60–I69) to vascular dementia (F01). No changes to ABS coding or query practices were made to 2006 or 2007 data, which would affect the number of deaths coded as dementia.

Source: National Mortality Database.

Use of health services

People with dementia use many health and aged-care services due to the severe nature of the condition. In 2008–09, there were an estimated 647,000 consultations (0.6% of all consultations) where GPs managed dementia. In the same year, the PBS and RPBS together subsidised over 386,000 prescriptions for four drugs used to treat Alzheimer disease. Around 116,000 hospitalisations with a principal or additional diagnosis of dementia in 2007–08 accounted for over 1.6 million hospital bed-days (Table 4.12).

Table 4.12: Services provided for people with dementia, 2008 (number)

Year		With dementia	Total
	Health services		
2008–09	GP encounters[(a)]	647,000	113,045,000
2008–09	Pharmaceuticals—dementia specific[(b)]	386,178	n.a.
2007–08	Hospitalisations	116,085	7,873,946
2007–08	Hospital bed-days	1,652,284	25,640,000
	Aged care services		
2008–09	Residential aged care residents[(c)]	81,940	138,302
2007–08	ACAP assessments	54,726	199,795
2008	Clients with community care packages[(d)]	5,287	40,284

n.a. Not available.

(a) Based on 5.72 dementia problems managed per 1,000 encounters from the BEACH survey; an extrapolation to Medicare-claimed GP consultations in 2008–09 provides the number of GP encounters for dementia (including senile and Alzheimer disease).

(b) PBS/RPBS data includes three anticholinesterase (donepezil hydrochloride, galantamine hydrobromide and rivastigmine hydrogen tartrate) and the NMDA receptor antagonist drug memantine.

(c) Residential aged care services exclude 19,192 missing cases.

(d) Comprises CACP, EACH and EACHD community care packages.

Sources: 2008–09 BEACH survey of general practice; PBS/RPBS; AIHW National Hospital Morbidity Database; AIHW analysis of ACCMIS database; unpublished data from DoHA.

In 2008, over one-quarter (27%) of assessments conducted by Aged Care Assessment Teams were for people with dementia. For the three Commonwealth-funded community aged care programs—Community Aged Care Packages, Extended Aged Care At Home and Extended Aged Care At Home Dementia—over three-quarters (84%) of care recipients needed assistance with tasks requiring memory and/or organisational skills, or in managing behavioural problems. Almost half of this group (47% or 5,287 care recipients) stated that the reason was diagnosed dementia or a related condition (Table 4.12).

4.7 Respiratory diseases

This section deals with two main forms of respiratory disease—chronic obstructive pulmonary disease (COPD) and asthma. Both are major causes of disability in Australia and COPD is also a major cause of death.

Chronic obstructive pulmonary disease

COPD is a serious, progressive and disabling disease in which destruction of lung tissue and narrowing of the air passages obstructs oxygen and carbon dioxide exchange, causing chronic shortness of breath. A person with COPD is progressively more prone to severe episodes of shortness of breath and coughing. Severe episodes can be life-threatening.

A variety of processes may lead to COPD. The most notable—emphysema—is the destruction of the lung parts known as alveoli, where the oxygen exchange between air and blood takes place. Emphysema occurs when inhaled irritants stimulate enzymes that destroy lung tissue. Many people with COPD make too much mucus, so they produce a lot of phlegm and have a long-term cough (chronic bronchitis). Chronic bronchitis, emphysema, scarring and narrowing of the airways often coexist as part of COPD. With these conditions, the lungs lose their function, becoming less able to move air in and out, and less able to take oxygen into the body.

Tobacco is by far the main inhaled substance leading to COPD. However, other fumes, dust and infectious organisms may contribute to the risk of the disease or may worsen symptoms either alone or with smoking. These can include environmental tobacco smoke (passive smoking), indoor and outdoor air pollution, occupational dusts and chemicals, and respiratory infections such as influenza or pneumonia.

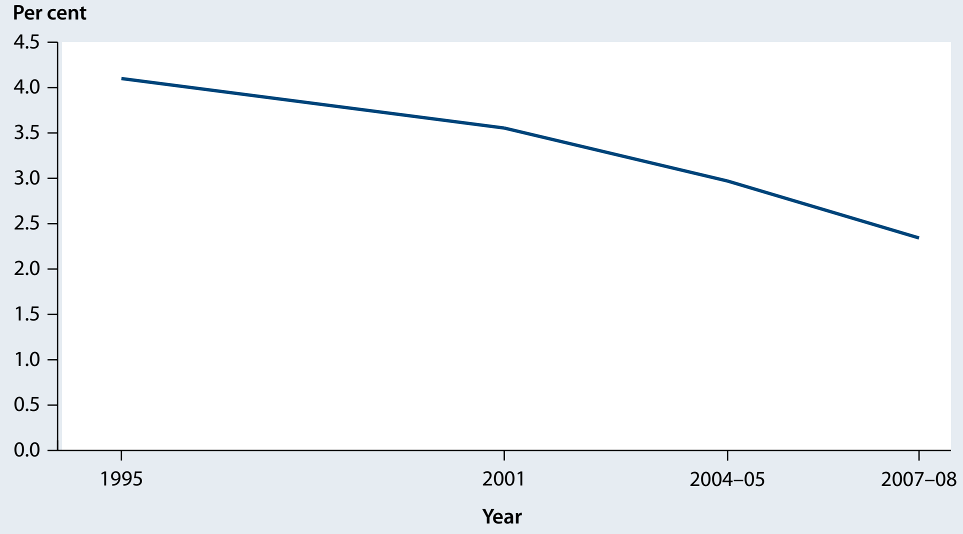
The proportion of the total burden of disease and injury attributed to COPD in 2010 in Australia is estimated to be 3.0% (3.1% among males and 2.9% among females). This is composed of about 57% fatal burden (YLL) and 43% non-fatal burden (YLD). Males account for only a slightly higher proportion of the COPD burden (53%) than females (47%). The proportion of total burden and injury attributed to COPD is projected to fall to 2.5% by 2023. See Chapter 2 for details of the burden of disease and how it is estimated.

Prevalence

Estimates of COPD prevalence differ according to the estimation method used. The most important difference is whether the estimate is based on self-report, diagnosis by doctor, X-rays or clinical measures of lung function (spirometry).

An estimated 490,000 Australians (2.3% of the population) have emphysema or bronchitis, based on self-reported information in the 2007–08 NHS. This estimate is used as a guide to the prevalence of COPD but is considered an underestimate because the symptoms overlap with those of other respiratory conditions, such as asthma. A diagnosis of asthma, for example, may mask COPD. Also, COPD is not usually diagnosed until its progression is substantial and it restricts a person's daily activities. COPD and asthma have common clinical features and can initially be difficult to distinguish. Lung function in asthma is considered largely reversible, meaning that medication can open the person's air passages and reverse the shortness of breath. With COPD, however, the function is considered poorly reversible. Without lung function testing it can be difficult to distinguish the two diseases in people who are entering middle age or later years. This means there is almost always a degree of uncertainty with prevalence estimates that are not based on this distinction.

Based on the NHS, the trend for the prevalence of emphysema and bronchitis has been downwards since 1995 (Figure 4.18). In 1995, the estimated proportion of the Australian population with emphysema or bronchitis was 4.1%, whereas in 2007–08 it was 2.3%. The fall has been consistent over that time and it is in line with falls in COPD hospitalisations, in COPD deaths and in smoking rates.



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW analysis of the 1995, 2001, 2004–05 and 2007–08 National Health Surveys.

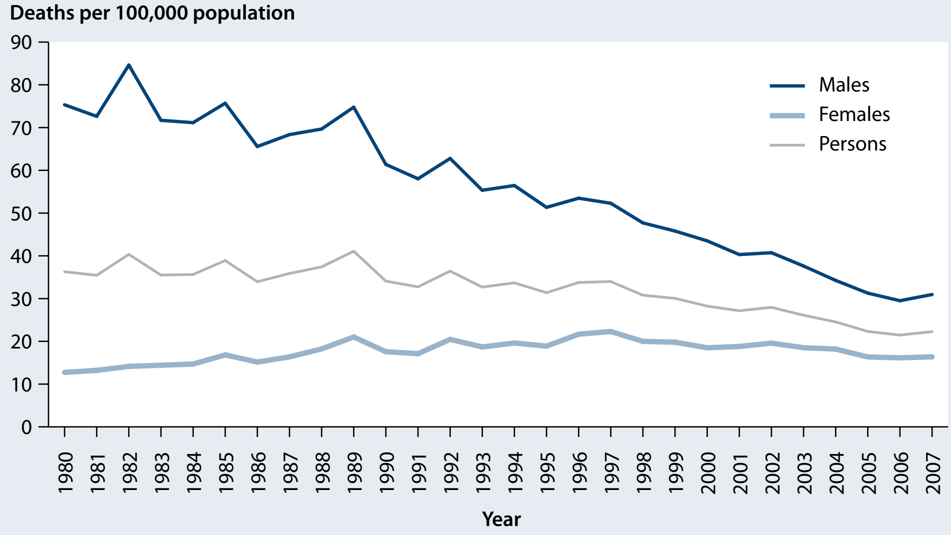
Figure 4.18: Trend in prevalence of emphysema and bronchitis, 1995 to 2007–08

When people in south-eastern Sydney were included in an international comparison study, the estimated prevalence of clinically significant COPD among adults aged 40 years and over was 9.3% (Buist et al. 2007)—almost 3 times the NHS-based estimate. However, this study included only people aged 40 years and over, whereas the NHS estimate is for all ages, and south-eastern Sydney may not represent Australia as a whole.

Deaths

COPD is a significant cause of death in Australia, being recorded as the underlying cause of 5,152 deaths (4% of all deaths) in 2007. It was listed as an associated cause in another 7,336 deaths, most often with circulatory diseases or respiratory cancers as the underlying cause. The number of deaths per 100,000 population where COPD was an underlying cause was much higher among males (31) than females (16) in 2007.

Where COPD was the underlying cause, deaths of males per 100,000 population had fallen fairly consistently over the last 25 years. For females, the rate rose a little until 1997, after which it fell towards its 1981 level (Figure 4.19).



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. COPD classified according to ICD-9 codes 491, 492, 496 (1980–96) and ICD-10 codes J41–J44 (1997–2007).
3. Rates for 1980–96 have been adjusted by a factor of 0.93 to be comparable with 1997–2007 rates.

Source: AIHW National Mortality Database.

Figure 4.19: Trends in chronic obstructive pulmonary disease mortality, 1980 to 2007

Disability and functioning

The shortness of breath experienced by people with COPD can be disabling as it can interrupt daily activity, sleep patterns and the ability to exercise. Within 7 to 8 years of diagnosis, most people with COPD become incapable of productive work (the diagnosis often being made late in the disease's course).

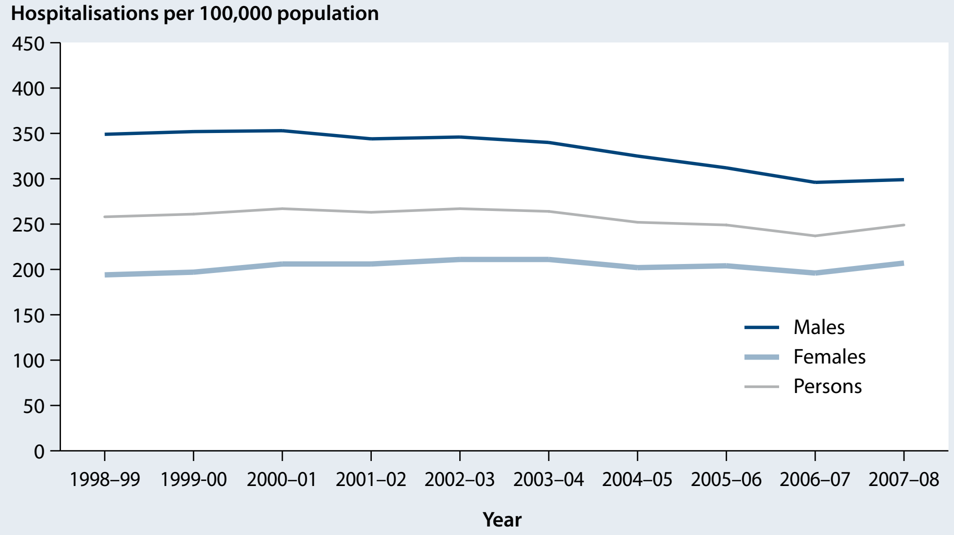
Estimates from the 2003 SDAC are that about 34% of those reporting emphysema and bronchitis had some disability due to the conditions and about 12% had a severe or profound disability. Disability was twice as common in males as females and more prominent in older age groups.

Use of health services

People with COPD may require hospital care when symptoms worsen, disability increases or the symptoms become life-threatening. In 2007–08 there were 59,427 hospitalisations (1% of all hospitalisations) for COPD as the principal diagnosis. The average length of stay (6.9 days) was over twice the average of all hospital stays in the year (3.3 days). The great majority (86%) of these COPD hospitalisations began with an emergency admission. Hospitalisation for COPD occurs mainly among older Australians with a smoking history, with people aged 65 years or over accounting for 76% of stays.

In terms of both the number of hospitalisations and the average length of time spent in hospital, COPD accounts for considerable health-care resources. The estimated direct expenditure allocated to COPD for 2004–05 was $548.7 million, 61% being for hospitalisations.

Males are more likely than females to be hospitalised for COPD. However, the age-standardised hospitalisation rate for males has fallen over the last 10 years while the female rate has stayed relatively stable. The male and female rate rose between 2006–07 and 2007–08 (Figure 4.20).



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Hospital Morbidity Database.

Figure 4.20: Trends in hospital stays for chronic obstructive pulmonary disease, 2001–02 to 2006–07

Published estimates from the 2007–08 BEACH survey found that COPD was managed in less than 1% of encounters in general practice (Britt et al. 2008a); however, this estimate does not include chronic bronchitis.

Prevention

About 74% of COPD deaths in Australia in 2003 could be attributed to tobacco smoke (Begg et al. 2007), and the global estimate is 82% (Zaher et al. 2004).

Reducing tobacco use is the most effective strategy for reducing the burden of COPD, and early diagnosis and management of COPD is also important. Australia's national tobacco strategy includes preventing the uptake of smoking and encouraging smokers to quit. International and Australian guidelines encourage clear, consistent and repeated non-smoking messages, smoke-free homes and smoke-free schools, public places and work environments.

Australia's clinical guidelines for the management of COPD (the 'COPDX plan') includes primary prevention of smoking, improving rates of smoking cessation and early detection of airflow limitation. For primary health-care professionals, the plan's key management components are: **C**onfirm diagnosis, **O**ptimise function, **P**revent deterioration, **D**evelop self-management plans and prevent e**X**acerbations (McKenzie et al. 2007).

International comparisons

Australia tends to be on a par with, or compare rather poorly with, other countries in measures of COPD, although its falling smoking rates may improve its ranking in the future. An international survey of people aged 20–44 years ranked Australia fourth highest out of 16 high-income countries in the prevalence of 'moderate to severe COPD', third in the prevalence of 'mild' COPD but 16th (the lowest) in the prevalence of those considered 'at risk' of COPD (some chronic symptoms but no airflow obstruction) (de Marco et al. 2004).

Another international study found the global prevalence of clinically significant COPD among people age 40 years and over was 10.1% (Buist et al. 2007), with the rate of the Australian sample, at 9.3%, being slightly lower.

Asthma

Asthma is a common chronic inflammatory lung condition. It causes episodes of wheezing, breathlessness and chest tightness due to widespread narrowing of the airways. Asthma affects people of all ages and has a substantial effect on the community, particularly among children. Among those with the condition, the episodes can be triggered by a wide range of exposures. These include viral infections, exercise, air pollutants, tobacco smoke or specific allergens such as house dust mites, pollens, mould spores, animal danders and occupational allergens. The symptoms of asthma are usually reversible, either spontaneously or with treatment.

Although the underlying causes of asthma are still 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.

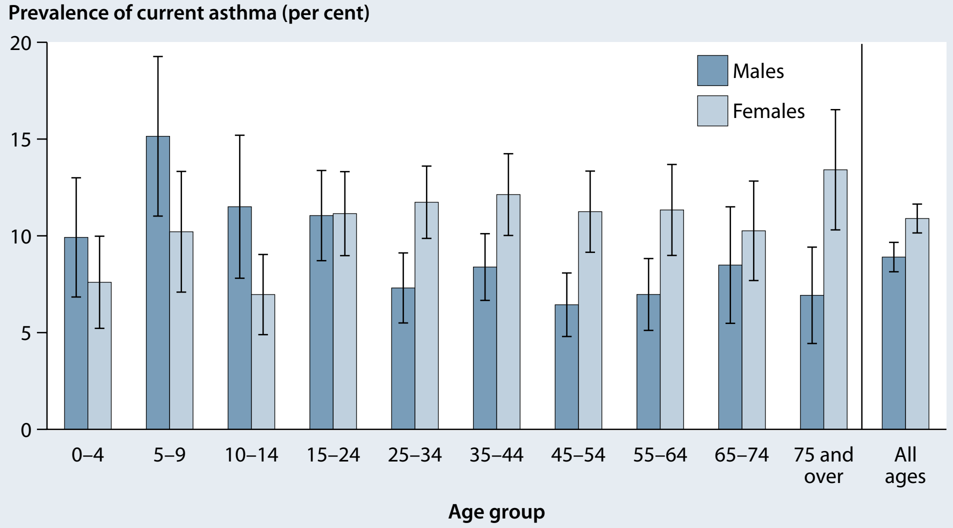
Prevalence and incidence

Important changes in the prevalence of asthma have been noted over the past 20–30 years. During the 1980s and early 1990s there was a substantial worldwide increase in the prevalence, particularly in children. However, in recent years this trend appears to have plateaued (Asher et al. 2006; Eder et al. 2006) and may even have reversed in children. Although Australia still has a high asthma prevalence by international standards (ACAM 2005), national data show a recent decrease in prevalence among children and young adults, consistent with worldwide trends. Among those aged under 35 years, the prevalence of asthma fell significantly from 14.0% to 11.4% between 2001 and 2004–05. However, in the same period, there was no change in the prevalence of asthma among people aged 35 years and over. A further consequence of these changes is that the difference in the prevalence of asthma between children and adults, which was quite marked in the 1980s and 1990s, is much less apparent now. Based on more recent self-reported data from the NHS (using a slightly different definition of current asthma), an estimated 10.0% of the Australian population had current asthma in 2007–08.

Among those aged under 15 years, the prevalence of asthma is higher for males than females but, among those aged 15 years and over, the reverse is true (Figure 4.21). Overall, females had a significantly higher prevalence of current asthma (10.9%) than males (8.9%) in 2007–08, although the highest prevalence occurred in males aged 5–9 years (15.1%).

Development of asthma in young children

Data from the Longitudinal Study of Australian Children showed that almost 17% of infants experience asthma or wheeze within the first 3 years of life (ACAM 2009). However, not all wheeze qualifies as asthma, and by the age of 2–3 years the incidence of wheeze, at 15.4%, was more than double that of asthma (6.4%). One-fifth (21%) of children had been diagnosed with asthma by the age of 4–5 years. Among the remaining 79% of children with no asthma diagnosis by age 4–5 years, 4% per year went on to be diagnosed with the condition over the next 2 years.



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. Error bars represent 95% confidence intervals; that is, a range (interval) of values within which we can be '95% confident' that the true value lies.
3. 'Current asthma' defined as yes to question 'ever told has condition' (asthma) and yes to 'symptoms of asthma include coughing, wheezing, shortness of breath and chest tightness. Have you had any symptoms of asthma or taken treatment for asthma in the last 12 months?'.

Source: ACAM analysis of ABS NHS 2007–08 expanded confidentialised unit record file.

Figure 4.21: Prevalence of current asthma, by age group and sex, all ages, 2007–08

Quality of life

Asthma can affect people's quality of life in a number of ways, by interfering with their sleep and attendance at school or work. People with asthma of all ages and both sexes rate their general health less favourably than people without the disease (ACAM 2007, 2008). For example, in the 2007–08 NHS, 25.0% of adults with current asthma rated their health as only 'fair' or 'poor' compared with 13.8% of adults without asthma. Those with asthma also report much higher levels of psychological distress than those without asthma. In 2007–08, 19.9% of adults aged 18 years and over with asthma had high/very high psychological distress compared with 11.1% of those without asthma.

Children with asthma are more likely than other children to have disturbed sleep. Moderate to severe sleep disturbance was 44% more prevalent among children with wheeze or asthma at age 4–5 years, compared with those without wheeze or asthma at the same age (ACAM 2009). Furthermore, 11% of sleep disturbance was attributed to wheeze or asthma at age 4–5 years. Sleep disturbance is an important problem attributable to asthma in children (Martin 1990; Miller & Strunk 1989) and is strongly associated with increased absenteeism from school (Diette et al. 2000; Silverstein et al. 2001). Children who had asthma or wheeze at age 4–5 years have been shown to have more days absent from school when they reach age 6–7 years than children without asthma or wheeze (ACAM 2009).

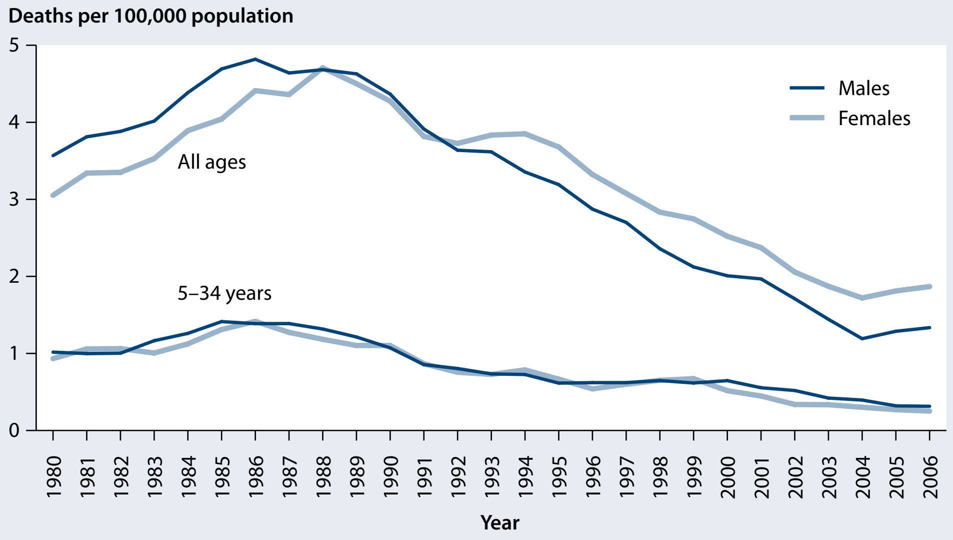
Deaths

Asthma death rates in Australia are high by international standards, although asthma is not a leading cause of mortality. In 2007, asthma was certified as the underlying cause of 385 deaths. This corresponds to an asthma mortality rate of 1.67 (95% CI 1.51—1.85) per 100,000 population, representing 0.28% of all deaths.

Since the peak in deaths from asthma in the late 1980s, the mortality rate has fallen by about 70%. Overall, the rate is higher in females than males.

There are challenges in attributing deaths to asthma. In older people, diagnosing respiratory problems is often complex and there can be misclassification between asthma and other diseases, especially COPD. For this reason, the age group of 5–34 years is usually chosen for examining time trends and making international comparisons.

Since the mid- to late 1980s, there has been a substantial decline in deaths attributed to asthma in 5–34 year olds—in fact, the death rates have fallen by more than 85% (Figure 4.22).



Notes

1. Age-standardised to the Australian population as at June 2001.
2. Asthma classified according to ICD-9 code 493 and ICD-10 codes J45–J46.
3. Deaths coded to ICD-9 (1979–1997) were converted to ICD-10 using the following conversion: ages 0–34 years, no conversion; 35–64 years, converted by a factor of 0.84; 65 years and over, converted by a factor of 0.68.

Source: AIHW National Mortality Database.

Figure 4.22: Trends in asthma mortality, 3-year moving average, 1979 to 2007

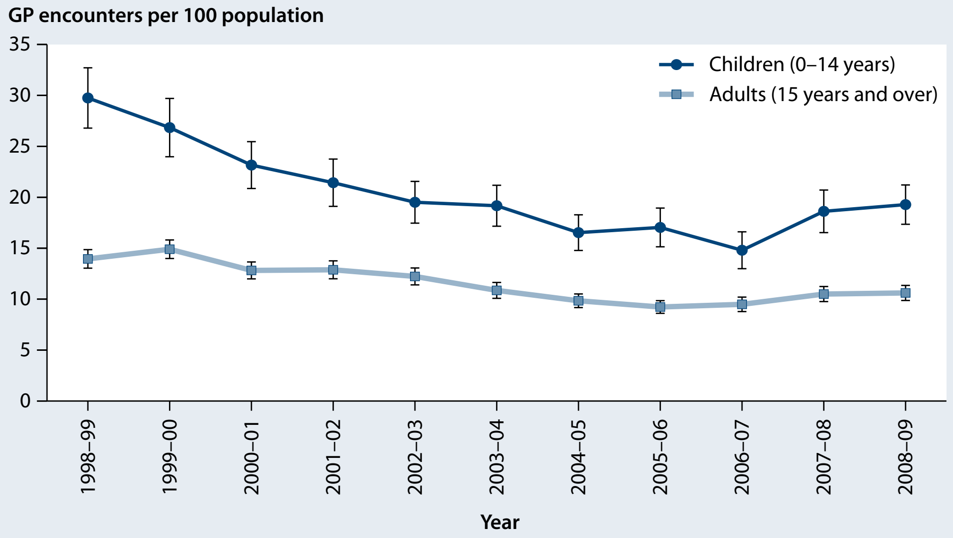
Burden of disease

It is estimated that, in 2010, asthma will be the 10th leading contributor to the overall burden of disease in Australia, accounting for 2.3% of the total number of DALYs (see Chapter 2 for an explanation of DALYs). In that year, 66,000 years of healthy life are estimated to be lost due to asthma. The great majority (92%) of DALYs due to asthma arise from YLD caused by the condition. Asthma is estimated to be the leading cause of burden of disease among children aged 0 to 14 years in 2010, contributing 37,700 DALYs (18.4% of total DALYs in that age group). Furthermore, chronic respiratory disease, which includes asthma, was the fourth leading contributor to the Indigenous health gap in the burden of non-communicable conditions during 2003. It accounted for 9% of the gap, behind CVD (23%), diabetes (12%) and mental disorders (12%). Overall, it is predicted that asthma will continue to rank as one of the major causes of disease burden in Australia for the next two decades, particularly among females.

Use of health services

Visits to general practitioners

GPs play a central role in managing asthma in the community, which includes assessment, prescribing regular medications, education and review, as well as managing acute episodes. Data from the BEACH surveys of general practice show that the rate of GP encounters for asthma decreased steadily between 1998–99 and 2006–07, particularly among children, but may have begun to rise since 2006–07 (Figure 4.23).



Notes

1. Asthma classified according to International Classification of Primary Care, 2nd edition (ICPC-2) code R96.
2. BEACH data year is April to March.

Source: BEACH Survey of General Practice.

Figure 4.23: General practice encounters for asthma per 100 population, by age group, 1998–2009

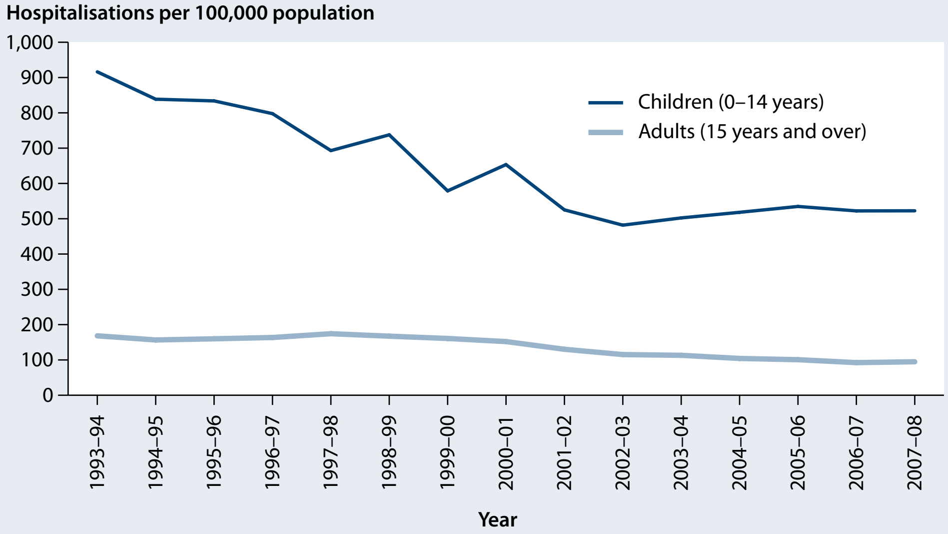
Hospitalisations

Hospitalisation for asthma is required when flare-ups or 'attacks' are life-threatening or when they cannot be managed at home. In 2007–08, there were 37,492 hospitalisations with a principal diagnosis of asthma in Australia, representing close to 1 in 200 of all hospitalisations during that year.

Between 1993 and 2002, there was a substantial fall in the rate of hospitalisations for asthma in both children and adults although, since about 2002–03, the rates for children appear to have levelled or increased a little (Figure 4.24). When comparing hospitalisation rates in 2007–08 with those in 1993–94, it can be seen that those in the recent period were 43% lower among children aged under 15 years and 44% lower among people aged 15 years and over. However, children still have high rates of hospitalisation for asthma compared with adults.

Peaks in asthma hospitalisation rates occur during winter among adults, whereas the rate among children is highest in February and May. A broadly similar seasonal pattern is observed in emergency department attendances.

Boys have higher rates of hospitalisations for asthma than girls. However, from the age of 14 years onwards, this trend is reversed and females have the higher rate. These patterns are consistent with those observed for asthma prevalence and the rate of GP encounters for asthma.



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. Asthma classified according to ICD-9-CM code 493 and ICD-10-AM codes J45–J46.
3. Hospitalisations coded to ICD-9-CM (1993 to 1997) were converted to ICD-10-AM using the following conversion: ages 0–34 years, no conversion; 35–64 years, converted by a factor of 0.64; 65 years and over, converted by a factor of 0.53.
4. Separations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.

Sources: AIHW National Hospital Morbidity Database.

Figure 4.24: Trends in hospitalisations for asthma, by age group, 1993–94 to 2007–08

Prevention

There is currently no cure for asthma, although the condition can be effectively managed. Key elements in that management include a written asthma action plan and regular use of medications that control the disease and prevent flare-ups. However, evidence suggests that the uptake of these strategies has not been optimal among those who could benefit most. In the 2004–05 NHS, only 18.5% of people with asthma who were aged 5 years or over reported using inhaled 'preventer' medicines in the preceding 2 weeks, despite national recommendations that they be used daily for most people with asthma (ACAM 2007). More recently, data from the ABS 2007–08 NHS showed that less than one-quarter (20.4%) of Australians with asthma reported having a written asthma action plan.

International comparisons

The prevalence of asthma is relatively high in Australia by international standards and the reasons for this are unknown. In the 2002 phase of the International Study of Asthma and Allergies in Childhood (ISAAC), the prevalence of wheeze in the last 12 months among those aged 6–7 years ranged from 2.4% to 37.6% across countries, and was highest among centres in New Zealand, the United Kingdom, Australia and Latin America (Pearce et al. 2007). The ISAAC study has shown a general decline in the prevalence of asthma symptoms in English-speaking countries. In Australia, the prevalence of recent wheeze decreased by 0.8% per year between 1993 and 2002.

Mortality rates due to asthma in Australia are also relatively high by international standards and are similar to those reported for the United States, the United Kingdom and New Zealand (ACAM 2008). Numerous other countries have lower rates of asthma mortality, such as Japan, France, Germany, Spain and Poland.

4.8 Arthritis and other musculoskeletal conditions

Arthritis and musculoskeletal conditions are very common in Australia and they are responsible for much pain and disability. They place significant burdens on the community, both economic and personal, through the need for hospital and primary care services, disruptions to daily life and lost productivity (AIHW 2005b).

Arthritis is marked by inflammation of the joints, causing pain, stiffness, deformity and disability. Other musculoskeletal conditions, such as osteoporosis, back pain and gout, affect the bones, muscles and their attachments to each other. There are more than 150 forms of arthritis and musculoskeletal conditions, and their causes include overuse of joints, congenital anomalies, metabolic or biochemical abnormalities, infections, inflammatory conditions, trauma and cancer. These conditions result in few deaths but can cause significant pain and disability, severely limiting a person's ability to perform everyday tasks at home and work.

Arthritis and musculoskeletal conditions were declared an NHPA in 2002. Initially the focus was on osteoarthritis, rheumatoid arthritis and osteoporosis; juvenile arthritis was added in 2006. The four conditions are described in Box 4.9.

Box 4.9: Focus conditions under the arthritis and musculoskeletal conditions National Health Priority Area

Osteoarthritis: A degenerative joint condition that mostly affects the hands, spine and weight-bearing joints such as hips, knees and ankles. Its main feature is the breakdown of the cartilage that overlies the ends of the bones in the joint. Osteoarthritis disrupts the normal functioning of the joint and can lead to pain, stiffness and activity limitation.

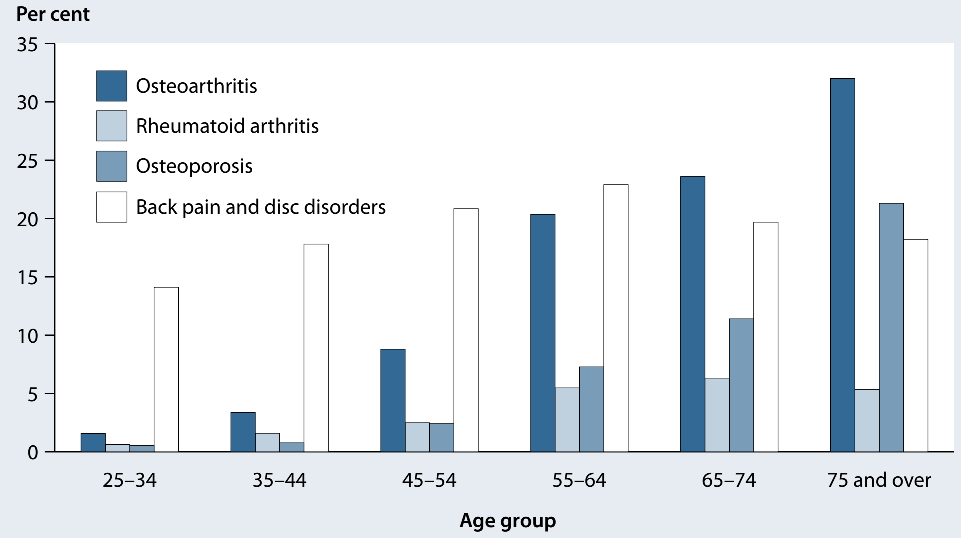
Rheumatoid arthritis: A chronic auto-immune disease marked by inflammation of the joints, most often affecting the hand joints in a symmetrical fashion. The immune system attacks the tissues lining the joints, causing pain, swelling and stiffness. Over time there is progressive and irreversible joint damage, which may result in deformities and severe disability. Rheumatoid arthritis can also lead to problems with the heart, lungs, nerves and eyes.

Juvenile arthritis: A common term used for arthritis occurring in children under the age of 16 years. The condition typically has an unpredictable pattern of disease activity, with periods of remission followed by a resurgence of signs and symptoms (known as 'flare-ups'). The main symptoms are swelling, pain and stiffness in the affected joints. Juvenile arthritis may affect children's growth and skeletal maturity, causing long-term disability and affecting their participation in activities such as sport.

Osteoporosis: The thinning and weakening of bones that often occurs with age, increasing the risk of fracture. Fractures after minimal trauma, such as minor bumps or falls from a standing height, are a hallmark of osteoporosis.

Prevalence

Based on self-reports in the 2007–08 NHS, more than 6.3 million Australians (31%) have arthritis or some other musculoskeletal condition. Arthritis affects over 3.1 million people (15%), with osteoarthritis (1.6 million; 8%) being the most common type. Rheumatoid arthritis, the next most common type, is estimated to affect 429,000 Australians (2%). Both of these conditions are more common among females than males. The prevalence of rheumatoid arthritis is highest among those aged 65–74 years, whereas the prevalence of osteoarthritis increases with age (Figure 4.25).



Source: ABS 2009b.

Figure 4.25: Prevalence of common musculoskeletal conditions, by age group, 2007–08

Back pain, back problems and disc disorders are also very common in Australia, affecting around 2.8 million people (14%). These problems are most prevalent among those aged 55–64 years, and are more commonly reported by males.

Information from the 2007–08 NHS suggests that almost 700,000 Australians (3%) have been diagnosed with osteoporosis. Most of these cases occur after the age of 55, and 82% of those reporting a diagnosis of the condition are females. However, because osteoporosis has no symptoms, it is often not diagnosed until a fracture occurs. Data about diagnosed cases are believed to underestimate the actual prevalence of the condition.

Disability and functioning

Arthritis and musculoskeletal conditions are significant causes of disability. According to the 2003 SDAC, around 1.2 million Australians (6.3%, or almost 1 in 3 people with disability) had a disability due to these conditions.

Arthritis and musculoskeletal conditions are responsible for significant activity limitation over time, but the type of limitation experienced varies with the type and severity of the condition (Box 4.10). For example, people with rheumatoid arthritis are at high risk of work disability as soon as their symptoms occur (Wolfe & Hawley 1998). In contrast, osteoarthritis usually develops more gradually and does not tend to limit people's activities until they are retired or close to doing so.

Box 4.10: Musculoskeletal conditions and disability

Osteoarthritis: The type of activity that a person with osteoarthritis finds difficult depends upon which joints are affected. Hand and arm problems may lead to a need for help with self-care tasks involving personal hygiene, dressing or other household chores. When the hip or knee is affected, mobility can be restricted, making tasks such as going up and down stairs, rising from a chair or bed, and walking very painful and difficult.

Rheumatoid arthritis: Deterioration in physical functioning can occur rapidly in the first couple of years after diagnosis. As with osteoarthritis, specific limitations depend upon the joints affected. In rheumatoid arthritis, however, multiple joints are often involved, resulting in a greater range of restrictions. Being unable to perform common tasks can lead to high levels of anxiety and depression. A loss of positive body image due to joint deformities can also further reduce a person's wellbeing.

Juvenile arthritis: The condition can interrupt a child's daily activities, such as attending school and participating in play or exercise. They might find it difficult to sit on the floor, hold pens and pencils, carry books and open their lunch box. Pain and functional limitations can also prevent children with arthritis from participating in sport, and the physical appearance of swollen and deformed joints can affect their psychosocial wellbeing. In some cases this can result in social isolation and poor social development, which may lead to problems with employment, social interaction and personal relationships in adulthood.

Osteoporosis: Disability in osteoporosis is usually related to fractures, and may be short-term or ongoing. The site and severity of the fracture will determine how a person's functioning may be limited, even for long periods, well after the fracture has been treated. Wrist and forearm fractures may affect the ability to write or type, prepare meals, perform personal care tasks and manage household chores. Fractures of the spine and hip usually affect mobility, making activities such as walking, bending, lifting, pulling or pushing difficult. Hip fractures, in particular, often lead to a marked loss of independence, and this reduces wellbeing.

Deaths

Arthritis and musculoskeletal conditions are not the underlying cause of many deaths. Almost 1,100 deaths (0.8% of all deaths) were recorded in 2007 with one of these conditions as the underlying cause. The most common causes of death were osteoporosis (240 deaths) and rheumatoid arthritis (159). Rheumatoid arthritis was much more likely to be recorded as an associated cause of death (646 cases) than as the underlying cause.

The risk of death increases after most types of osteoporotic fractures, but particularly hip fractures. There were more than 1,400 deaths in 2007 where hip fracture was recorded as an associated cause of death.

Burden of disease

Arthritis and musculoskeletal conditions are estimated to account for only 0.6% of Australia's YLL in 2010. However, they are estimated to be responsible for 7.7% of Australia's YLD. Including both deaths and disability, measured in terms of DALYs, they are expected to account for around 4% of the national disease burden in 2010.

Use of health services

Arthritis and musculoskeletal conditions are treated in a variety of settings, including primary care, hospital and allied health services. Most of these conditions are effectively managed by GPs, who provide initial diagnosis, relevant referrals, therapies such as medication and advice on self-management. Specialists help with confirming the diagnosis and prescribing more specialised drugs or other treatments, especially for rheumatoid arthritis. Hospital services provide surgical intervention or more specialised treatment. Allied health-care professionals, such as physiotherapists and occupational therapists, help to manage pain and maximise physical functioning.

Information about services provided by GPs and hospitals is presented below. Although allied health care and specialist services are integral to the management of musculoskeletal conditions, little information about the use of these services is currently available.

Visits to general practitioners

Musculoskeletal conditions were the fourth most commonly managed problem by GPs in 2007–08, accounting for 11.4% of all problems managed (Britt et al. 2008a). About three osteoarthritis problems were managed per 100 encounters with a GP (more than one problem can be managed at each encounter) and this equates to almost 3 million Medicare-paid GP consultations a year. Osteoporosis was managed at 1 per 100 encounters in 2007–08, equating to around 1 million Medicare-paid GP consultations. Rheumatoid arthritis was managed at half this frequency (Britt et al. 2009).

Hospitalisations

Hospitalisations for arthritis and musculoskeletal conditions are much less frequent than GP visits, and usually occur when surgical intervention is required. In 2007–08 there were more than 421,000 hospitalisations with the principal diagnosis of musculoskeletal conditions, of which 86,000 were for osteoarthritis and almost 8,000 for rheumatoid arthritis.

Although osteoporosis is not often listed as the main diagnosis in a hospitalisation, this is because most hospitalisations for osteoporosis involve a minimal trauma fracture. These cases are generally given the principal diagnosis of fracture (not osteoporosis), with the 'external cause' code indicating a minimal trauma event. There were almost 82,000 hospitalisations for minimal trauma fractures in 2007–08.

Surgical procedures

Advances in surgical procedures have provided more effective ways of managing the pain and disability associated with arthritis and musculoskeletal conditions. Joint replacement surgery (arthroplasty, usually of the knee or hip) is considered a cost-effective intervention for severe osteoarthritis, as it reduces pain and disability, and restores some patients to near-normal function (Bachmeier et al. 2001). The fractures resulting from osteoporosis often require hospital care and treatment. Procedures such as partial joint replacement and the use of pins, screws and plates can help to strengthen and realign broken bones. These procedures can restore varying degrees of function, ultimately improving quality of life.

In 2007–08, more than 488,000 surgical procedures were performed in hospitalisations with the principal diagnosis of arthritis and musculoskeletal conditions. Of these, 100,000 were for a principal diagnosis of osteoarthritis, almost 4,000 for rheumatoid arthritis, and a further 64,000 for minimal trauma fracture. (More than one procedure may be performed in each hospitalisation.)

Joint replacements were the most common surgical procedures performed for osteoarthritis and rheumatoid arthritis. For example, about 26% of hospitalisations for osteoarthritis involved a total knee replacement in 2007–08 (Table 4.13). Other common surgical procedures included arthroscopy (using a special camera to look inside a joint) and arthrodesis (fusing together the bones within a joint).

Table 4.13: Common surgical procedures for arthritis and musculoskeletal conditions, 2007–08

Principal diagnosis	Type of procedure	Number	Per cent[(a)]
Osteoarthritis	Total arthroplasty of knee, unilateral	25,970	25.8
	Total arthroplasty of hip, unilateral	18,847	18.8
	Arthroscopic meniscectomy of knee with debridement, osteoplasty or chondroplasty	9,316	9.2
	Hemiarthroplasty of knee	2,868	2.9
	Arthroscopic chondroplasty of knee	2,056	2.1
	Other	41,347	41.2
Total		*100,404*	*100.0*
Rheumatoid arthritis	Total arthroplasty of knee, unilateral	330	8.6
	Total arthroplasty of hip, unilateral	164	4.3
	Arthrodesis of 1st metatarsophalangeal joint	143	3.7
	Excision of lesion of soft tissue, not elsewhere classified	123	3.2
	Administration of agent into joint or other synovial cavity, not elsewhere classified	106	2.8
	Other	2,968	77.4
Total		*3,834*	*100.0*
Minimal trauma fracture	Internal fixation of fracture of trochanteric or subcapital femur	9,113	14.2
	Closed reduction of fracture of distal radius	5,992	9.3
	Hemiarthroplasty of femur	4,497	7.0
	Open reduction of fracture of distal radius, with internal fixation	3,279	5.2
	Open reduction of fracture of ankle with internal fixation of diastasis, fibula or malleolus	2,316	3.6
	Other	38,991	60.7
Total		*64,188*	*100.0*

(a) Per cent based on total number of hospitalisations with that principal diagnosis (86,141 for osteoarthritis; 7,809 for rheumatoid arthritis; and 81,875 for minimal trauma fractures).

Note: Procedures have only been counted once per hospitalisation, although they may be performed more than once.

Source: AIHW National Hospital Morbidity Database.

Non-surgical procedures

Almost 784,000 non-surgical procedures were also listed in hospitalisations with the principal diagnosis of arthritis and musculoskeletal conditions in 2007–08. The most common procedures included allied health interventions (such as physiotherapy and occupational therapy) and the administration of medications.

Prevention

The effects of arthritis and musculoskeletal conditions can be reduced through early intervention and appropriate long-term management. Over the past couple of decades there have been some encouraging advances in understanding the risk factors, causes and progression of these conditions, and in developing medications and other therapies to prevent and manage them. Although musculoskeletal conditions such as rheumatoid and juvenile arthritis cannot yet be prevented, others, such as osteoarthritis and osteoporosis, can be prevented or can at least have their onset delayed.

Preventing obesity, avoiding joint trauma and modifying work-related joint stress through ergonomic approaches are recommended for preventing osteoarthritis. Keeping physically active, maintaining a healthy weight, and increasing the intake of substances such as vitamin D and calcium are the keys to preventing osteoporosis.

Arthritis in children

Arthritis is most common in the older age groups, but it also affects young people. Juvenile arthritis, also known as juvenile rheumatoid arthritis or juvenile chronic arthritis, is the term used for arthritis of unknown cause that begins before the 16th birthday and lasts at least 6 weeks. There are several different forms of juvenile arthritis and they are estimated to have affected about 4,600 Australian children in 2004–05 (AIHW 2008d).

As with arthritis in adults, the main symptoms of juvenile arthritis are pain, swelling and stiffness in the joints. Joint stiffness is usually common after rest or decreased activity, and there is often weakness in muscles and other soft tissues around the joints involved. However, juvenile arthritis is not a ‘mini-version’ of adult arthritis. Although some forms of arthritis that affect children are also found in adults, other forms are found almost exclusively in children.

Juvenile arthritis is highly diverse in its features. Many children are affected in only one or a few joints, whereas others have arthritis in multiple joints. Some children are also affected in areas other than joints—eyes, skin and other body tissues. In some cases, the symptoms may alter over the course of the disease.

Because the disease affects children in the prime of their growth and development, it may lead to activity limitations and physical deformities early in life (see Box 4.10). Although remission is common, the disease can continue or recur throughout adulthood and result in complications over time, thus increasing the need for health services in the long term.

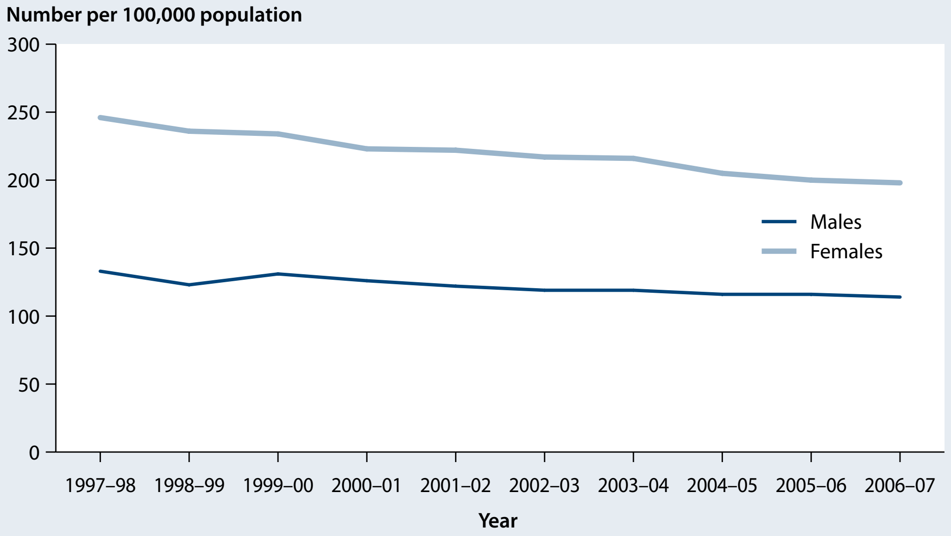
There are no well-recognised management strategies that consistently achieve the best results for juvenile arthritis. A multidisciplinary approach is usually needed to enable normal childhood activities, support proper growth and development, and reduce joint erosion and disability.

Hip fractures from minimal trauma

Unlike most other musculoskeletal conditions, osteoporosis has no obvious signs of development and is often only diagnosed after a fracture following minimal trauma has occurred, such as when a person falls from a standing position. Fractures due to osteoporosis can occur anywhere in the body, but are more likely to occur in the hips, spine, wrists, pelvis and forearms. Of these, hip fractures often have the most severe consequences in terms of ongoing pain, disability and mortality.

A hip fracture is a break that occurs at the top of the thigh bone (femur), near the hip. It is estimated that every day 40 Australians break their hips following minimal trauma (AIHW 2010b). These fractures are a substantial burden on society and the health system, and considerable resources have been dedicated to reducing this burden through raising awareness of the risks for fractures and subsidising services for diagnosing and managing osteoporosis.

The incidence of minimal-trauma hip facture in Australia is declining, with the age-adjusted rates for males falling by 14% and for females by 20% between 1997–98 and 2006–07 (Figure 4.26) (AIHW 2009f). This trend may help offset the expected increase in the absolute number of hip fractures resulting from population ageing over time.



Notes

1. Data have been age-standardised to the Australian population at 30 June 2001.
2. Persons aged 40 years and over.

Source: AIHW National Hospital Morbidity Database.

Figure 4.26: Trends in the incidence of minimal-trauma hip fracture, 1997–98 to 2006–07

4.9 Injury

Injury has a major, but often preventable, influence on Australia's health. It affects Australians of all ages and is the greatest cause of death in the first half of life. It leaves many with serious disability or long-term conditions. Injury is estimated to account for 6.5% of the burden of disease in 2010. For these reasons, injury prevention and control was declared an NHPA and is 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). This section describes fatal and serious non-fatal (hospitalised) injury and poisoning in Australia. Injury of Aboriginal and Torres Strait Islander people is covered in Chapter 5.

Hospitalised injury

Hospitalisation data provide an indication of the incidence of the more severe injuries. Injury accounted for over 1 in 20 of all hospitalisations in Australia in 2007–08, with almost 426,000 injury hospitalisations that year. Table 4.14 shows this and also provides estimates of the number of people hospitalised (a lower number, because some injuries result in more than one episode in hospital), along with several other summary measures.

Incidence rates of serious injury are higher for males than females, both overall and for most types of injury. However, the average length of stay is longer for females than males, reflecting the large number of older females hospitalised for hip fractures (see 'Fall-related injury' later in this section).

Table 4.14: Hospitalisations due to injury and poisoning[(a)], 2007–08

Measure	Males	Females	Persons[(b)]
Hospitalisations			
Hospitalisations due to injury and poisoning[(a)]	248,590	177,352	425,949
Hospitalisations due to all causes	3,724,423	4,149,381	7,873,946
Injury hospitalisations as proportion of all hospitalisations (%)	6.7	4.3	5.4
Cases			
Estimated number of hospitalised injury cases[(c)]	230,676	163,823	394,505
Crude rate (per 100,000 population)	2,134	1,507	1,819
Adjusted rate (per 100,000 population)[(d)]	2,156.0	1,400.3	1,793.8
Number of patient days	771,056	830,410	1,601,483
Average patient days per case	3.3	5.1	4.1
Number of high-threat-to life cases[(e)]	39,854	43,360	83,214

(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

(b) Includes cases where sex is missing or indeterminate.

(c) Omits inward transfers from acute hospitals.

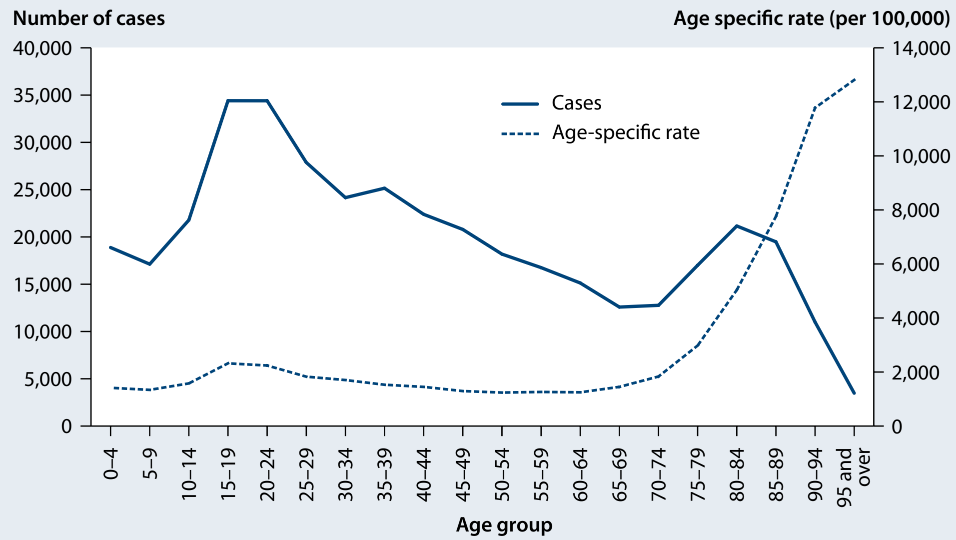
(d) Adjusted by direct standardisation to the Australian estimated resident population at 30th June 2001.

(e) ICD-based Injury Severity Score < 0.941 (weights according to the method of Stephenson et al. 2003).

Source: AIHW National Morbidity Database.

High threat-to-life cases are defined here as those with an International Classification of Diseases-based injury severity score (ICISS) of less than 0.941 (Stephenson et al. 2004). Injury of this severity is likely to have a large effect 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 21% of all hospitalised injury cases in 2007–08 (17% of the male cases, 26% of the female) and 54% of injury patient days in 2007–08.

The incidence of injury varies with age, with cases being most numerous for teenagers and young adults (Figure 4.27). There is also a peak in rates at this age, but the highest rates are in the oldest age groups. The rate of hospitalised injury at ages 90 years and over was more than 11,000 per 100,000 persons, slightly more than 1 hospitalisation for injury for every 10 people at these ages during 2007–08. This high rate is almost entirely due to injury from unintentional falls (see 'Fall-related injury' below).



(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

Source: AIHW National Morbidity Database.

Figure 4.27: Hospitalisations due to injury and poisoning[(a)], 2007–08: number of cases and rates, by age group

The rate of hospitalised injury for males is greater than for females in every age-group below the age of 65 years. This is largely due to transport injury (mainly road crashes) and interpersonal violence. At ages older than 65 years the female rate exceeds the male rate, due mainly to injury from unintentional falls.

A standard method of classifying injury incidents is based on whether or not they are deliberately inflicted (for example unintentional, self-inflicted or assault) and the mechanism of injury (for example falling, poisoning or drowning). Table 4.15 summarises the types of external causes among injury cases admitted to hospital in 2007–08. The great majority (86%) of injury cases were unintentional—that is, the injuries were not caused deliberately. Falls and transportation (mostly motor vehicles) were common external causes of injury (51% of all hospitalised injury cases), and accounted for more than three-quarters of high threat-to-life cases (79%).

The age-standardised rate of fall-related hospitalisations increased from 618.5 per 100,000 in 2005–06 to 654.1 per 100,000 in 2007–08. This is particularly noteworthy in the high threat-to-life cases and reflects the reported increases in falls hospitalisations in older people over the past 6 years (Bradley & Pointer 2009).

Table 4.15: Hospitalisation due to injury and poisoning[(a)], by external cause groups, 2007–08

	All cases			High threat-to-life[(c)]			
External cause of injury[(b)]	**Number**	**Per cent of total**	**Rate[(d)]**	**Number**	**Per cent of total**	**Rate[(d)]**	**Per cent within type**
Unintentional							
Transportation	53,587	14	253.7	13,616	16	63.6	25
Drowning & submersion	450	0	2.2	399	0	1.9	89
Poisoning, pharmaceuticals	6,552	2	30.8	792	1	3.5	12
Poisoning, other substances	2,261	1	10.6	228	0	1.0	10
Falls	145,675	37	654.1	51,840	62	222.0	36
Fires/burns/scalds	5,811	1	27.6	1,004	1	4.7	17
Other unintentional	125,466	32	590.8	8,083	10	36.4	6
Intentional							
Self-inflicted	23,870	6	113.4	1,851	2	8.6	8
Inflicted by another person	23,315	6	111.1	4,451	5	21.2	19
Undetermined intent	5,102	1	24.3	369	0	1.7	7
Other & missing	2,416	1	11.0	581	1	2.6	24
Total	**394,505**	**100**	**1,829.4**	**83,214**	**100**	**367.2**	**21**

(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

(b) ICD-10-AM External Cause codes aggregated as in Berry & Harrison 2007.

(c) ICD-based Injury Severity Score < 0.941 (weights from Stephenson et al. 2003).

(d) The number of cases per 100,000 persons, directly standardised to the Australian estimated resident population at 30 June 2001.

Source: AIHW National Morbidity Database.

Disability and chronic injury

The nature and severity of an injury will determine the likelihood and degree of long-term disability and impairment for an individual. For minor injuries recovery is usually quick, typically resolving within days or weeks. More serious injuries can have major effects, resulting in the need for lifetime care and support. These most serious cases are sometimes described as catastrophic injuries, for example persisting spinal cord injury and severe traumatic brain injury (TBI).

Each year in Australia, about 300 new cases of spinal cord injury from traumatic causes are added to an estimated prevalent population of those with spinal cord injury of about 9,000 (AIHW: Cripps, 2007). Based on 2005 cost estimates (Walsh et al. 2005), the ongoing costs associated with the long-term care of all these people are estimated to be nearly $500 million per year.

In 2007–08 there were 15,432 cases of primary hospitalised TBI (see Helps et al. 2008 for inclusion criteria). The highest proportion of all primary hospitalised TBI occurred in 15–24 year olds, accounting for 22% (3,387) of all cases. Nearly 70% occurred in males. Cases of TBI can vary in terms of their threat to life but it is important to note that even those that have a low threat to life can have lifelong consequences for the individual.

Other injuries, such as burns, fractures and back injuries, can also have profound effects on long-term health and wellbeing. The results of the NHS suggest that in 2007–08 about 2.4 million Australians had a long-term condition due to an injury (ABS 2009b).

Deaths

Almost 7.4% of all deaths occurring in Australia in 2005–06 resulted from an injury (or external cause of injury), about 27 per day (Table 4.16). (See Box 4.11 for information on the special way that injury deaths are counted.) The overall injury death rate (age-standardised) for males was over twice that of females. During the first year of life, congenital and perinatal conditions were the most common cause of death, but injury was the most common cause of death from early childhood through to middle age. In 2005–06, nearly half (49%) of all deaths of persons aged 1–44 years were due to injury.

Table 4.16: Injury deaths: numbers, proportions and rates, 2005–06

Measure	Males	Females	Persons
Number of deaths[(a)]	6,115	3,805	9,920
Proportion of all deaths	8.9%	5.8%	7.4%
Crude rate per 100,000 population	59.8	36.8	48.2
Adjusted rate per 100,000 population[(b)]	63.3	30.7	46.5

(a) Deaths occurring during 2004–05 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any multiple cause of death coded to ICD-10 S00–T75, T79. The method follows Henley et al. 2007.

(b) Adjusted by direct standardisation to the Australian population in June 2001; the rate is given as the number of cases per 100,000 persons.

Source: AIHW National Mortality Database.

Of the 9,920 injury-related deaths in 2005–06, 77% (7,655 deaths) had an injury coded as the underlying cause of death while the remaining 23% (2,265) had injury coded as an associated cause of death. Rates for individual external causes of injury are not shown here due to data quality issues (see 'Data quality' later in this section). It should also be noted that the figure of 9,920 may be a slight underestimate of the true number of injury-related deaths due to the presence of several hundred cases coded to ill-defined and unknown causes of death. How many of these cases were due to injury is not known, but previous research suggests that the number is likely to be relatively small.

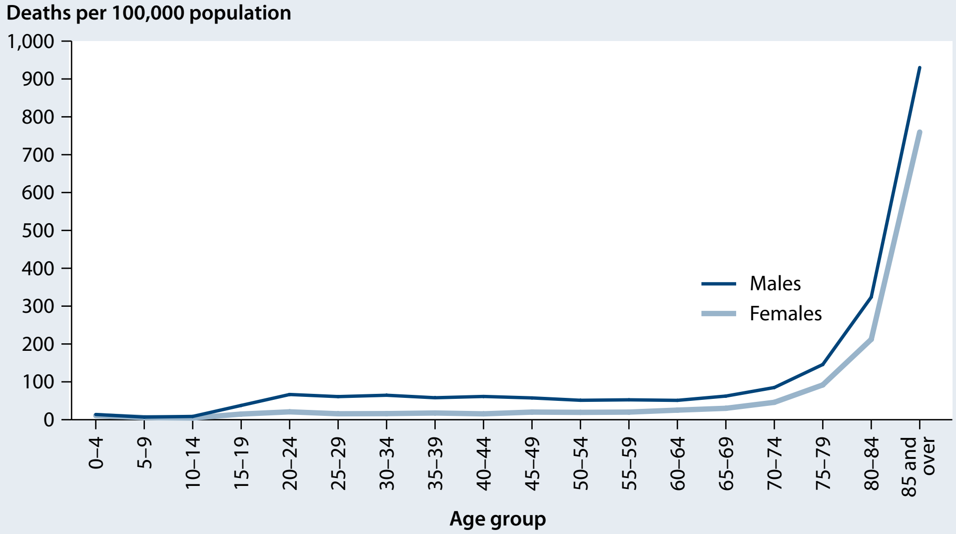
Box 4.11: Counting injury deaths

Injury deaths reported here follow the method which takes account of multiple causes of death described in Henley et al. (2007). This method includes a death as an injury death if:

- the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y8, or Y89, or
- there is any cause of death coded to ICD-10 S00–T75 or T79.

By counting injury deaths in this way we obtain a more complete count than the previous method based solely on the underlying cause of death being an external cause. Note that this new method does not include complications of surgical and medical care (Henley et al. 2007). The method used here is not comparable to that used for the diseases covered in this chapter of *Australia's health*, but is the method used in *Australia's health 2008* to count injury deaths. The previous method results in a figure of about 8,000 injury deaths in 2005, compared with the almost 10,000 injury deaths obtained using the method adopted in this section.

Injury death rates are low in childhood compared with other ages (Figure 4.28). However, mortality from all causes is low in this age group, and injury accounted for about 40% of all deaths between the ages of 1 and 14 years in 2005–06.



Notes

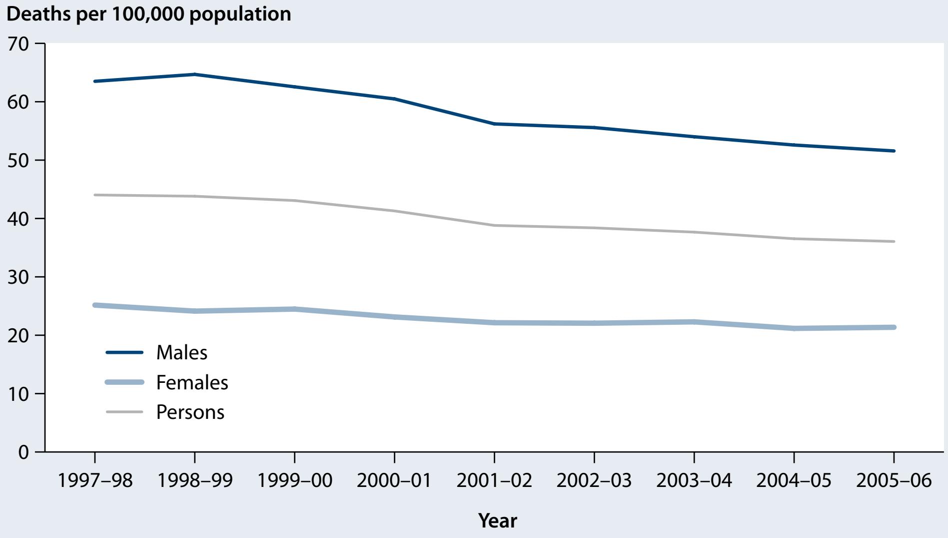
1. Includes deaths occurring during 2005–06 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any multiple cause of death coded to ICD-10 S00–T75, T79.
2. Adjusted by direct standardisation to the Australian population in June 2001.

Source: AIHW National Mortality Database.

Figure 4.28: Injury death rates by age and sex, 2005–06

Trends in mortality

Overall injury mortality has declined in recent years (Figure 4.29), especially among younger age groups (Figure 4.30). In the period from 1997–98 to 2005–06, there was an encouraging decline of almost 40% in death rates for those aged 15–24 years, while for those aged 0–14 years and 25–44 years, mortality rates fell by 30% and 33% respectively. For those aged 65 years and over, rates declined from 1997–98 to 2000–01 before rising again to a rate in 2005–06 similar to that in 1997–98. Trends in rates for individual external causes of injury are not shown here due to data quality problems (see Box 4.12).

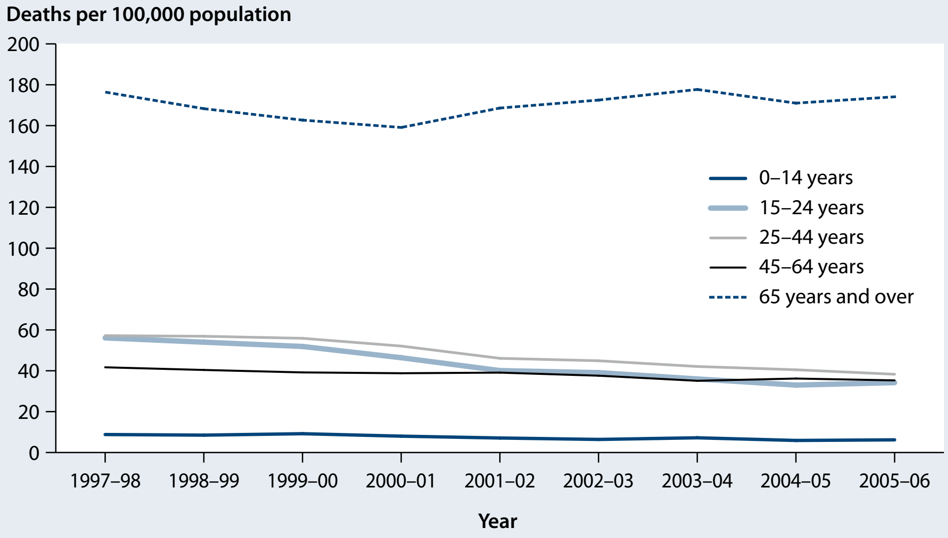


Notes

1. Includes deaths (based on year of death) occurring from 1997–98 to 2005–06 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any multiple cause of death coded to ICD-10 S00–T75, T79.
2. Adjusted by direct standardisation to the Australian population in June 2001.

Source: AIHW National Mortality Database.

Figure 4.29: Injury death rates by sex, 1997–98 to 2005–06



Notes

1. Includes deaths (based on year of death) occurring from 1997–98 to 2005–06 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any multiple cause of death coded to ICD-10 S00–T75, T79.
2. Adjusted by direct standardisation to the Australian population in June 2001.

Source: AIHW National Mortality Database.

Figure 4.30: Injury death rates by age group, 1997–98 to 2005–06

Box 4.12: Changes affecting timing and interpretation of injury deaths data in Australia

Interpreting rates and trends of injury mortality in Australia for recent years is complicated by classification issues, which have resulted in underestimation of some and overestimation of other external causes of injury in Australian Bureau of Statistics (ABS) mortality data. Investigations of how this occurred and revised estimates for part of the period have been presented elsewhere (Harrison et al. 2009; Henley & Harrison 2009). Underestimation has chiefly affected statistics on suicides and homicides, and also road deaths to some extent. Overestimation has occurred for deaths recorded as unintentional and due to mechanisms that are common among suicides and homicides—chiefly poisoning, hanging and strangulation, and firearm discharge (Henley & Harrison 2009). The main cause of the problem was a mismatch between the time to completion of processing of some coroners' cases and the ABS's schedule for producing annual files of cause of death data (Harrison et al. 2009).

Beginning with the deaths registered in 2007, the ABS has introduced a revised way of treating information from coroners' cases that are still incomplete when the ABS is due to release its cause data for deaths in a given year. The relevant cases will be assigned a cause of death code based on the level of detail available on the cause, mechanism and intent of the death. The ABS will review their coding of these deaths periodically and it will be changed if indicated by information that becomes available when the coroner's case has closed.

In future, therefore, the ABS will be releasing several versions of cause-of-death data for deaths registered in a particular year. The first release of ABS cause-of-death data (for example, 2007 registrations as released in 2009) shows a large number of cases assigned to 'undetermined intent' codes (see table on next page) (ABS 2009c). The counts for transport-related deaths, suicides and homicides are all lower than expected. However, most of these cases will be re-allocated in future ABS releases of cause data for 2007. Cases initially allocated to *Hanging, strangulation and suffocation, undetermined intent (Y20)* and many allocated to *Poisoning, undetermined intent (Y10–Y19)* are likely to be reassigned to intentional self-harm codes when final information is available. Similarly, most cases allocated to *Firearm discharge, undetermined intent (Y22–Y24)* and *Contact with sharp object, undetermined intent (Y28)* are likely to be reassigned to assault or intentional self-harm, and most cases first allocated to *Crashing of motor vehicle, undetermined intent (Y32)* will probably be assigned to unintentional transport-related codes.

Selected external causes of injury, Australia 2007

External cause of injury (ICD-10 code)	Count[a]
Transport accidents (V01–V99)	1,372
Unintentional Poisoning (X40–X49)	805
Intentional self-harm (X60–X84)	1,977
Assault (X85–Y09)	168
Event of undetermined intent (Y10–Y34)	1,154
Poisoning, undetermined intent (Y10–Y19)	331
Hanging, strangulation and suffocation, undetermined intent (Y20)	166
Drowning and submersion, undetermined intent (Y21)	40
Firearm discharge, undetermined intent (Y22–Y24)	28
Contact with sharp object, undetermined intent (Y28)	19
Crashing of motor vehicle, undetermined intent (Y32)	110
Other specified events, undetermined intent (Y33)	114
Unspecified event, undetermined intent (Y34)	260

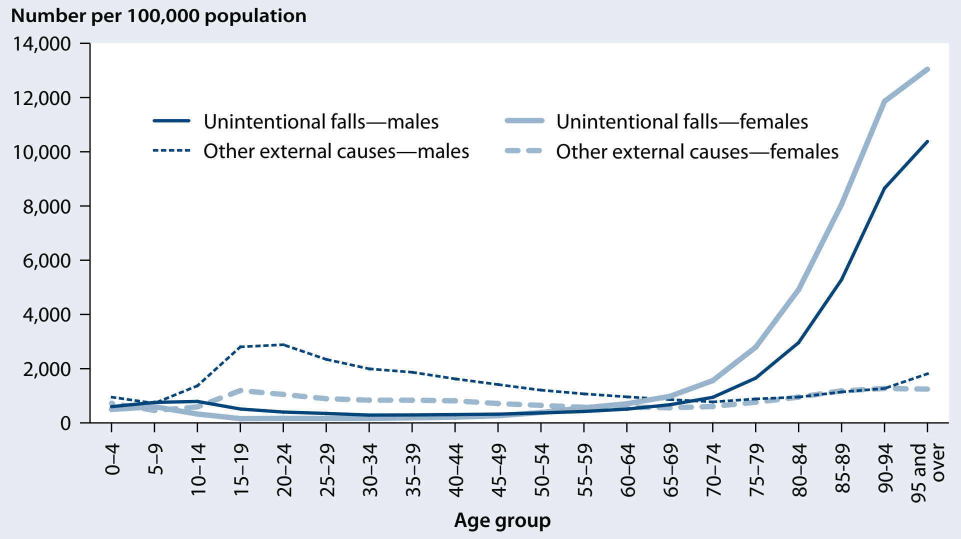
(a) Counts derived by including multiple cause of death codes along with underlying cause of death codes.

Source: ABS 2009d.

Fall-related injury

Falls account for about one-third of all hospitalised injury cases and one-fifth of all fatal injury in Australia. The overall age-standardised rate of injurious falls requiring hospitalisation in 2007–08 was 654 per 100,000 population. The rate increased rapidly with age; for Australians aged 65 years and over the rate was 2,516 per 100,000. At ages 85 years and over, unintentional falls accounted for about 7 times the number of injury incidents attributed to all other external causes combined. Unlike most other types of external cause, rates of hospitalisation due to falls were higher for older females than older males (Figure 4.31). Deaths following falls also rise rapidly with age, especially after about 70 years of age.

Falls by older people commonly result in a fracture, often a hip fracture. Three in 10 hospitalised fall-related injuries for older Australians in 2007–08 involved the hip or thigh and three-quarters of these were fractures of the neck of the femur. Head injuries due to a fall were also common, particularly for males. Most injurious falls are due to slips, trips and stumbles and other falls on the same level (53% of injurious falls for people aged 65 years and over in 2007–08). Seven out of 10 falls resulting in hospitalisation of older people in 2007–08 occurred either in the home or in aged care facilities. Rates of injurious falls in aged care facilities have been found to be higher than those in the home.



(a) Includes cases where principal diagnosis was coded to ICD-10-AM S00–T75 or T79 and first external cause was coded to V01–Y89.

Source: AIHW National Morbidity Database.

Figure 4.31: Hospitalisation due to injury and poisoning[(a)], 2007–08: age-specific rates by sex; unintentional falls and all other external causes of injury

Injurious falls by older people place a heavy burden on the hospital system because they are numerous and cases have a long average stay in hospital. These cases often require a period of rehabilitation after acute care. Injurious falls may also have a considerable impact on quality of life, often reducing independence and hastening admission to residential care (Tinetti & Williams 1997, 1998). Serious falls also significantly contribute to premature mortality (Keene et al. 1993; Sattin 1992). A method of analysing data that included acute and follow-up care in hospital led to an estimate that the average total hospital stay due to an injurious fall by an older person was 16 days in 2007–08.

The direct cost of fall-related acute episodes of care for Australians aged 65 and over in 2006–07 was estimated to be $600 million. The total hospital cost is likely to be considerably higher than this, because episodes of care classified as rehabilitation and certain other types could not be accounted for in this estimate.

4.10 Infectious diseases

The term ‘infectious disease’ refers to an illness, fever or rash due to harmful organisms (mostly micro-organisms) or their toxic products. Generally acute in nature, infectious diseases are large causes of illness, disability and death in many parts of the world. From a public health perspective, their distinctive feature is that some can occur in outbreaks that affect many people, especially if they can spread rapidly through human-to-human contact.

In Australia and similar developed countries, infectious diseases are not among the leading contributors to the burden of disease. With improved sanitation, the introduction of antibiotics and immunisation programs, the effects of infectious diseases on Australia’s health have reduced markedly over the last century.

Yet the burden of infectious diseases continues to be significant in Australia: infections and immunisations account for about 7% of all GP consultations (Britt et al. 2005). Around 3–4% of deaths annually are attributed to infection (AIHW 2009a), as are a similar percentage of hospitalisations, including pneumonia, urinary tract infections and gastrointestinal infections (AIHW 2007b). Also, the potential for serious outbreaks continues to present a challenge in public health and requires planning and constant vigilance.

Health departments continue to respond to outbreaks and to monitor trends for certain important infections. The infections chosen for surveillance usually meet at least one of the following criteria:

- They have a high risk of death, especially if this includes young and otherwise healthy people.
- They are highly contagious.
- They have not been seen until recently, for example severe acute respiratory syndrome (SARS) and avian influenza.
- They are not established in Australia.
- They are vaccine-preventable.
- They are related to lifestyle factors, for example sexual activity or injecting drug use.
- They arise from contaminated food.
- They can be used for bioterrorism.
- They require worldwide monitoring, even though they are not so relevant to Australia, for example cholera.

There are three main data sources used in this section, as outlined in Box 4.13. The section begins with a very brief overview of infectious diseases as a whole, then provides information on a series of diseases of interest.

Box 4.13: Infectious diseases data

Three main data sources are used in this section:

- The incidence of infectious diseases is largely based on information from the National Notifiable Diseases Surveillance System, compiled by the Office of Health Protection in the Australian Government Department of Health and Ageing from data supplied by the states and territories. A disease may be made notifiable to jurisdictional health authorities depending on its significance to public health. Each state or territory has specific requirements under its public health legislation for notification by medical practitioners, laboratories and hospitals. Data for the most recent year (2009) are provisional and may not be complete, as they can change retrospectively.
- Information on the number of deaths from infectious diseases has come from the Australian Institute of Health and Welfare (AIHW) National Mortality Database.
- Information on hospitalisations for infectious diseases has come from the AIHW's National Hospital Database.

In this section, only deaths and hospitalisations coded to the 'certain infectious and parasitic diseases' chapter (ICD-10 and ICD-10-AM codes A00–B99) have been included. This is consistent with the method used for *Australia's health 2008*.

Overview

Incidence

Infectious diseases remain relatively common. Although there are no data on the incidence of infectious disease overall, some of these diseases are notifiable, meaning that the law requires them to be notified to government health authorities. A selection of the main notifiable diseases is included in Table 4.17. Among this group of diseases, chlamydia infection was the most common with over 62,000 notifications. Other leading notifiable diseases were campylobacteriosis (a gastrointestinal disease), hepatitis C infection, pertussis (whooping cough) and laboratory-confirmed influenza.

Table 4.17: Selected nationally notifiable diseases, 2009

Disease	Notifications	Number per 100,000
Vaccine-preventable diseases		
Meningococcal disease (invasive)	259	1.3
Pneumococcal disease (invasive)	1,555	7.1
Pertussis (whooping cough)	29,208	133.5
Mumps	163	0.7
Influenza (laboratory-confirmed)	**45,031**	**205.9**
Mosquito-borne diseases		
Barmah Forest virus infection	1,488	6.8
Ross River virus infection	4,757	21.7
Malaria	531	2.4
Dengue	1,398	6.4
Sexually transmissible infections		
HIV(a)	995	4.6
Syphilis(b)	2,835	12.9
Gonococcal infection	8,072	36.9
Chlamydial infection	62,686	286.6
Hepatitis		
Hepatitis B(c)	7,967	36.4
Hepatitis C (c)	12,984	59.4
Gastrointestinal diseases		
Campylobacteriosis(d)	15,826	107.1
Salmonellosis (nec)	9,517	43.5
Tuberculosis	**1,300**	**5.9**

nec Not elsewhere classified.

(a) 2008.

(b) includes all syphilis categories (see Table S22 🖱).

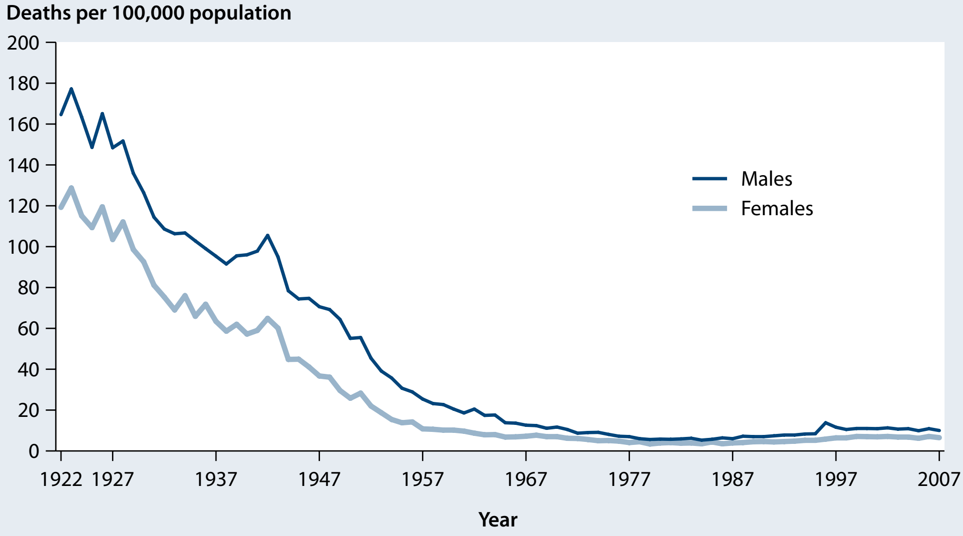
(c) Includes incident and unspecified cases.

(d) Notified as 'foodborne disease' or 'gastroenteritis in an institution' in New South Wales.

Sources: NCHECR 2009; NNDSS 2009.

Mortality

Deaths from infectious diseases have declined dramatically since the early part of the last century (Figure 4.32). In 1922, they accounted for 15% of all deaths, but by 2007 they accounted for a little over 1%. In 2007, there were just over 1,800 infectious diseases deaths, a death rate of 8.1 per 100,000 (age-standardised). Septicaemia (blood poisoning) accounted for the largest proportion of these (1,105 deaths), and the next most common was 'sequelae of infectious and parasitic diseases' (176 deaths).



Note: Includes deaths with an underlying cause of death coded to ICD-10 A00–B99 and corresponding codes in earlier versions of ICD.

Source: AIHW 2009a.

Figure 4.32: Death rates from infectious diseases, 1922–2007

Burden of disease

The infectious diseases group is estimated to be a relatively small contributor to the burden of disease in 2010, accounting for 1.7% of the total burden. Most of the burden (69%) was because of premature death rather than years lived with disability.

Hospitalisations

Over 91,000 hospitalisations in 2007–08 were attributed to infectious diseases (ICD-10-AM codes A00–B99 as the principal diagnosis), a figure that has remained fairly steady in recent years. Intestinal infectious diseases were the largest group (38%). The largest number of admissions was for children, particularly those aged under 5 years.

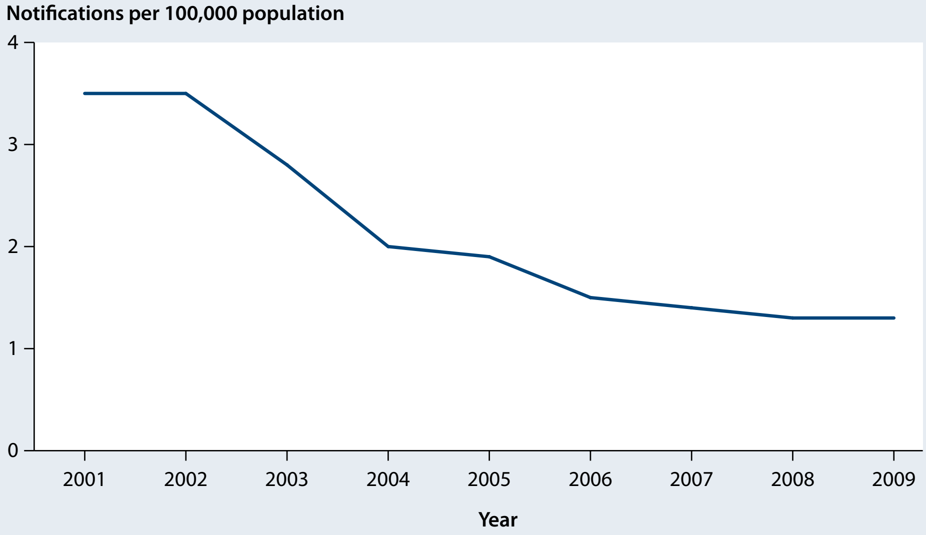
Vaccine-preventable infections

Immunisation has had a dramatic influence on rates of illness and death from a wide variety of infections. This section focuses on a selected number of infections for which childhood immunisation programs exist, namely invasive meningococcal disease, invasive pneumococcal disease (IPD), pertussis and mumps.

Invasive meningococcal disease

This bacterial infection is caused by *Neisseria meningitidis* (also known as 'meningococcus'). It is one of the highest profile infections in Australia because of the rapid and serious way it can attack children and young adults. Infection is usually most common in children aged under 5 years and those aged 15–24 years (Senanayake 2007:230). Around 10% of those infected die (Rosenstein et al. 2001), which is a high rate for an acute infection.

Notification rates for infections due to meningococcal disease in Australia have been falling in recent years (Figure 4.33). This may be partly attributed to a nationally funded immunisation program to vaccinate against the C strain of meningococcus. Certainly, in 2008, only 7% (21 of the 286 cases) of notified meningococcal infections were caused by the C strain, with almost 77% being caused by the B strain. In addition, there were a reduced number of cases due to the C strain in people aged 25 years or more, suggesting that there is 'herd immunity'—the phenomenon where unvaccinated groups benefit from others having been vaccinated (Australian Meningococcal Surveillance Programme 2009).



Source: NNDSS 2010.

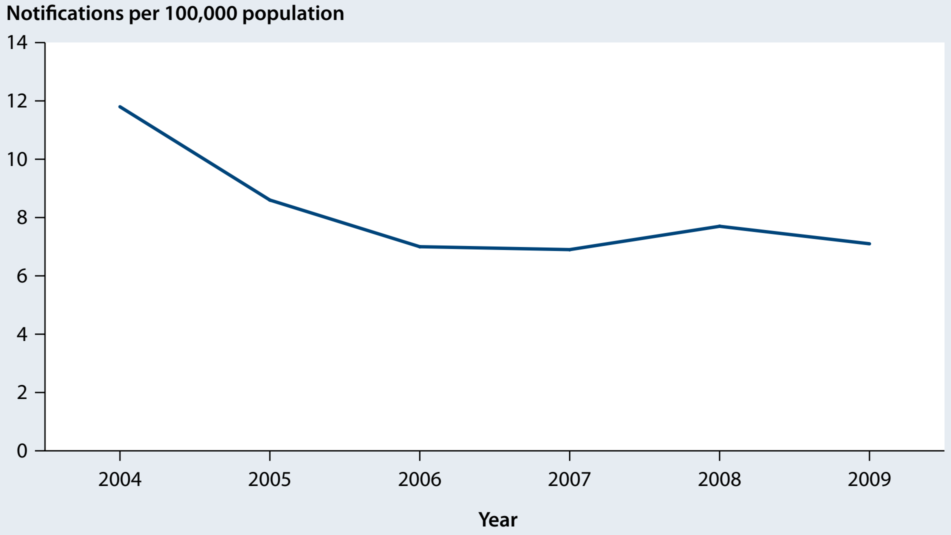
Figure 4.33: Rates of meningococcal infections, 2001–2009

Invasive pneumococcal disease

IPD is due to a bacterium called *Streptococcus pneumoniae* (also known as 'pneumococcus'). An individual can be classified as having IPD only if pneumococcus is isolated from a so-called sterile site. Blood, spinal fluid and fluid from around the lung are examples of sterile sites; therefore, middle ear and chest infections due to pneumococcus are not included in the notifications for IPD since they are not classified as sterile sites.

Rates of IPD tend to be largest at the extremes of age, namely in children under 2 years and the very elderly (McIntyre et al. 2000). Also, indigenous populations in many countries are at higher risk of IPD than non-indigenous populations. Australia is no exception, with Indigenous rates of IPD 4.3 times as high as in other Australians (Roche 2008a).

The introduction of a new vaccine in the last decade has changed the disease patterns of IPD. Before January 2005, only certain at-risk children were eligible for free IPD immunisation. However, from then the Australian Government expanded its program to fund vaccination for all infants and children and all adults aged 65 years or over (Roche et al. 2008a). Since these changes there has been an overall reduction in notification rates of IPD (Figure 4.34), including among age groups which are not covered by the vaccination program (NNDSS 2009)—most probably due to herd immunity.



Source: NNDSS 2010.

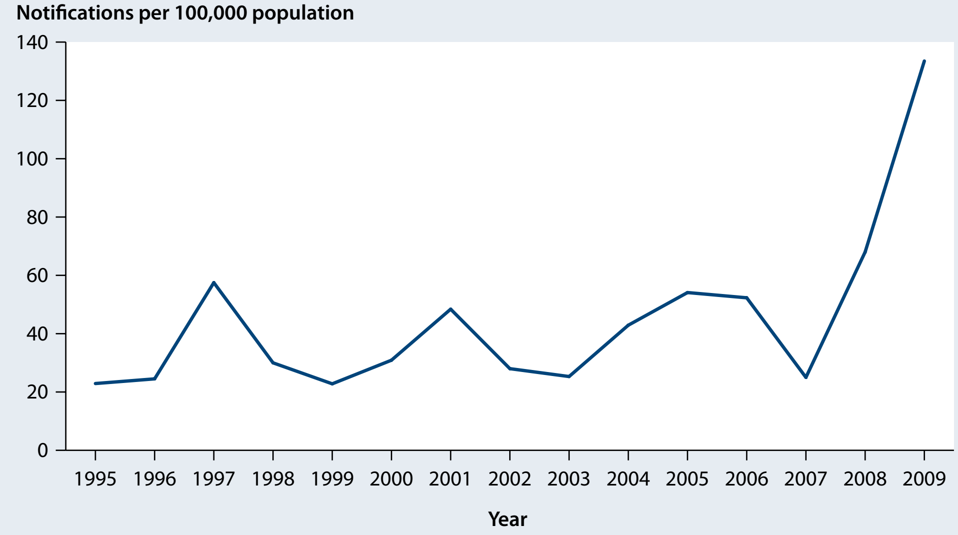
Figure 4.34: Notification rates of invasive pneumococcal disease, 2004–2009

Pertussis (whooping cough)

Pertussis 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, particularly in infants. There is typically a background rate of cases interrupted by an epidemic peak every 4 years or so (Figure 4.35) (Cherry 2005; NNDSS 2009).

Despite global immunisation programs, pertussis remains a significant problem in both developing and developed nations (WHO 2005). This includes Australia, where pertussis is the most commonly notified vaccine-preventable infection. Since vaccination began among children in Australia, there has been a shift upwards in the age distribution of pertussis, with almost 90% of notifications since 2003 occurring in those aged over 10 years and around half in those aged 20–59 years.

In 2008 and 2009, there was a sharp increase in notification rates for pertussis (Figure 4.35). In addition, there was a large increase in the proportion of young children infected: those aged from 0–4 years accounted for 11% and 15% of pertussis cases in 2008 and 2009 respectively, whereas they only made up around 3–8% of cases in the preceding 5 years (NNDSS 2009). The increased notification rate in the 0–4 year age group is important because susceptible infants are those most likely to die from the infection (Brotherton et al. 2004). However, the increased proportion of young children identified with pertussis may not necessarily be due to increased levels of infection. It is likely that better tests for pertussis and more testing of sick children means that more young children are being identified with pertussis than previously.



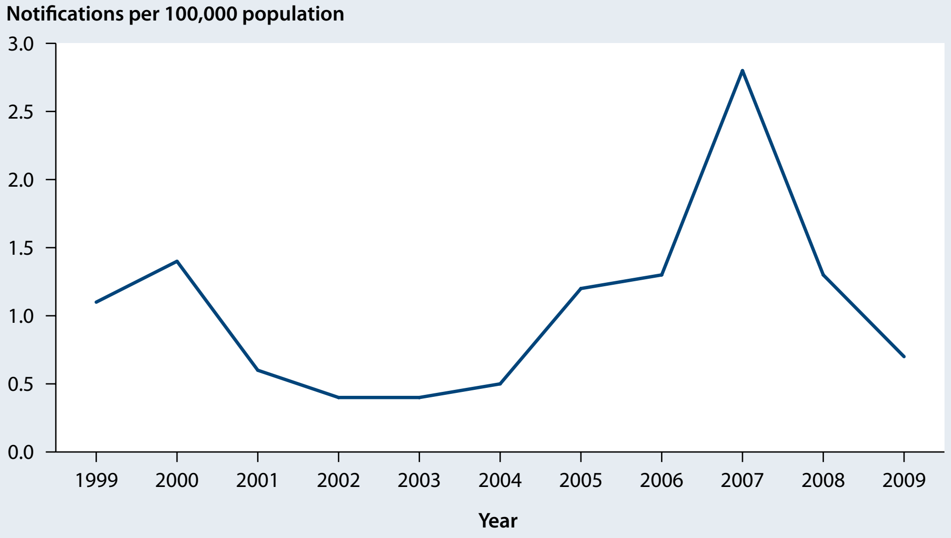
Source: NNDSS 2010.

Figure 4.35: Notification rates of pertussis, 1995–2009

Mumps

Mumps is a vaccine-preventable viral disease that has experienced a resurgence. It causes swelling of the salivary glands in the face and can lead to a variety of complications such as meningitis, inflammation of the testicles in post-pubertal males, and pancreatitis. In susceptible populations it is a highly infectious disease (WHO 2007).

Notification rates of mumps had been increasing in Australia in recent years although there has been a decline over the last 2 years (Figure 4.36). In addition, whereas mumps was traditionally an infection of mainly young children, it now also affects adolescents and adults (NNDSS 2009). This is probably due to a combination of vaccine failure in childhood (especially in those who received only one dose of vaccine) and adults having waning immunity from the immunisation they had when children (Cohen et al. 2007; Harling et al. 2005).



Source: NNDSS 2010.

Figure 4.36: Notification rates of mumps, 1999–2009

Influenza

Influenza is a common viral respiratory infection that affects many people around the world each year. The classical infection consists of fevers, generalised muscle aches, headache, cough and sore throat. This combination of symptoms is also called an 'influenza-like illness' or 'ILI', since other viruses or bacteria can produce a similar sickness. The most serious complication of influenza is pneumonia, which can be due to the influenza virus itself or a secondary bacterial infection. More details about influenza are provided in Box 4.14.

Box 4.14: Influenza characteristics and vaccination

Not all influenza viruses are the same—they are distinguished in different ways. First, they can be classed as influenza A, B or C. Influenza B and C are exclusively human viruses, whereas influenza A can also be found in aquatic birds and other mammals besides humans. Influenza A viruses can then be further subdivided into 'H' and 'N' strains, based on two of their proteins (Zambon 1999). For example, avian influenza ('bird flu') is the influenza A strain H5N1.

Influenza tends to be a seasonal illness in temperate climates where it usually occurs from June to September in southern hemisphere countries (such as Australia) and December to April in the northern hemisphere. It can occur throughout the year in tropical countries (Li et al. 2005). The annual seasonal influenza epidemics are due to small changes in the virus (antigenic drift), but epidemics can occur when a new virus subtype emerges (antigenic shift). The problem with antigenic shift is that the human population has no underlying immunity to the new virus;

(continued)

Box 4.14 (continued): Influenza characteristics and vaccination

therefore, worldwide epidemics (known as pandemics) can result. There have been four influenza pandemics since the beginning of the 20th century: 1918 (H1N1), 1957 (H2N2), 1968 (H3N2) and 2009 (H1N1).

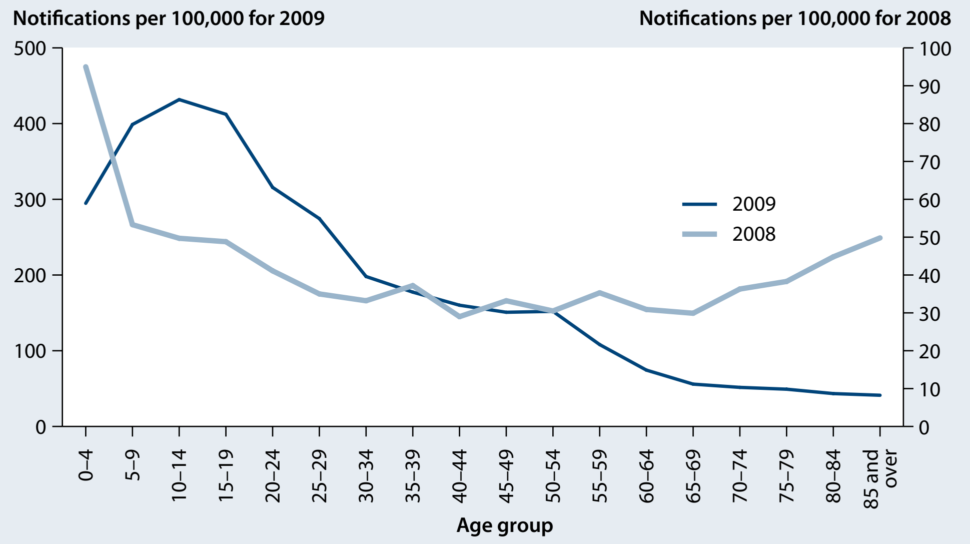
Influenza vaccines need to be given just before the influenza season. Since the viruses continually mutate, a new influenza vaccine has to be given every year. The vaccine usually covers three strains of influenza: two A strains and one B strain (NHMRC 2008).

Pandemic (H1N1) 2009 ('swine flu')

In 2009, the world experienced its first influenza pandemic since 1968. The infection became known as 'swine flu' because it developed from a reassortment of influenza viruses from pigs, birds and humans. The first two recognised cases occurred in children in California. However, it soon became apparent that a large pre-existing outbreak of respiratory illness in neighbouring Mexico was also due to the same virus.

Being a new virus increased both the likelihood of transmission and the lethal potential of H1N1 because of a lack of immunity in the population. Furthermore, it had become capable of sustained human-to-human transmission, which had happened only rarely with avian influenza H5N1 ('bird flu') (Senanayake 2009a). Despite being a new virus, swine flu did not affect all age groups equally. The highest rates of infection were in children and young adults, with rates tailing off in the older age groups. This is different from a standard influenza year such as 2008, where peaks of infection tend to occur in very young children and the elderly with lower rates in young adults (Figure 4.37). The reason for the lower rates of pandemic (H1N1) 2009 influenza infection in older age groups is thought to be due to pre-existing immunity. Even though the virus is new, many other strains of H1N1 have caused influenza in the past, so people exposed to those older H1N1 strains would have developed an immunity that has provided cross-immunity to the 2009 H1N1 strain. This has been supported by finding cross-reactive antibodies in blood from people of different age groups (Senanayake 2009b).

By late October 2009, the outbreak had affected most countries around the world, with the World Health Organization reporting over 440,000 notified cases worldwide (WHO 2009). However, this figure is likely to be a gross underestimate since most people with pandemic (H1N1) 2009 were not being tested (WHO 2009). Australia featured prominently early in the outbreak because the virus emerged just before our winter, which is the start of our usual influenza season—presumably providing the ideal conditions for the virus to spread. By mid-January 2010, the Department of Health and Ageing had reported 53,302 confirmed cases of pandemic (H1N1) 2009 in Australia (NNDSS 2010). In fact, the number of laboratory-confirmed cases of influenza in 2009 (including the pandemic strain and all others) far exceeded figures from previous years (Figure 4.38). This may be due to a genuinely large rise in influenza circulating in the community in 2009, a rise in testing, or both.



Source: NNDSS 2010.

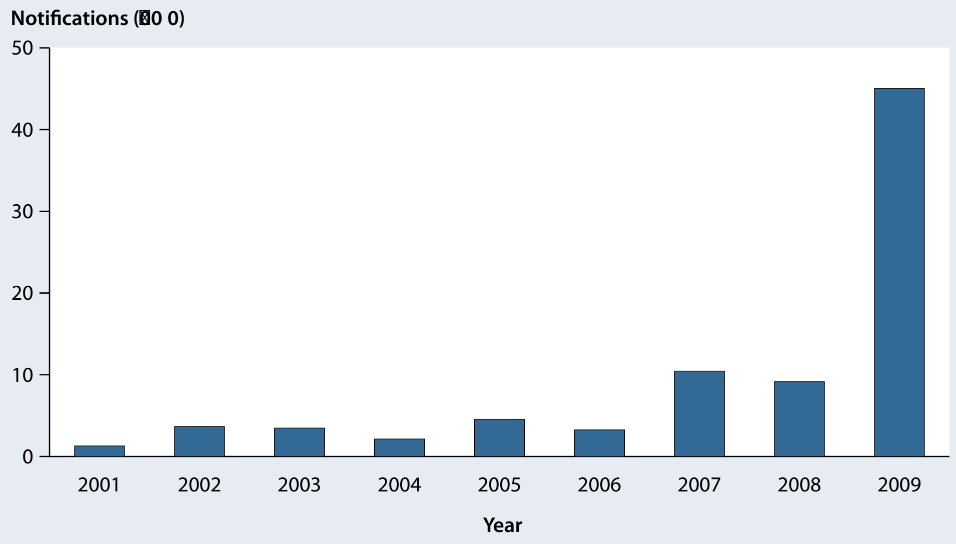
Figure 4.37: Notification rates of influenza by age group: 2008 and 2009

Of the 37,149 cases of pandemic (H1N1) 2009 influenza, confirmed by 23 October 2009, 4,833 were hospitalised and 186 died—1 in 200 among the confirmed cases. Of these deaths, 3 (2%) had occurred in pregnant females and 24 (13%) in Indigenous people (DoHA 2009). Indeed, while most people suffered a mild illness and recovered by themselves, many experienced moderate or severe illness. Groups at risk of severe infection included pregnant females and those with chronic lung disease, heart disease, obesity, diabetes, autoimmune disease or an impaired immune system (Senanayake 2009b). However, more than 30% of those who died had no known pre-existing illness or chronic health conditions.

Data from intensive care units (ICUs) throughout Australia and New Zealand found that 722 patients were admitted to an ICU between 1 June and 1 August 2009 with a confirmed diagnosis of pandemic (H1N1) 2009. Most of these ICU patients had the risk factors discussed previously but it is worth noting that one-third of them were young and middle-aged people with none of these risk factors. Over 9% were pregnant females (compared with pregnant females making up 1% of the general population), nearly 30% were severely obese (compared with around 5% in the general population), and over 9% were Aboriginal or Torres Strait Islanders (compared with 2.5% in the general population) (The ANZIC Influenza Investigators 2009).

The new virus was initially sensitive to two antiviral medications commonly used against influenza (oseltamivir and zanamivir), although resistance to oseltamivir sporadically developed in a small number of cases in a few countries.

Soon after the outbreak first appeared, vaccine development began in earnest. By October 2009, Australia was one of the first countries to begin its national vaccination program against pandemic (H1N1) swine flu. This corresponded to autumn in the northern hemisphere, where increased flu activity due to the pandemic (H1N1) 2009 virus was expected.



Source: NNDSS 2010.

Figure 4.38: Notifications of laboratory-confirmed influenza, 2001–2009

Hendra virus

Hendra is a virus that is found in fruit bats and is named after a suburb in Brisbane where the virus was first isolated during an outbreak (ProMED 2009). On rare occasions it can be transmitted to horses from bats and to humans from horses, potentially leading to fatal illnesses in both horses and humans. Since 1994, there have been 13 episodes of transmission from bats to horses (Animal Health Australia 2009) with around a handful of episodes also involving horse-to-human transmission. No cases of human-to-human or bat-to-human transmission have been described (Field 2009). In 2008, a veterinary worker died from an outbreak of Hendra virus, and in 2009 an outbreak near Rockhampton infected both horses and humans, resulting in the death of another veterinary worker (ProMED 2008, ProMED 2009).

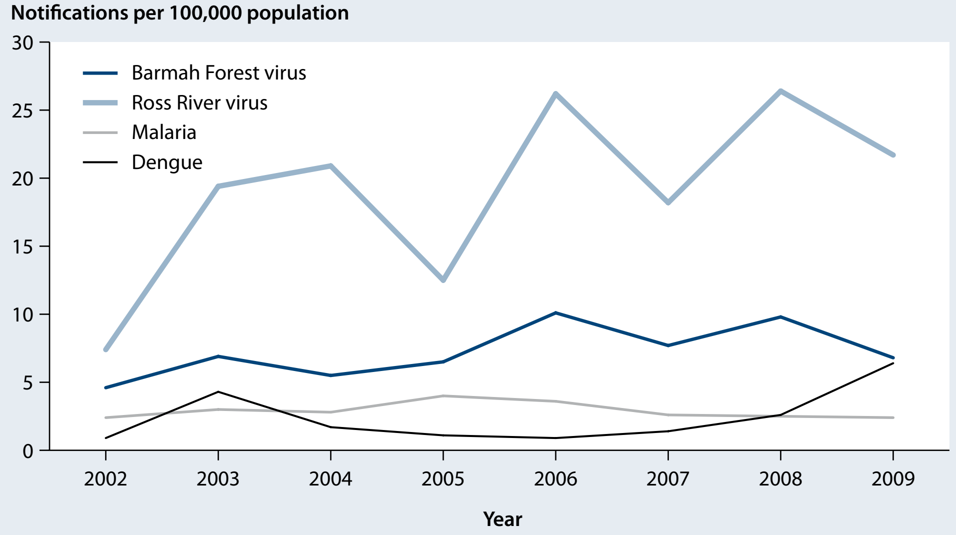
Mosquito-borne infections

Australia has numerous notifiable mosquito-borne infections including:

- infections acquired only within Australia (such as Ross River virus and Barmah Forest virus)
- infections usually acquired only overseas (malaria)
- infections that could have been acquired in either location (such as Japanese encephalitis and dengue).

Barmah Forest virus and Ross River virus

Barmah Forest virus and Ross River virus come from a family of viruses called alphaviruses. They are transmitted to humans by a variety of species of mosquito. Both viruses typically cause an illness with fevers, rash and joint pains. Despite their geographical names, cases have now been reported throughout Australia for both infections, with most notifications being from Queensland and New South Wales (Fitzsimmons et al. 2009; NNDSS 2009). The notification rates for both infections have fluctuated over the last few years (Figure 4.39).



Source: NNDSS 2010.

Figure 4.39: Notification rates for mosquito-borne infections, 2002–2009

Malaria

Malaria is a parasitic infection transmitted by the female *Anopheles* mosquito. Although hundreds of cases are reported in Australia every year, these cases have almost certainly been acquired overseas. Malaria commonly causes fevers within 2 weeks of being infected, although some people become unwell many months after being bitten. Even people who take all their required medication during their travel can still be infected. One species of the malaria parasite can kill humans quickly if untreated, especially when it spreads to the brain ('cerebral malaria'). Until recently, only four strains of malaria had been associated with infection in humans. Recently a fifth such strain was identified in some parts of Asia—*Plasmodium knowlesi* (Luchavez et al. 2008). The Australian data show relatively stable rates (Figure 4.39).

Dengue

North Queensland experienced an unprecedented outbreak of dengue from late 2008 to mid-2009. Dengue is a viral infection transmitted by the day-feeding *Aedes* mosquito. People with dengue usually complain of fevers, rash, headache and muscle aches in the neck and back that can be very severe. The disease is a global problem, and is responsible for tens of millions of cases per year. Currently, Australian outbreaks are typically confined to those areas of Queensland in which the *Aedes* mosquito resides. There are four different types of dengue virus (DENV-1 to 4) and infection with one type does not protect from future infections with others. In fact, infection with another strain of dengue virus in people who have had dengue previously can lead to far more severe and even life-threatening illnesses (dengue haemorrhagic fever and dengue shock syndrome) (Senanayake 2006).

The dengue outbreak in north Queensland was remarkable for a number of reasons. First, it was a very large outbreak with just over 1,000 cases confirmed between November 2008 and June 2009 compared with a similar number of confirmed cases over the nine years between 2000 and 2008. Second, the dominant strain was the highly virulent DENV-3 imported by a Cairns resident returning from Indonesia. This particular strain had a shorter incubation period in both mosquitoes and humans, allowing it to be transmitted more quickly. This made it harder for public health workers to keep track of the growing number of cases. Furthermore, despite the DENV-3 strain being the dominant dengue virus, all four strains of dengue were circulating at the time. In addition to all these viral factors, it has been suggested the *Aedes* mosquito transmitting the virus also fuelled the outbreak by developing resistance to pesticides that had been effective previously. Another unique feature of the outbreak was the large number of imported cases of active dengue in 2009 (18 cases) (Ritchie 2009).

Sexually transmissible infections

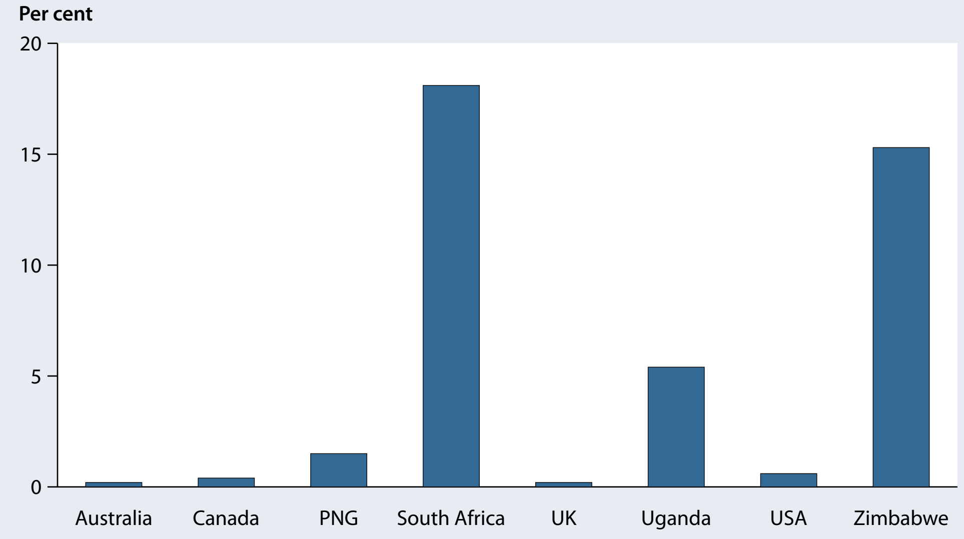
Human immunodeficiency virus

Human immunodeficiency virus (HIV) can be transmitted by sexual contact with an infected person, through infected blood products, to the foetus during pregnancy and to infants through breastfeeding by an infected mother. Those infected can remain well for many years without treatment but are still able to infect others. In most untreated cases, the virus will progressively damage their immune system over many years until they become susceptible to a number of serious infections and cancers. This stage is known as the acquired immune deficiency syndrome (AIDS).

Infection with HIV cannot be cured and there is no vaccine to prevent it, although research into a vaccine continues. However, a wider variety of more effective antiviral medications has allowed people with HIV to lead relatively normal lives. It has become a disease that many more people now live with rather than die from, as they previously did.

At the end of 2008 there had been 28,330 diagnoses of HIV infections and 10,348 diagnoses of AIDS in Australia since notifications began here (NCHECR 2009). Between 1988 and the end of 2006, there were nearly 5,000 deaths where AIDS or HIV was the underlying cause (AIHW 2009a). Although HIV continues to be a global problem, Australia has maintained a very low prevalence of the infection compared with other countries (Figure 4.40).

The annual number of new HIV cases in Australia has remained fairly constant (around 900–1,000 cases) from 2004 to 2008. The number of AIDS notifications in the latest 3 years declined despite the steady number of new HIV cases, presumably reflecting the effectiveness of the antiviral medications. Most notifications of HIV came from New South Wales, followed by Victoria and Queensland. Overall, the great majority of notifications continue to be among men who have sex with men (69%), with females accounting for about 15% of notifications in 2008. Around 25% of HIV notifications from 2004 to 2008 have been attributed to heterosexual contact. Of people diagnosed with HIV associated with heterosexual contact in the last 5 years, 59% either came from a high-prevalence country or had a sexual partner from a high-prevalence country (NCHECR 2009).



Source: UNAIDS 2008.

Figure 4.40: Estimated prevalence of HIV in adults aged 15–49 years in selected countries, 2007

Syphilis

Syphilis is a complex sexually transmissible infection due to an organism known as *Treponema pallidum*. It responds well to penicillin but untreated it becomes a chronic disease with a variable course and long latent (symptom-free) periods. Its most serious expressions are tertiary (third-stage) syphilis and congenital syphilis, where a child is infected by its mother during pregnancy. In a proportion of untreated cases, tertiary syphilis can arise about 10 or more years after the original infection, with serious damage to the brain, other parts of the nervous system, and the cardiovascular system. Congenital syphilis is a serious condition that can result in a variety of problems for the child from birth or much later in life.

In Australia, there has been a resurgence of infectious syphilis, particularly among men who have sex with men. Risk factors probably include an increase in unprotected sexual practices, being HIV-positive, having more partners and using more recreational drugs (Botham et al. 2006; Jin et al. 2005). The increase in notifications has been part of a wider pattern in the developed world (Centers for Disease Control and Prevention 2004; Fenton et al. 2001). In 2008 in Australia, however, there was a decline in the rate of diagnoses in all states and territories except Western Australia. It is unclear whether this pattern will continue.

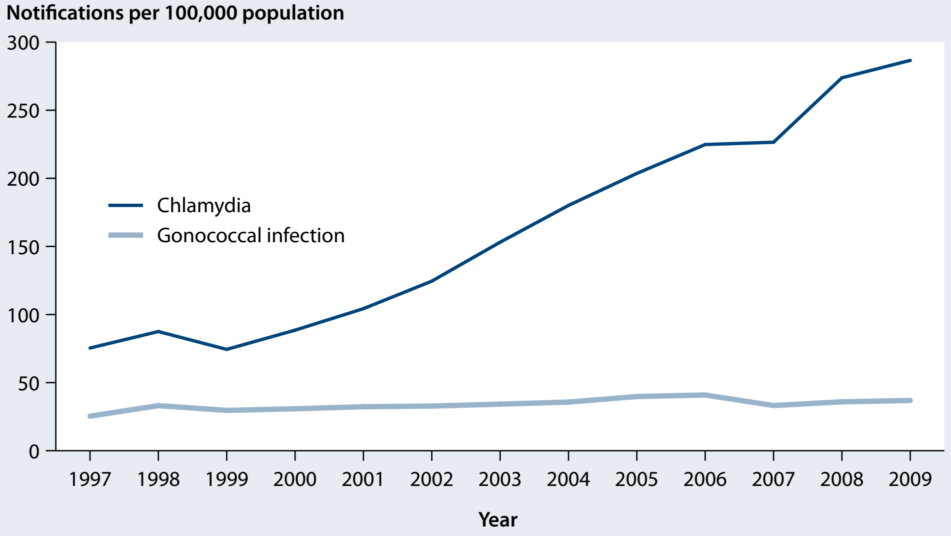
Notifications of congenital syphilis have remained low in Australia (7–14 cases per year or 0–0.1 per 100,000 population per year from 2006 to 2008) (NNDSS 2009). This reflects effective screening and treatment of pregnant women for syphilis.

Chlamydia and gonorrhoea

In 2008, chlamydia continued to be the most notified infection in Australia, with over 58,000 new diagnoses (NCHECR 2009). Chlamydia is a sexually transmissible infection due to the bacterium *Chlamydia trachomatis*. The most important feature of chlamydia is that it is often a silent infection in males and females. In males, it can infect the prostate, urethra and testes while females can develop infections of the cervix, uterus and pelvis. In females, complications may result in chronic pelvic pain, infertility and ectopic pregnancy (Bowden et al. 2002). Between 2003 and 2008, the rates of chlamydia diagnoses in both males and females almost doubled, although there are about 50% more cases in females than males. The age groups most affected are 15–19 and 20–29 year olds, which accounted for over 80% of infections in 2008 (NCHECR 2009).

Gonorrhoea is due to the bacterium *Neisseria gonorrhoeae* (also known as 'gonococcus'). It can cause a similar spectrum of disease to chlamydia but tends to be more symptomatic (Bowden et al. 2002). Unlike the rapid rise in chlamydia rates, gonorrhoea rates appear to have been stable (Figure 4.41). In New South Wales, Victoria and the Northern Territory, they declined substantially in 2008 compared with 2006 (NCHECR 2009).

There is a striking sex difference in the notification rates: gonococcal rates are far more common in males while chlamydia is more common in females (NNDSS 2009).



Source: NNDSS 2010.

Figure 4.41: Notification rates of chlamydia and gonococcal infections, 1997–2009

Hepatitis B and C infections

Hepatitis B and C viruses can cause chronic liver damage and liver cancer. Notification rates of new cases of hepatitis B and C have remained fairly stable in recent years at just over 1 and just over 2 per 100,000 population respectively each year. In 2008, there were more than 200 new cases of hepatitis B infection and more than 400 cases of hepatitis C infection diagnosed (NCHECR 2009; NNDSS 2009). However, there have been movements in the number of newly diagnosed cases where the onset of the disease is unspecified (some will be new cases that have just developed and been diagnosed quickly, but some may be cases that developed some time in the past that have only recently been diagnosed). Over the 10 years from 2000 to 2009 there was a substantial decline in the total rate of newly diagnosed cases of hepatitis C, and a smaller decline for hepatitis B (NNDSS 2009).

A program to increase vaccination coverage in adolescents may explain a drop in the rate of new hepatitis B infections in recent years that occurred among those aged 15–29 years. Injecting drug use accounted for about 50% of new cases of hepatitis B infection with a small decline from 21% to 18% in the proportion of those attributable to heterosexual sex (NCHECR 2009). However, although there has been a decline in new hepatitis B infections, there are concerns that the long-term complications of chronic hepatitis B infection (that is, cirrhosis and liver cancer) may become an increasing problem in Australia as the currently infected individuals are ageing, with very few receiving antiviral therapy. One report predicts that, by 2017, the burden of chronic hepatitis B infection will lead to a three-fold increase in liver cancer rates compared with 2008, increased deaths attributable to the infection and an increasing demand on liver clinics (Butler et al. 2009).

From 2004 to 2008, there was a large decline in the rate of diagnosis of hepatitis C infection from 64.7 per 100,000 to 53.2 per 100,000. This was most marked in those aged 15–19 years, although those aged 20–39 years also had a large reduction in rates. This is thought to be due largely to less injecting drug use, which is considered one of the most important causes of hepatitis C transmission. However, other contributing factors, such as reductions in risk behaviour related to drug injecting and reduced testing, cannot be excluded (NCHECR 2009).

Gastrointestinal outbreaks

Gastrointestinal infections are common, with only limited data available to monitor them. Some data are available from OzFoodNet, a federal government agency that specialises in investigating outbreaks of gastrointestinal illness and clusters of disease due to contaminated food (OzFoodNet Working Group 2008a,b,c; 2009a,b). These reports under-represent the true number of outbreaks since many are not reported to health authorities (OzFoodNet Working Group 2009a).

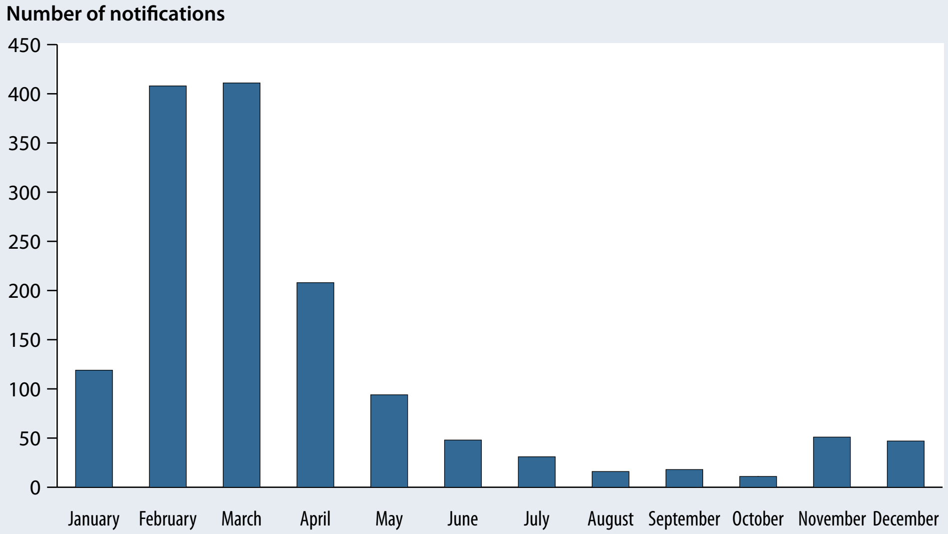
There were 1,742 outbreaks of gastrointestinal illness notified to OzFoodNet during the 15-month period from 1 January 2008 to March 2009, an average of 17 per week from around the country. Most of the outbreaks were attributed to person-to-person spread. The number of Australians affected in each quarter ranged from 3,518 to 7,446. The number hospitalised from these outbreaks ranged from 84 to 292 per quarter, with death rates ranging from 0.2% to 0.4%.

Of the outbreaks transmitted by food, the cause was often not identified. But when it was, *Salmonella* was the most common agent, in particular *Salmonella* Typhimurium. *Salmonella* is a bacterium found in a variety of animals as well as humans and it can contaminate virtually any food.

Cryptosporidiosis

Cryptosporidium is a parasite that can infect humans. Illnesses due to it are known as cryptosporidiosis, the most common of which is a self-limiting watery diarrhoea. However, in certain groups with reduced immunity, such as those with AIDS, it can lead to life-threatening disease. Humans can be infected through a number of ways: ingesting contaminated water (for example in public swimming pools), eating contaminated food, contact with infected animals and even from infected people (Senanayake 2007).

While cases of cryptosporidiosis occur every year, in early 2009 there was a large outbreak that mainly affected New South Wales, the Australian Capital Territory, Victoria and Queensland (NNDSS 2009). Data from New South Wales clearly demonstrate the higher than anticipated number of cases in 2009, of which 78% were identified in the first 4 months of the year (Figure 4.42). Almost 60% of cryptosporidiosis notifications in New South Wales (835 out of the 1,430 cases) between 1 October 2008 to 30 September 2009 were in children under 10 years of age (NSW Health Department 2010).



Source: NSW Health Department 2010.

Figure 4.42: Cryptosporidiosis notifications in New South Wales in 2009

Tuberculosis

Tuberculosis (TB) is a potentially serious infection caused by a group of bacteria known as the TB complex, with most cases caused by *Mycobacterium tuberculosis*. It especially affects the lungs, with fever-like symptoms and destruction of tissue. New TB cases still occur in Australia, with about 1,000 new cases identified annually, representing a rate of just over 5 per 100,000 population (NNDSS 2009). This is low compared with other developed and developing nations, although some groups in Australia have higher rates of infection: 18.3 per 100,000 and 6.6 per 100,000 in people born overseas and Indigenous Australians respectively. TB treatment programs remain effective in Australia, with 95% cure rates (Roche 2008b).

People with HIV are prone to TB and this has become a problem overseas. The death rate for TB in HIV-positive individuals is much higher than in non-HIV individuals (Corbett et al. 2003). A United States study found that 26% of their TB cases in 2007 were associated with HIV. In Australia, out of 486 individuals with TB who were tested for HIV in 2007, only 13 (3%) were positive (Barry & Konstantinos 2009).

Although TB can affect virtually any part of the body, TB of the lungs (usually without TB infection in another part of the body) is still the most common form in Australia, occurring in about 60% of cases (Roche et al. 2008b). TB of the lungs is especially important because, unlike other forms of TB, it can be spread to other individuals and therefore poses a public health risk.

Emerging infections

Highly virulent strain of *Clostridium difficile*

Clostridium difficile is a bacterium that can cause an infection typically marked by diarrhoea following the use of antibiotics. Although the infection has been recognised for about 30 years, a highly virulent strain, known as NAP1 or PCR ribotype 027, recently emerged in North America and Europe. This was associated with severe infection, leading to higher rates of death and surgical removal of infected bowel than had been seen with this infection previously (Riley 2009). Despite the emergence of this strain in other parts of the world, Australia had not seen any cases; however, in 2009, the first case of this aggressive strain of *C. difficile* appeared here, having probably been brought from the United States (Riley et al. 2009).

Multiresistant bacteria in returning travellers

An increasing problem worldwide is the ability of various bacteria to become resistant to a range of antibiotics. The difficulties in treating infections with these bacteria arise because there are so few effective antibiotics against them, and the antibiotics are often very expensive or have serious side effects. One of these bacteria is a highly resistant form of *Escherichia coli*, a bacterium which normally colonises the healthy bowel. While Australia is thought to have low levels of such highly resistant *E. coli*, it is a bigger problem in other countries. An Australian study showed that international travel is a risk factor for being colonised with highly resistant *E. coli*. The researchers found that only 8% of travellers were colonised with the resistant bacterium before travel but this increased to 47% on return to Australia. Being colonised with these bacteria does not necessarily mean that infection will occur, but if it does it can be troublesome. Interestingly, within 1 month of the travellers' return to Australia, the highly resistant *E. coli* had disappeared from their bowels in most cases, being replaced by the 'local' less resistant 'Australian' *E. coli* (Kennedy & Collignon, 2009).

References

ABS (Australian Bureau of Statistics) 2002a. Australian social trends 2002. ABS cat no. 4102.0. Canberra: ABS.

ABS 2002b. National Health Survey: summary of results 2001. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2006. National Health Survey: summary of results 2004–2005, Australia. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2008. National Survey of Mental Health and Wellbeing: summary of results, Australia, 2007. ABS cat. no. 4326.0. Canberra: ABS.

ABS 2009a. National Health Survey: summary of results 2007–2008 Australia. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2009b. National Health Survey: summary of results 2007–2008 (reissue). ABS cat. no. 4364.0.

ABS 2009c. Causes of Death, Australia, 2007. ABS cat. no. 3303.0. Canberra: ABS.

ABS 2009d. Causes of Death, Australia, 2007. Multiple causes of death datacube, 2009 release. Canberra: ABS.

ACAM (Australian Centre for Asthma Monitoring) 2005. Asthma in Australia 2005. AIHW Asthma Series 2. Cat. no. ACM 6. Canberra: AIHW.

ACAM 2007. Asthma in Australia: findings from the 2004–05 National Health Survey. Cat. no. ACM 10. Canberra: AIHW.

ACAM 2008. Asthma in Australia 2008. AIHW asthma series no. 3. Cat. no. ACM 14. Canberra: AIHW.

ACAM 2009. Asthma in Australian children: Findings from Growing Up in Australia, the Longitudinal Study of Australian Children. Cat. no. ACM 17. Canberra: AIHW.

AIHW (Australian Institute of Health and Welfare) 2004. Heart, stroke and vascular diseases—Australian facts 2004. Cat. no. CVD 27. Canberra: AIHW and National Heart Foundation of Australia.

AIHW 2005a. Chronic kidney disease in Australia 2005. Cat. no. PHE 68. Canberra: AIHW.

AIHW 2005b. Arthritis and musculoskeletal conditions in Australia 2005. Arthritis series no. 1. Cat. no. PHE 67. Canberra: AIHW.

AIHW 2007a. Dementia in Australia: national data analysis and development. Cat. no. AGE 53. Canberra: AIHW.

AIHW 2007b. Australian hospital statistics 2005–06. Health services series no. 30. Cat. no. HSE 50. Canberra: AIHW.

AIHW 2008a. Health care expenditure on cardiovascular diseases 2004–05. Cat. no. CVD 43. Canberra: AIHW.

AIHW 2008b. Diabetes: Australian facts 2008. Diabetes series no. 8. Cat. no. CVD 40. Canberra: AIHW.

AIHW 2008c. Australia’s health 2008. Australia’s health no. 11. Cat. no. AUS 99. Canberra: AIHW.

AIHW 2008d. Juvenile arthritis in Australia. Arthritis series no. 7. Cat. no. PHE 101. Canberra: AIHW.

AIHW 2009a. GRIM (General Record of Incidence of Mortality) books. Canberra: AIHW.

AIHW 2009b. Impact of falling cardiovascular disease death rates: deaths delayed and years of life extended. Bulletin no. 70. Cat. no. AUS 113. Canberra: AIHW.

AIHW 2009c. Insulin-treated diabetes in Australia 2000–2007. Diabetes series no. 11. Cat. no. CVD 45. Canberra: AIHW.

AIHW 2009d. Diabetes prevalence in Australia: an assessment of national estimates. Diabetes series no. 12. Cat. no. CVD 46. Canberra: AIHW.

AIHW 2009e. An overview of chronic kidney disease in Australia 2009. PHE 111. Canberra: AIHW.

AIHW 2010a. Cardiovascular medicines and primary health care: a regional analysis. Cardiovascular disease series no. 32. Cat. no. 48. Canberra: AIHW.

AIHW 2010b. The problem of osteoporotic hip fracture in Australia. Bulletin no. 76. Cat. no. AUS 121. Canberra: AIHW.

AIHW: Cripps RA 2007. Spinal cord injury, Australia, 2005–06. Injury Research and Statistics Series Number 36. AIHW cat. no. INJCAT 102. Adelaide: AIHW.

AIHW: Field B. 2004. Rheumatic heart disease: all but forgotten in Australia except among Aboriginal and Torres Strait Islander peoples. Bulletin no. 16. Cat. no. AUS 48. Canberra: AIHW.

AIHW: Phillips G 2003. The impact of ICD coding standard changes for diabetes hospital morbidity data. Cat. no. CVD 26.Canberra: AIHW.

AIHW: Senes S 2006. How we manage stroke in Australia. Cardiovascular disease series no. 24. Cat. no. CVD 31. Canberra: AIHW.

AIHW: Senes S & Penm E 2007. Medicines for cardiovascular health: are they used appropriately? Cardiovascular disease series no. 27. Cat. no. CVD 36. Canberra: AIHW.

AIHW: Templeton M & Pieris-Caldwell I 2008. Gestational diabetes mellitus in Australia, 2005–06. Diabetes series no. 10. Cat. no. CVD 44. Canberra: AIHW.

AIHW & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia, an overview 2008. Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW.

AIHW & CA (Cancer Australia) 2008. Non-melanoma skin cancer: general practice consultations, hospitalisation and mortality. Cancer series no. 43. AIHW cat. no. 39. Canberra: AIHW.

AIHW, CA & AACR 2008. Cancer survival and prevalence in Australia: cancers diagnosed from 1982 to 2004. Cancer series no. 42. AIHW cat. no. CAN 38. Canberra: AIHW.

Alzheimer's Australia 2009. About dementia and memory loss. Viewed 21 January 2010, <www.alzheimers.org.au>.

Animal Health Australia 2009. Hendra virus update. Animal Health Surveillance quarterly report 14(3), Viewed 29 March 2010, < http://www.animalhealthaustralia.com.au>.

ANZDATA (Australian and New Zealand Dialysis and Transplant Registry) 1979. Second report of the Australia and New Zealand combined dialysis and transplant registry. Adelaide: The Australian Kidney Foundation.

Asher MI, Montefort S, Bjorksten B, Lai CKW, Strachan DP, Weiland SK et al. 2006. Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. The Lancet 368(9537):733–43.

Atkins RC, Polkinghorne KR, Briganti EM, Shaw JE, Zimmet PZ & Chadban SJ 2004. Prevalence of albuminuria in Australia: the AusDiab Kidney Study. Kidney International 66:S22–4.

Atkinson MA & Eisenbarth GS 2001. Type 1 diabetes: new perspectives on disease pathogenesis and treatment. The Lancet 358(9277):221–9.

Australian Meningococcal Surveillance Programme 2009. Annual report of the Australian meningococcal surveillance programme, 2008. Communicable Disease Intelligence 33(3):259–267.

Bachmeier CJ, March LM, Cross MJ et al. 2001. A comparison of outcomes in osteoarthritis patients undergoing total hip and knee replacement surgery. Osteoarthritis and Cartilage 9(2): 137–46.

Barr E, Magliano D, Zimmet P, Polkinghorne K, Atkins R, Dunstan D et al. 2006. AusDiab 2005 The Australian Diabetes, Obesity and Lifestyle Study; tracking the accelerating epidemic: its causes and outcomes. Melbourne: International Diabetes Institute.

Barry C & Konstantinos A 2009. Tuberculosis notifications in Australia, 2007. Communicable Diseases Intelligence 33(3): 304–15.

Begg S, Vos T, Barker B, Stevenson C, Stanley L, Lopez AD, 2007. The burden of disease and injury in Australia 2003. Cat. no. PHE 82. Canberra: AIHW.

Berry J & Harrison J 2007. Hospital separations due to injury and poisoning, Australia 2003–04. Cat. no. INJCAT 88. Adelaide: AIHW.

Botham SJ, Ressler KA, Bourne C & Ferson MJ. 2006. Epidemic infectious syphilis in inner Sydney—strengthening enhanced surveillance. Australian and New Zealand Journal of Public Health 30(6):529–33.

Bowden FJ, Tabrizi SN, Garland SM, Fairley, CK 2002. Sexually transmitted infections: new diagnostic approaches and treatments. Medical Journal of Australia 176(11): 551–57.

Bradley C & Pointer S 2009. Hospitalisations due to falls by older people, Australia 2005–06. Cat. no. INJCAT 122. Adelaide: AIHW.

Britt H & Miller GC (eds) 2009. General practice in Australia, health priorities and policies 1998 to 2008. General practice series no. 24. Cat. no. GEP 24. Canberra: AIHW.

Britt H, Miller GC, Charles J, Henderson J, Bayram C, Harrison C et al. 2008a. General practice activity in Australia 2007–08. General practice series no. 22. Cat. no. GEP 22. Canberra: AIHW.

Britt H, Miller GC, Charles J, Henderson J, Bayram C, Harrison C et al. 2008b. General practice activity in Australia 1998–99 to 2007–08: 10 year data tables. Internet only publication. AIHW Cat.no. GEP 23. Canberra: AIHW.

Britt H, Miller GC, Knox S et al. 2005. General practice activity in Australia 2004–05. AIHW Cat. no. GEP 18. Canberra: AIHW. Viewed 3 September 2009, <http://www.aihw.gov.au/publications/index.cfm/title/10661>.

Brotherton J, McIntyre P, Puech M et al. 2004. Vaccine preventable diseases and vaccination coverage in Australia 2001 to 2002. Communicable Diseases Intelligence 28 Suppl 2:vii–S116.

Buist A, McBurnie M, Vollmer W, Gillespie S, Burney P, Mannino D et al. 2007. International variation in the prevalence of COPD (The BOLD Study): a population-based prevalence study. The Lancet 370(9589):741–50.

Butler JRG, Korda RJ, Watson KJR, Watson DAR 2009. The impact of chronic hepatitis B in Australia: projecting mortality, morbidity and economic impact. Canberra: Australian Centre for Economic Research on Health.

CARI (Caring for Australasians with Renal Impairment) 2007. The CARI Guidelines: Justification for living donor transplantation. Westmead: CARI.

Centers for Disease Control and Prevention 2004. Trends in primary and secondary syphilis and HIV infections in men who have sex with men—San Francisco and Los Angeles, California, 1998–2002. MMWR Morbidity and Mortality Weekly Report 53(26):575–8.

Chadban SJ, Briganti EM, Kerr PG, Dunstan DW, Welborn TA, Zimmet PZ et al. 2003. Prevalence of kidney damage in Australian adults: The AusDiab kidney study. Journal of the American Society of Nephrology 14(7 Suppl 2):S131–8.

Cherry JD 2005. The epidemiology of pertussis: a comparison of the epidemiology of the disease pertussis with the epidemiology of Bordetella pertussis infection. Pediatrics 115(5):1422–7.

Chew GT, Gan SK & Watts GF 2006. Revisiting the metabolic syndrome. Medical Journal of Australia 185(8):445–9.

Chong JW, Craig ME, Cameron FJ, Clarke CF, Rodda CP & Donath SM 2007. Marked increase in type 1 diabetes mellitus incidence in children aged 0–14 yr in Victoria, Australia, from 1999 to 2002. Pediatric Diabetes 8(2):67–73.

Cohen C, White JM, Savage EJ et al. 2007. Vaccine effectiveness estimates, 2004–2005 mumps outbreak, England. Emerging Infectious Diseases 13(1):12–17.

Colagiuri R, Colagiuri S, Yach D & Pramming S 2006. The answer to diabetes prevention: science, surgery, service delivery, or social policy? American Journal of Public Health 96(9):1562–9.

Colagiuri S, Borch-Johnsen K, Glumer C & Vistisen G 2005. There really is an epidemic of Type 2 diabetes. Diabetologia 48(8):1459–63.

Corbett EL, Watt CJ, Walker N et al. 2003. The growing burden of tuberculosis: global trends and interactions with the HIV epidemic. Archives of Internal Medicine 163(9):1009–21.

de Marco R, Accordini S, Cerveri I, Corsico A, Sunyer J, Neukirch F et al. 2004. An international survey of chronic obstructive pulmonary disease in young adults according to GOLD stages. Thorax 59(2):120–5.

DIAMOND Project Group 2006. Incidence and trends of childhood Type 1 diabetes worldwide 1990–1999. Diabetic Medicine 23(8):857–66.

Dickman P 2004. Estimating and modelling relative survival using SAS. Stockholm: Karolinska Institutet. Viewed 8 May 2007, <www.pauldickman.com/rsmodel/sas_colon>.

Diette G, Markson L, Skinner EA, Nguyen TTH, Algatt-Bergstrom P & Wu AW 2000. Nocturnal asthma in children affects school attendance, school performance, and parents' work attendance. Archives of Pediatrics & Adolescent Medicine 154(9):923–8.

Disney APS (ed.) 1999. ANZDATA Registry Report 1999. Australia and New Zealand Dialysis and Transplant Registry. Adelaide, South Australia.

DoHA (Department of Health and Ageing) 2008. Aged Care Funding Instrument (ACFI). Viewed 21 January 2010, <www.health.gov.au/acfi>.

DoHA 2009. Pandemic (H1N1) 2009 update bulletin 26 October. Viewed 26 October 2009, <http://www.healthemergency.gov.au/internet/healthemergency/publishing.nsf/Content/bulletins-26Oct-1Nov>.

Dunstan D, Zimmet P, Welborn T, Sicree R, Armstrong T & Atkins Rea 2001. Diabesity and associated disorders in Australia-2000: the accelerating epidemic. The Australian Diabetes, Obesity and Lifestyle Study (AusDiab). Melbourne: International Diabetes Institute.

Eder W, Ege MJ & von Mutius E 2006. The asthma epidemic. New England Journal of Medicine 355(21):2226–35.

Fenton KA, Nicoll A & Kinghorn G 2001. Resurgence of syphilis in England: time for more radical and nationally coordinated approaches. Sexually Transmitted Infections 77(5):309–10.

FaHCSIA (Department of Families, Housing, Community Services and Indigenous Affairs) 2009. Disability support pension overview. Viewed 2 September 2009, <http://www.fahcsia.gov.au/sa/disability/pubs/policy/Documents/DSPReports/2007/>.

Field H 2009. Horses, humans and Hendra virus. Microbiology Australia 30:133.

Fitzsimmons GJ, Wright P, Johansen CA, Whelan PI; National Arbovirus & Malaria Advisory Committee 2009. Arboviral diseases and malaria in Australia, 2007–08: Annual report of the National Arbovirus and Malaria Advisory Committee. Communicable Diseases Intelligence 33(2):155–170.

Flack J & Colagiuri S 2005. Final report—NACD-ANDIAB 2004. Sydney: NADC-ANDIAB (National Association of Diabetes Centres—Australian National Diabetes Information Audit & Benchmarking).

Harling R, White JM, Ramsay ME et al. 2005. The effectiveness of the mumps component of the MMR vaccine: a case control study. Vaccine 23(31):4070–4.

Harrison JE, Pointer S & Elnour AA 2009. A review of suicide statistics in Australia. Injury research and statistics series no. 49. Cat. no. INJCAT 121. Adelaide: AIHW.

Harvey R, Skelton-Robinson M & Rosser MN 2003. The prevalence and causes of dementia in people under the age of 65 years. Journal of Neurology, Neurosurgery and Psychiatry 74(9):1206–9.

Haynes A, Bower C, Bulsara MK, Jones TW & Davis EA 2004. Continued increase in the incidence of childhood Type 1 diabetes in a population-based Australian sample (1985–2002). Diabetologia 47(5):866–70.

Helps Y, Henley G & Harrison JE 2008. Hospital separations due to traumatic brain injury, Australia 2004–05. Injury research and statistics series number 45. Cat. no. INJCAT 116. Adelaide: AIHW.

Henley G et al. 2007. Injury deaths, Australia 2003–04. Cat. no. INJCAT 89. Adelaide: AIHW.

Henley G & Harrison J 2009. Injury deaths, Australia, 2004–05. Cat. no. INJCAT 127. Adelaide: AIHW.

IDF (International Diabetes Federation) 2006. Diabetes atlas, 3rd edition. Brussels: IDF.

IDF 2009. Diabetes atlas, 4th edition. Brussels: IDF.

Ibels L, Caterson R, Coleman P, Gallery E, Mahony J et al. 2009. The kidney and diseases of the kidney. Royal North Shore Hospital. Viewed 26 November 2009, <www.renalresources.com/publications.php>.

Jamrozik K, Dobson A, Hobbs M et al. 2001. Monitoring the incidence of cardiovascular disease in Australia. Cat. no. CVD 16. Canberra: AIHW.

Jin F, Prestage GP, Kippax SC et al. 2005. Epidemic syphilis among homosexually active men in Sydney. Medical Journal of Australia 183(4):179–83.

Kennedy KJ & Collignon PJ 2009. Colonisation with Escherichia coli resistant to critically important antibiotics: a high risk for international travellers. Abstract for Annual Scientific Meeting of the Australasian Society for Infectious Diseases, Hunter Valley, NSW.

Kidney Health Australia 2006. The economic impact of end-stage kidney disease in Australia. Melbourne: Kidney Health Australia.

Kidney Health Australia 2007. Chronic kidney disease (CKD) management in general practice. Melbourne: Kidney Health Australia.

Li J, Hampson A, Roche P et al. 2005. Annual report of the National Influenza Surveillance Scheme, 2006. Communicable Diseases Intelligence 29:125–36.

Lobo A, Launer LJ, Fratiglioni L, Andersen K, Di Carlo A, Breteler MMB et al. 2000. Prevalence of dementia and major subtypes in Europe: a collaborative study of population-based cohorts. Neurology 54(11 Suppl 5):S4–S9.

Luchavez J, Espino F, Curameng P, Espina R, Bell D, Chiodini P et al. B 2008. Human Infections with Plasmodium knowlesi, the Philippines. Emerging Infectious Diseases 14(5):811-3.

Martin R 1990. Nocturnal asthma. Immunology and Allergy Practice 12:165–9.

Mathew T, Faull R & Snelling P 2005. The shortage of kidneys for transplantation in Australia. Medical Journal of Australia 182(5):204–05.

McDonald SP, Excell L & Livingston B (eds.) 2008. Australian and New Zealand Dialysis and Transplant Registry Report 2008. Adelaide: ANZDATA.

McDonald SP & Russ GR 2002. Survival of recipients of cadaveric kidney transplants compared with those receiving dialysis treatment in Australia and New Zealand, 1991–2001. Nephrology Dialysis Transplantation 17:2212–9.

McIntyre PB, Gilmour RE, Gilbert GL et al. 2000. Epidemiology of invasive pneumococcal disease in urban New South Wales, 1997–1999. Medical Journal of Australia 173:S22–6.

McKenzie D, Abramson M, Crockett A, Glasgow N, Jenkins S, McDonald C et al. 2007. The COPD-X Plan. Sydney: Australian Lung Foundation.

Miller BD & Strunk RC 1989. Circumstances surrounding the deaths of children due to asthma: a case-control study. American Journal of Diseases of Children 143:1294–9.

NHMRC (National Health and Medical Research Council) 2008. Australian immunisation handbook, 9th edition. Canberra: NHMRC. Viewed 1 October 2009, <http://immunise.health.gov.au/internet/immunise/publishing.nsf/Content/handbook-home>.

NCCI (National Cancer Control Initiative) 2003. The 2002 national non-melanoma skin cancer survey: a report by the NCCI Non-melanoma Skin Cancer Working Group. Melbourne: NCCI.

NCHECR (National Centre in HIV Epidemiology and Clinical Research) 2009. HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2009. Sydney: NCHECR.

NNDSS (National Notifiable Diseases Surveillance System) 2009. Communicable diseases intelligence tables. Canberra: NNDSS. Viewed 1 February 2010, <http://www9.health.gov.au/cda/Source/CDA-index.cfm>.

NNDSS (National Notifiable Diseases Surveillance System) 2010. Communicable diseases intelligence tables. Canberra: NNDSS. Viewed 4 March 2010, < http://www9.health.gov.au/cda/Source/CDA-index.cfm>.

NPHP (National Public Health Partnership) 2004. The National Falls Prevention for older people plan: 2004 onwards. Canberra: National Public Health Partnership.

NPHP 2005a. The National Injury Prevention and Safety Promotion Plan: 2004–2014. Canberra: National Public Health Partnership.

NPHP 2005b. The National Aboriginal and Torres Strait Islander Safety Promotion Strategy. Canberra: National Public Health Partnership.

NSF (National Stroke Foundation) 2010. Facts, figures and statistics. Melbourne: NSF. Viewed 8 February 2010, <http://www.strokefoundation.com.au/facts-figures-and-stats>.

NSW Health Department 2010. Cryptosporidiosis notifications in NSW residents, 29 October 2009. NSW Notifiable Diseases Database System (NDD)(HOIST). Viewed 3 March 2010, <http://www.health.nsw.gov.au/data/diseases/cryptosporidiosis.asp>.

OECD (Organisation for Economic Cooperation and Development) 2009. OECD health data 2009: statistics and indicators for 30 countries. Paris: OECD.

OzFoodNet Working Group 2008a. OzFoodNet quarterly report, 1 January to 31 March 2008. Communicable Diseases Intelligence 32(2):267–71.

OzFoodNet Working Group 2008b. OzFoodNet quarterly report, 1 April to 30 June 2008. Communicable Diseases Intelligence 32(3):335–40.

OzFoodNet Working Group 2008c. OzFoodNet quarterly report, 1 July to 30 September 2008. Communicable Diseases Intelligence 32(4):469–72.

OzFoodNet Working Group 2009a. OzFoodNet quarterly report, 1 October to 31 December 2008. Communicable Diseases Intelligence 33(1):53–8.

OzFoodNet Working Group 2009b. OzFoodNet quarterly report, 1 January to 31 March 2009. Communicable Diseases Intelligence 33(2):232–8.

Pearce N, Aït-Khaled N, Beasley R, Mallol J, Keil U, Mitchell E et al. 2007. Worldwide trends in the prevalence of asthma symptoms: phase III of the International Study of Asthma and Allergies in Childhood (ISAAC). Thorax 62(9):758–66.

ProMED 2008. PRO/AH/EDR> Hendra virus, human, equine—Australia (07): (QLD). Archive number 20080821.2606. Viewed 31 October 2009, <http://www.promedmail.org/pls/otn/f?p=2400:1202:2913417039447384::NO::F2400_P1202_CHECK_DISPLAY,F2400_P1202_PUB_MAIL_ID:X,73636>.

ProMED 2009. PRO/AH/EDR> Hendra virus, human, equine—Australia (04): (QL) fatal. Archive number 20090903.3098. Viewed 31 October 2009, <http://www.promedmail.org/pls/otn/f?p=2400:1202:2913417039447384::NO::F2400_P1202_CHECK_DISPLAY,F2400_P1202_PUB_MAIL_ID:X,79061>.

Riley TV 2009. Is *Clostridium difficile* a threat to Australia's biosecurity? Medical Journal of Australia 190(12):661–2.

Riley TV, Thean S, Hool G, Golledge, CL 2009. First Australian isolation of epidemic *Clostridium difficile* PCR ribotype 027. Medical Journal of Australia. 190(12):706–8.

Ritchie SA 2009. Dengue: Australia's other pandemic. Microbiology Australia. 30:114–117.

Roche P, Krause V, Cook H et al. 2008a. Invasive pneumococcal disease in Australia, 2006. Communicable Diseases Intelligence 32(1):18–30.

Roche P, Krause V, Konstantinos A et al. 2008b. Tuberculosis notifications in Australia, 2006. Communicable Diseases Intelligence 32(1):1–11.

Rosenstein NE, Perkins BA, Stephens DS, Popovic T & Hughes JM 2001. Meningococcal disease. New England Journal of Medicine 344(18):1378–88.

Senanayake S 2006. Dengue fever and dengue haemorrhagic fever—a diagnostic challenge. Australian Family Physician 35(8):609–12.

Senanayake S 2007. Clinical cases in infectious diseases: a public health approach. Sydney: McGraw-Hill Education.

Senanayake SN 2009a. A pandemic that's not bird flu? Pigs might fly. Medical Journal of Australia 191(1):38–40.

Senanayake SN 2009b. Swine flu update: bringing home the bacon. Medical Journal of Australia 191(3):138–40.

Shaw JE & Chisholm DJ 2003. Epidemiology and prevention of type 2 diabetes and the metabolic syndrome. Medical Journal of Australia 179(7):379–83.

Silverstein MD, Mair JE, Katusic SK, Wollan PC, O'Connell EJ & Yunginger JW 2001. School attendance and school performance: a population-based study of children with asthma. Journal of Pediatrics 139(2):278–83.

Slade T, Johnston A, Teesson M, Whiteford H, Burgess P, Pirkis J et al. 2009. The mental health of Australians 2: Report on the 2007 National Survey of Mental Health and Wellbeing. Canberra: DoHA.

Staples MP, Elwood M, Burton RC, William JL, Marks R & Giles GG 2006. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. Medical Journal of Australia 184(1):6–10.

Stephenson S, Langley J, Henley G & Harrison J 2003. Diagnosis-based injury severity scaling. Cat. no. INJCAT 59. Adelaide: AIHW.

Stewart JH, McCredie MR, Williams SM & McDonald SP 2004. Interpreting incidence trends for treated end-stage renal disease: implications for evaluating disease control in Australia. Nephrology 9:238–46.

Tan KS & Johnson DW 2008. Managing the cardiovascular complications of chronic kidney disease. Australian Prescriber 31(6):154–8.

Taplin CE, Craig ME, Lloyd M, Taylor C, Crock P, Silink M et al. 2005. The rising incidence of childhood type 1 diabetes in New South Wales, 1990–2002. Medical Journal of Australia 183(5):243–6.

The ANZIC Influenza Investigators Webb SA et al. 2009. Critical care services and 2009 H1N1 influenza in Australia and New Zealand. New England Journal of Medicine 361(20):1925–34.

Thomas MC 2007. The CARI guidelines: Prevention of progression of kidney disease: early detection of patients with kidney disease. Nephrology (Carlton) 12 Suppl 1:S37–40.

UNAIDS 2008. A global view of HIV infection. Geneva: UNAIDS. Viewed 25 September 2009, <http://data.unaids.org/pub/GlobalReport/2008/GR08_2007_HIVPrevWallMap_GR08_en.jpg>.

Virjee S, Robinson S & Johnston DG 2001. Screening for diabetes in pregnancy. Journal of the Royal Society of Medicine 94(10):502–9.

Walsh J, Dayton A, Cuff C & Martin P 2005. Long term care—actuarial analysis on long-term care for the catastrophically injured. Sydney: PriceWaterhouseCoopers.

WHO (World Health Organization) 1999. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: Diagnosis and classification of diabetes mellitus. Geneva: Department of Noncommunicable Disease Surveillance, WHO.

WHO 2003. Investing in mental health. Geneva: WHO.

WHO 2005. Pertussis vaccines—WHO position paper. Weekly Epidemiological Record 80(4):31–9.

WHO 2007. Mumps virus vaccines. Weekly Epidemiological Record 82(7):51–60.

WHO 2009. Pandemic (H1N1) 2009—update 72. Geneva: WHO. Viewed 29 March 2010, <http://www.who.int/csr/don/2009_10_30/en/index.html>.

Wolfe F & Hawley DJ 1998. The long-term outcome of rheumatoid arthritis: Work disability: a prospective 18 year study of 823 patients. Journal of Rheumatology 25(11):2108–17.

Zaher C, Halbert R, Dubois R, George D & Nonikov D 2004. Smoking-related diseases: the importance of COPD. Int J Tuberc Lung Dis 8(12):1423-8.

Zambon MC 1999. Epidemiology and pathogenesis of influenza. Journal of Antimicrobial Chemotherapy 44 Suppl B:3–9.

Whose health? How population groups vary

5

KEY POINTS

- **Indigenous people** are generally less healthy than other Australians, die at much younger ages, and have more disability and a lower quality of life.
- **People living in rural and remote areas** tend to have higher levels of disease risk factors and illness than those in major cities.
- Compared with those who have social and economic advantages, **disadvantaged Australians** are more likely to have shorter lives.
- **People with disability** are more likely than others to have poor physical and mental health, and higher rates of risk factors such as smoking and overweight.
- Compared with the general community, **prisoners** have significantly worse health, with generally higher levels of diseases, mental illness and illicit drug use than Australians overall.
- Most **migrants** enjoy health that is equal to or better than that of the Australian-born population—often with lower rates of death, mental illness and disease risk factors.
- Compared with those in the general community, **Defence Force members** have better health, although their work can place them at higher risk of injury.
- The **veteran community** is less likely than the general community to report being in very good or excellent health.

Influences on health affect our day-to-day lives. While the nature and impact of these influences vary from person to person, examining the health of population groups reveals distinct patterns within the community. These patterns help us understand how and why health is distributed unevenly, and guide us on how the health of different groups can be improved. Although population groups in Australia are many and diverse, this chapter summarises the health of eight groups. Each of these groups—whether experiencing similar, better or worse health than the general population—brings a unique set of challenges to Australia's health and welfare systems as they aim for greater fairness in society.

One broad pattern is that people with the greatest social and economic disadvantage often have the poorest levels of health. The first five groups in this chapter show various levels of health disadvantage: Indigenous Australians; rural Australians; socioeconomically disadvantaged people, including the unemployed; people with disabilities; and prisoners. Other population groups that experience particular disadvantage, but whose health status is not reported here, include homeless people and refugees.

Just as some groups can have worse health than the general Australian population, so can some have better health. This can be due to social advantages but it can also be because some groups are selected on the very basis of their health. Two examples are people who migrate to Australia and Defence Force members, and they are examined here along with the veteran community. It will be seen, however, that the 'healthier' status of overseas-born people and Defence Force members may not be sustained and specific services may be required to support their health needs.

In December 2007, the Council of Australian Governments (COAG) agreed to a partnership between all levels of government to work with Indigenous communities to achieve the target of closing the large inequality gap between Indigenous and other Australians (Box 5.1). In light of this, a large section of Chapter 5 has been dedicated to the health of Aboriginal and Torres Strait Islander people.

Finally, another perspective on the population is that of age groups. For information on health across the life stages, Chapter 6 provides statistics on mothers, babies and children, as well as working-age and older Australians.

5.1 Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander people (Indigenous Australians) generally have significantly more ill health than other Australians. They typically die at much younger ages and are more likely to experience disability and reduced quality of life because of ill health (AIHW 2009a).

One of the reasons for this poorer health is that Indigenous Australians are socioeconomically disadvantaged compared with other Australians. On average, they report having lower incomes than other Australians, higher rates of unemployment, lower educational attainment, and more overcrowded households (AIHW 2009a).

This socioeconomic disadvantage also places Aboriginal and Torres Strait Islander people at greater risk of unhealthy factors such as smoking and alcohol misuse, as well as overweight and obesity.

The following section summarises the health status of Indigenous Australians and the health gap between them and other Australians. First, it discusses the quality of data about Indigenous Australians, followed by demographic details such as their age structure and where they live. Key summary measures—disability, life expectancy and mortality—are then used to describe their health, followed by details of the six main conditions that cause Indigenous ill health and mortality. Finally, information is provided on health risk factors among Indigenous Australians, including social factors such as lower educational attainment and unemployment.

Box 5.1: Monitoring the COAG Closing the Gap targets for Indigenous disadvantage

The Council of Australian Governments (COAG) has agreed to six specific targets and timelines to reduce disadvantage among Indigenous Australians. These targets acknowledge the importance of reducing the gap in health levels and of improving the social determinants of health. They include:

- closing the life expectancy gap within a generation (by 2030)
- halving the gap in mortality rates for Indigenous children within a decade (by 2018)
- ensuring that all Indigenous 4 year olds in remote communities have access to early childhood education within 5 years (by 2013)
- halving the gap for Indigenous students in reading, writing and numeracy within a decade (by 2018)
- halving the gap for Indigenous students in Year 12 attainment by 2020
- halving the gap in employment levels within a decade (by 2018).

As annual estimates of life expectancy are not available, substitute measures can be used for this target. They include mortality rates, hospitalisation rates and the prevalence of health risk factors such as smoking, risky alcohol consumption and obesity.

The National Indigenous Reform Agreement has been established to outline the task of closing the gap in Indigenous disadvantage. It sets objectives, outcomes, outputs, performance indicators and performance benchmarks to assess progress against the targets. Also for this purpose, other national agreements and mainstream National Partnership Agreements include reporting arrangements that will see many indicators analysed by Indigenous status.

The Australian Government and states and territories will work in partnership to achieve the agreed COAG targets; develop, progress and review the national objectives and outcomes for Indigenous reform; and ensure that their data are of high quality and available for reporting. Fundamental to this is respectful and collaborative partnership with Indigenous Australians. This approach draws on the strengths of Indigenous cultures and is considered particularly important in creating lasting change in the lives of Indigenous Australians.

Data quality

There has been much progress in collecting information on the health of Aboriginal and Torres Strait Islander people over the last decade, but many practical, analytical and conceptual challenges remain (ABS & AIHW 2008). This is partly due to varying levels of identification of Indigenous people in administrative records and partly to the statistical and practical challenges of surveying a population that is relatively small—2.5% of the total population—and one-quarter of whom (24%) live in remote or very remote areas (ABS 2007a). Improving both the counting of Indigenous Australians in the Census and identifying them in administrative data sets are key strategies towards better quality information about Indigenous health.

A number of administrative data sets provide useful information on specific diseases, risk factors, living conditions, and access to and use of services. These sets include information on birth and death registration; disease registers; consultations with general practitioners (GPs); community-controlled and other Aboriginal health services; and hospital use.

Although data quality is improving, there are various issues with these administrative collections, the main one being that they under-identify Indigenous Australians. For example, Indigenous deaths registrations are not yet complete enough in all states and territories to provide true national estimates. Deaths data from New South Wales, Queensland, Western Australia, South Australia and the Northern Territory are used to provide indicative national information. The Australian Institute of Health and Welfare (AIHW) has recently assessed the extent of under-counting of Indigenous people in hospital records. The results show that the quality of identification in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory is adequate for reporting on Indigenous hospital use. Only those jurisdictions considered to have the most complete coverage of Indigenous Australians are used in analysis of mortality and hospital data within *Australia's health 2010.*

Further improvement to data quality will result from COAG initiatives (see Box 5.1). The National Indigenous Reform Agreement strongly emphasises the need for closing the data gaps through improvements in data quality for a number of sectors including health, education and employment. COAG has agreed to a number of data quality improvements that Australian Government agencies, including the Australian Bureau of Statistics (ABS) and the AIHW, will undertake along with the states and territories.

Some of these improvements include:

- capturing data in relation to smoking, alcohol and drug use during pregnancy, antenatal care and the Indigenous status of the baby
- improving Indigenous enumeration in the Census
- developing best practice guidelines for data linkage
- implementing a nationally consistent pathology data collection.

For information on the full list of data quality improvement activities, see the National Indigenous Reform Agreement on the COAG website.

The Indigenous population

In 2009, the estimated Indigenous population was about 550,000, constituting 2.5% of the total Australian population. Of all Indigenous Australians, 6% identified themselves as being of Torres Strait Islander origin and 4% as being of both Aboriginal and Torres Strait Islander origin. Despite the common perception that most Indigenous Australians live in remote areas, the majority (76%) live in major cities and non-remote regional areas (ABS 2007a).

The Indigenous population is much younger than the non-Indigenous population. In 2006, the median age was 20 years for Indigenous people and 37 years for the non-Indigenous population (ABS 2007b). This is largely due to higher fertility rates and to deaths occurring at younger ages in the Indigenous population. For this reason, many of the rates presented in this section are age-standardised to allow for meaningful comparisons with the non-Indigenous population (see Box 2.2 in Chapter 2 for a discussion of age-standardisation methods).

Selected measures of health status

There are various measures of health status that can provide information on both Indigenous health and the gap between Indigenous and non-Indigenous Australians. These are self-assessed health status, the burden of disease and injury, disability, life expectancy, mortality, hospitalisations and general practice consultations. While these measures relate to different aspects of health, and some are indirect, such as health service use, they all show that Indigenous Australians tend to have poorer health than non-Indigenous Australians.

For example, Table 5.1 shows that Indigenous rates of hospitalisation and mortality in recent years were around twice the rate of non-Indigenous Australians. Similarly, the percentage of Indigenous Australians who assessed their health as only fair or poor in the 2004–05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) was nearly twice the rate of other Australians.

Table 5.1: Measures of health status, Indigenous Australians compared with non-Indigenous

Measure of health status	Year	Unit	Indigenous rate[(a)]	Difference between groups[(b)]
Self-assessed health fair/poor	2004–05	%	22	1.9
Burden of disease—males	2003	DALYs per 1,000	212.4	2.4
Burden of disease—females	2003	DALYs per 1,000	191.5	2.5
Disability prevalence	2006	%	4.3	1.8
Life expectancy—males	2005–2007	Age in years	67	–12
Life expectancy—females	2005–2007	Age in years	73	–10
Mortality[(c)]	2003–2007	Per 100,000	454.6	1.8
Hospitalisations[(d)]	2007–08	Per 1,000	549.1	2.5
General practitioner encounters	2003–04 to 2007–08	Per 100 encounters	158.1	1.1

DALYs Disability-adjusted life years. See Section 2.7.

(a) Rates are crude.

(b) The difference for life expectancy is in years, whereas for the other methods it is a rate ratio. Rate ratios are based on age-standardised rates and indicate the relative difference between Indigenous and non-Indigenous Australians.

(c) Data are for NSW, Qld, WA, SA and NT combined.

(d) Data are for NSW, Vic, Qld, WA, SA and NT combined.

Sources: ABS 2009a; AIHW 2009a; AIHW National Hospital Morbidity Database; AIHW National Mortality Database; Bettering the Evaluation and Care of Health survey of general practice, AGPSCC; Vos et al 2007.

For a detailed look at measures covering the health status of Indigenous Australians, see the Aboriginal and Torres Strait Islander Health Performance Framework (AHMAC 2006).

Burden of disease

A single summary measure of population health which takes into account both illness and death is 'disability-adjusted life years' (DALYs), which is the sum of years of life lost due to premature death and the 'healthy years' of life lost due to disability. A study by Vos and others found that Indigenous Australians suffer an overall burden of disease that is 2.5 times that of the total Australian population (Vos et al. 2007). This indicates a very large potential for health gain.

Two-thirds of the Indigenous health gap was due to mortality and one-third was due to disability. Non-communicable diseases—which include chronic illnesses such as cardiovascular disease, diabetes, mental disorders and chronic respiratory diseases—were responsible for 70% of the observed health gap.

Disability

Related to their poorer health status is the higher rate of disability that Aboriginal and Torres Strait Islander Australians experience (ABS & AIHW 2008). In the 2006 Census of Population and Housing, a total of 19,600 Indigenous people (4%) were identified as needing assistance with core activities (self-care, mobility or communication) some or all of the time.

After taking age differences into account between the Indigenous and non-Indigenous populations, the level of need for assistance among Indigenous people overall was almost twice as high as that among non-Indigenous people.

Life expectancy

Available data indicate that the life expectancy at birth for Aboriginal and Torres Strait Islander people is much lower than for non-Indigenous Australians.

Recently, the ABS reviewed their method of compiling the Indigenous life tables (Box 5.2). For the period 2005–2007, the life expectancy at birth was estimated to be 67 years for Indigenous males and 73 years for Indigenous females. In contrast, life expectancy at birth for non-Indigenous Australians for the same period was 79 years for males and 83 years for females. This is a difference of 12 years for males and 10 years for females.

Box 5.2: Estimating life expectancy for Aboriginal and Torres Strait Islander people

Over the years, a number of methods have been used to estimate the life expectancy of Aboriginal and Torres Strait Islander people. Known as 'indirect' methods, they have relied on different assumptions and estimates of the population, births, deaths and migration of Indigenous persons (Bhat 2002; Preston & Hill 1980; Vos et al. 2007).

After critically assessing a range of different methods, the Australian Bureau of Statistics (ABS) has recently concluded that indirect methods are no longer appropriate for estimating Indigenous life expectancy (ABS 2009a). The ABS applied the 'direct' demographic method to derive 2005–2007 life tables for the Indigenous and non-Indigenous populations by adjusting death registrations data on the basis of identification rates obtained from the Census Data Enhancement Indigenous Mortality Quality Study. This study linked Census records with death registration records to examine differences in the reporting of Indigenous status across the two data sets.

The new ABS method suggests a markedly higher Indigenous life expectancy than previous estimates, which had put the mortality gap at about 17 years. Since the new method is significantly different from the earlier one, the revised estimate cannot be used to suggest that there has been a sudden dramatic improvement in Indigenous life expectancy.

Mortality

Mortality rates are an important measure of the health status of a population. The overall mortality rates for Indigenous people are around twice those of non-Indigenous people.

All-age mortality

In the period 2003–2007, in the five jurisdictions that are considered to have the most complete coverage of Indigenous deaths (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), mortality rates for Indigenous males and females were around twice as high (across all age groups) as their non-Indigenous counterparts, except for those aged 75 years and over, where the ratio was only 1.2.

Infant and child mortality

The mortality rate for children aged under 5 years is a key indicator of the general health and wellbeing of a population.

Over the period 2003–2007, there were 692 deaths of Aboriginal and Torres Strait Islander children aged 0–4 years in New South Wales, Queensland, Western Australia, South Australia and the Northern Territory combined. Indigenous children aged 0–4 years died at around twice the rate of non-Indigenous children during this period. For injury and poisoning, and respiratory diseases, which were common causes of death among children of this age group, Indigenous children died at 3 and 4 times the rate of non-Indigenous children respectively.

As the large majority of deaths of Indigenous children aged 0–4 years were deaths of those aged under 1 year (576 deaths or 83%), progress towards closing the gap in under-5 mortality could be best achieved by reducing mortality among infants. The mortality rate for Indigenous infants during 2003–2007 was 10.3 per 1,000 live births compared with 4.2 per 1,000 for non-Indigenous infants. The most common cause of death for this Indigenous age group was the set of conditions originating in the perinatal period such as birth trauma, disorders related to fetal growth, and respiratory and cardiovascular disorders specific to the perinatal period. Death from sudden infant death syndrome (SIDS) was around 4 times as common among Indigenous infants as among non-Indigenous infants.

Conditions causing ill health and mortality

Several different health measures—self-reported prevalence, general practice consultations, mortality, and burden of disease and injury—consistently show the main conditions that cause ill health and mortality among Indigenous Australians.

For example, the latest available data show that cardiovascular disease was the leading cause of Indigenous mortality and disease burden, and among the top six causes of hospitalisation, encounters with GPs and self-reported prevalence of disease (Table 5.2). Similarly, injury was the leading cause of hospitalisation, the third most common cause of death and the third most common cause of disease burden among Indigenous Australians. Mental disorders, diabetes and respiratory diseases were also commonly featured as the top conditions across most measures.

Table 5.2: Main conditions that cause ill health and mortality, Indigenous Australians, various measures

Self-reported prevalence 2004–05		Burden of disease and injury (DALYs) 2003		Cause of death data 2003–07(a)		Hospitalisations 2007–08(b)		General practitioner encounters 2003–04 to 2007–08	
Condition	**%**	**Condition**	**%**	**Condition**	**%**	**Condition**	**%**	**Condition**	**%**
Eye/sight problems	30	Cardiovascular disease	18	Cardiovascular disease	27	Injury and poisoning	13	Respiratory	20
Respiratory	27	Mental disorders	16	Cancer	17	Respiratory	11	Skin problems	16
Musculoskeletal	22	Injury	13	Injury/other external	15	Digestive	9	Musculoskeletal	14
Ear/hearing problems	12	Chronic respiratory	9	Respiratory	8	Mental disorders	7	Diabetes/other metabolic	15
Cardiovascular problems	12	Diabetes	9	Diabetes/other metabolic	8	Cardiovascular diseases	6	Psychological problems	14
Diabetes/other metabolic	9	Cancers	8	Digestive	6	Genitourinary diseases	4	Cardiovascular	13

(a) Data are for NSW, Qld, WA, SA and NT combined.

(b) Data are for NSW, Vic, Qld, WA, SA and NT combined. Proportions exclude hospitalisations for care involving dialysis. Top conditions listed exclude pregnancy, childbirth & the puerperium; and symptoms, signs and abnormal clinical and laboratory findings.

Sources: 2004–05 NATSIHS; AIHW National Hospital Morbidity Database; AIHW National Mortality Database; BEACH survey of general practice, AGPSCC; Vos et al. 2007.

Many of the main conditions that cause ill health are similar among Indigenous and non-Indigenous people; for example, cardiovascular disease, mental disorders and respiratory diseases were responsible for similar proportions of the total disease burden in both groups (Vos et al. 2007). However, cancer was responsible for a greater disease burden among non-Indigenous people, while the reverse was true for injury and diabetes.

In the following section, more detailed information is presented on the top six conditions contributing to the burden of disease among Aboriginal and Torres Strait Islander people (second column of Table 5.2). This measure was chosen because it takes into account both mortality and disability in determining which conditions are the greatest contributors to the poor health status of the Indigenous population and therefore where the biggest health gains might be made. The sections on specific health conditions draw on self-reported, hospitalisation and mortality data.

Cardiovascular disease

Cardiovascular disease—diseases of the heart and blood vessels—is a serious health problem for Aboriginal and Torres Strait Islander people. Part of this can be attributed to their high prevalence of tobacco smoking, overweight and obesity, poor nutrition and diabetes (see 'Determinants and risk factors' in this section).

In the 2004–05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS), about 12% of Indigenous Australians reported heart or cardiovascular problems, with over half (54%) of those aged 55 years and over reporting heart or cardiovascular problems as a long-term condition (ABS 2006a). Although the self-reported prevalence of cardiovascular disease is only slightly higher for Indigenous Australians than for other Australians, their rate of hospitalisation for it is higher than for other Australians. In 2007–08, coronary heart disease (heart attack and angina) was the most common type of cardiovascular disease responsible for Indigenous hospitalisations, with the rate being 3 times that of non-Indigenous Australians.

Over the period 2003–2007, Indigenous Australians were 3 times as likely as non-Indigenous Australians to die from cardiovascular disease. Box 5.3 discusses a particular problem for Indigenous Australians, acute rheumatic fever and its complication, rheumatic heart disease.

Box 5.3: Acute rheumatic fever and rheumatic heart disease

Both acute rheumatic fever (ARF) and rheumatic heart disease (RHD) are preventable causes of ill health and death. They are associated with environmental factors such as overcrowding and poor sanitation.

Indigenous Australians in the Northern Territory (NT) have some of the highest rates of ARF and RHD in the world, and almost all new cases recorded in the NT are Aboriginal and Torres Strait Islander people (AIHW 2004). The death rates for Indigenous Australian males and females due to rheumatic heart disease are far higher than for other Australians (16 and 22 times as high, respectively, over the period 2000–2004).

Mental health and social and emotional wellbeing

Until recently, most national data on the social and emotional wellbeing of Aboriginal and Torres Strait Islanders centred on the use of mental health services. The 2004–05 NATSIHS included an interim module to collect national data on social and emotional wellbeing for the first time. The module captured eight aspects of social and emotional wellbeing, including psychological distress and its effects, positive wellbeing, feelings of anger, stressors, perceptions of discrimination, cultural identification, and removal from family (ABS 2006a).

The NATSIHS results indicated that 27% of Indigenous adults had high or very high levels of psychological distress, with Indigenous females significantly more likely than Indigenous males to report such levels (32% and 21% respectively) (AIHW 2009b). Compared with non-Indigenous Australians surveyed in the 2004–05 National Health Survey (NHS), and after taking into account differences in the age structure of the two populations, Indigenous Australians were twice as likely to report high or very high levels of psychological distress (AIHW 2009b).

The results also indicate that in the 4 weeks before their interview, 12% of Indigenous Australians had visited a doctor or other health professional due to feelings of psychological distress, and 21% reported that there had been one or more days in which they were unable to work or carry out normal activities due to such feelings. In relation to stressors, 42% of Indigenous adults indicated that they or their family or friends had experienced the death of a family member or close friend in the previous year, 28% reported serious illness or disability and 20% reported alcohol-related problems (AIHW 2009b).

Other data sources also indicate that Aboriginal and Torres Strait Islanders have poorer social and emotional wellbeing than non-Indigenous Australians. For example, in 2006–07 the rate of community mental health service contacts for Indigenous Australians was 2.5 times that for other Australians (AIHW 2009c).

Injury

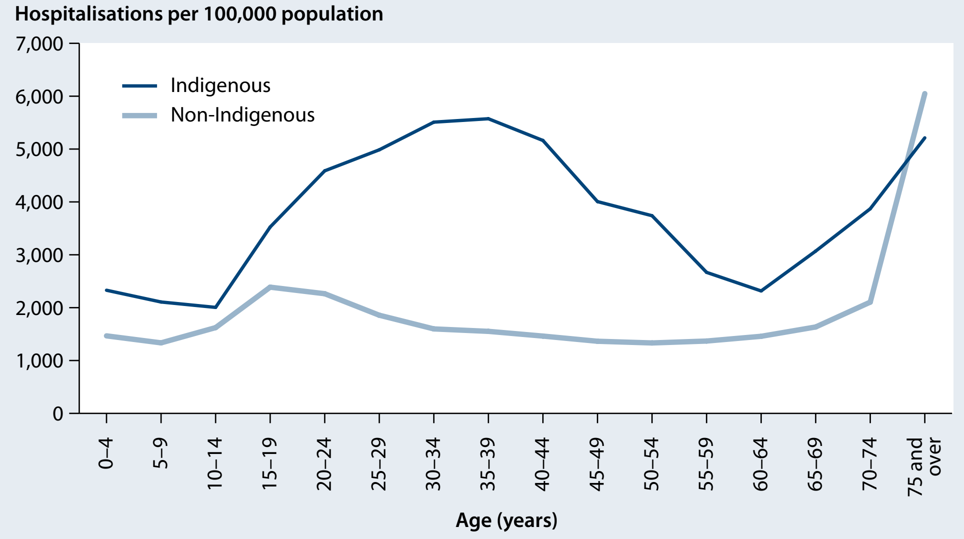
Injury (which here includes poisoning) is the third leading cause of death and the main cause of hospitalisation (excluding dialysis for kidney disease) of Indigenous Australians. This is in stark contrast to non-Indigenous Australians, where injury does not feature as a top cause of death overall (see Table 2.10).

Many Indigenous Australians drink alcohol at levels that increase the risk of injury. Also, it is reported that social and economic disadvantages, as well as feelings of despondency in Indigenous communities, often result in self-harm, making their incidence of intentional injury much more common than among other Australians (AHMAC 2008).

In 2007–08, Indigenous Australians were hospitalised for injury at twice the rate of other Australians. Their most commonly recorded types of injury were those inflicted by another person (29% of all injury hospitalisations) and accidental falls (20%).

The distribution of hospitalised injury by age differs between Indigenous and non-Indigenous Australians (Figure 5.1). By contrast with non-Indigenous Australians, rates of injury in Indigenous Australians continue to rise in younger adulthood, peaking in the 35–39 years age group.

The risk excess (that is, the absolute difference between the two sets of rates) was greatest at ages from about 20 to 50 years. Like cardiovascular disease, injury is one of the causes of mortality that most contribute to the low life expectancy of Indigenous Australians, mainly because of high rates at early and middle adult ages.



(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

Note: Figure excludes transfers from acute hospitals.

Source: AIHW National Hospital Morbidity Database.

Figure 5.1: Hospitalisations due to injury and poisoning[(a)], 2007–08: rates by age for Indigenous and non-Indigenous Australians

In the period 2003–2007, Indigenous Australians died from injury at more than twice the rate of non-Indigenous Australians. Transport accidents were the most common cause of injury death of Indigenous Australians, followed by self-harm. Deaths due to assault were much more common among Indigenous Australians, at 6 times the rate of non-Indigenous Australians.

Respiratory diseases

Respiratory diseases are leading causes of illness, disability and mortality around Australia. Common examples are asthma, chronic obstructive pulmonary disease, influenza and pneumonia. While all these can result in a high use of health services, pneumonia and chronic obstructive pulmonary disease are the leading causes of death among respiratory diseases.

In the 2004–05 NATSIHS, the proportion of Aboriginal and Torres Strait Islander people who reported some form of respiratory disease was 27%. The most common form they reported was asthma (15%). After adjusting for differences in age structure between the Indigenous and non-Indigenous populations, Indigenous people were nearly twice as likely as non-Indigenous people to report having bronchitis, and 1.5 times as likely to report having asthma (ABS 2006a).

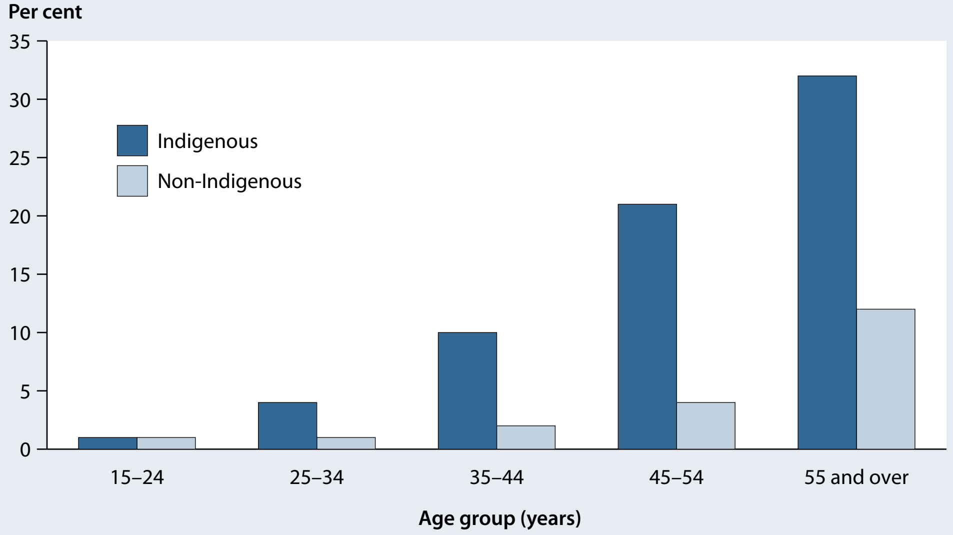
As for Australians generally, Indigenous hospitalisations for respiratory disease were most common among the very young and the very old. Indigenous Australians were hospitalised at higher rates than other Australians for most types of respiratory diseases—for influenza and pneumonia at around 4 times the rate, and 5 times for chronic obstructive pulmonary disease (ABS & AIHW 2008).

Between 2003–2007 there were 863 deaths recorded for Indigenous persons from respiratory diseases in New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, representing 8% of all Indigenous deaths in those areas. Over this period, Indigenous persons died from respiratory diseases at twice the rate of non-Indigenous persons.

Diabetes

Type 1 diabetes (see Chapter 4) is rare in the Indigenous population, but there is a very high prevalence of Type 2 diabetes. Indigenous people tend to develop Type 2 diabetes earlier than other Australians and often die from it at younger ages.

In the 2004–05 NATSIHS, the self-reported prevalence of diabetes among Indigenous Australians was 6%. After adjusting for differences in age structure, Indigenous Australians were 3 times as likely as non-Indigenous Australians to report diabetes as a long-term health condition. However, among those aged 45–54 years, they were 5 times as likely (Figure 5.2).



Source: AIHW analyses of 2004–05 NATSIHS.

Figure 5.2: Proportion of persons reporting diabetes or high sugar levels, by Indigenous status and age group, 2004–05

Hospital and mortality data further show the extent of diabetes among Indigenous Australians. In 2007–08, hospitalisation rates for any diagnosis of diabetes were almost 9 times as high for Aboriginal and Torres Strait Islander people as for other Australians. For the period 2003–2007, Indigenous Australians were 7 times as likely as non-Indigenous Australians to have diabetes recorded on their death certificate.

Chronic kidney disease

Aboriginal and Torres Strait Islander people also have high levels of chronic kidney disease, which is partly due to their high prevalence of diabetes. From self-reports, an estimated 7,500 (3%) Indigenous Australians aged 18 years and over had kidney disease as a long-term condition in 2004–05 (AIHW: Penm 2008). However, one clinical survey suggests that the prevalence may be higher than that, at least in some communities. In a remote community in the Northern Territory, 12% of adults were found to have stage 3, 4, or 5 chronic kidney disease (see Box 4.7 in Chapter 4) and a further 36% had evidence of reduced kidney function (McDonald et al. 2003).

In 2007, 9% (218) of Australians who began kidney replacement therapy—dialysis or transplant—identified as Indigenous. After adjusting for age, the incidence rate of treated end-stage kidney disease is around 6 times as high for Aboriginal and Torres Strait Islander people as for non-Indigenous people.

As at 31 December 2007, of all Indigenous patients registered as receiving treatment for end-stage kidney disease, 88% relied on dialysis and only 12% were living with a functioning kidney transplant. In contrast, the corresponding figures for non-Indigenous Australians were 55% and 45% (Jose et al. 2008).

Kidney dialysis was the most common reason for hospitalisation among Indigenous Australians in 2007–08, representing 43% of all their hospitalisations. Excluding dialysis, Indigenous Australians were hospitalised for chronic kidney disease as a principal or additional diagnosis at 5 times the rate of other Australians.

For the period 2003–2007, Indigenous Australians were 5 times as likely as non-Indigenous Australians to have chronic kidney disease recorded on their death certificate.

Comorbidity of cardiovascular disease, diabetes and chronic kidney disease

Cardiovascular disease, diabetes and chronic kidney disease often occur together in the general population, a situation known as comorbidity. However, this particular comorbidity is even more common among Indigenous Australians. In 2007–08, Indigenous Australians were 12 times as likely as other Australians to be hospitalised with all three conditions (Table 5.3). Similarly, in 2003–2007 they died with all three diseases at 13 times the rate of non-Indigenous Australians and in both periods they also had a much higher comorbidity rate of two of these diseases.

Table 5.3: Deaths and hospitalisations among Indigenous Australians with comorbidities of cardiovascular disease, chronic kidney disease and diabetes, 2003–2007 and 2007–08

	Age-standardised rates			
	Males	**Females**	**Persons**	
2003–2007		**Deaths (per 100,000)**		**Standardised mortality ratio**[(a)]
CVD, CKD and diabetes	82	106	93	13.2
Two of the above	273	292	278	4.7
2007–08		**Hospitalisations (per 1,000)**		**Standardised morbidity ratio**[(b)]
CVD, CKD and diabetes	41	46	44	11.8
Two of the above	111	126	118	6.2

CKD Chronic kidney disease.

CVD Cardiovascular disease.

(a) The standardised mortality ratio is calculated by dividing the observed number of deaths by the number that would be expected if the Indigenous population had the same age distribution as the non-Indigenous population.

(b) The standardised morbidity ratio is calculated by dividing the observed number of hospitalisations by the number that would be expected if the Indigenous population had the same age distribution as the rest of the Australian population (non-Indigenous and not stated).

Notes

1. The deaths data are based on data from deaths registered in NSW, Qld, WA, SA and the NT only, and are indirectly age-standardised to the 2004–2006 non-Indigenous Australian population. The data from these five jurisdictions are not necessarily representative of the other jurisdictions or of Australia as a whole. Three years' data are combined due to small numbers of Indigenous deaths.
2. The hospitalisation data are based on data from NSW, Vic, Qld, WA, SA and public hospitals in the NT only, and are indirectly age-standardised to the 2007–08 population for other Australians. The data from these six jurisdictions are not necessarily representative of the other jurisdictions or of Australia as a whole.

Sources: AIHW National Hospital Morbidity Database; AIHW National Mortality Database.

Cancer

Due to the overwhelming dominance of cardiovascular disease and injury among Indigenous Australians, cancer is generally less prominent among them than among other Australians. Across Australia, there were 3,083 cancers diagnosed among Indigenous Australians in the period 2002–2004. The age-standardised incidence rates were higher for Indigenous than non-Indigenous persons for lung cancer, cancer of the mouth and throat, cancer of unknown primary site and cervical cancer. The incidence was lower for Indigenous Australians for colorectal cancer, prostate cancer and lymphomas (ABS & AIHW 2008).

Hospitalisation rates for cancer for both Indigenous and other Australians increased from age 25 years onwards but were considerably lower for Indigenous than other Australians in each age group. The most common cancers for which Indigenous males were hospitalised were lung cancer, skin cancer, leukaemia and prostate cancer. The corresponding cancers for Indigenous females were breast cancer, lung cancer, skin cancer and cervical cancer.

Cancer was the second leading cause of death among Indigenous Australians in the period 2003–2007, and represented 17% of all Indigenous deaths in the five jurisdictions with the most complete coverage of Indigenous deaths. Indigenous Australians died from lung cancer at almost twice the rate of non-Indigenous Australians, and Indigenous females died from cervical cancer at 5 times the rate of non-Indigenous females.

Cancer incidence and survival data come from the state and territory cancer registries. However, Aboriginal and Torres Strait Islander people are not yet identified on pathology forms, and the extent to which Aboriginal and Torres Strait Islander cancer patients are identified in hospital inpatient statistics varies around Australia. Nevertheless, identification of these patients in the registries has been improving.

Determinants and risk factors

There is strong evidence that low socioeconomic status is associated with both poor health and higher levels of risk factors, such as smoking and obesity (see Chapter 3; Carson et al. 2007). It is widely acknowledged that closing the gap in life expectancy will need major improvements in the social determinants of health for Indigenous Australians, such as their education, employment and housing. This section examines those three social determinants along with such risk factors as smoking and alcohol abuse, poor nutrition and obesity. It concludes with an overview of the association between some social determinants and these risk factors.

Education

Education is considered a key factor in improving the health and wellbeing of Indigenous Australians (see Chapter 3 for a more general discussion of education). Results from the 2004–05 NATSIHS indicate that higher levels of schooling are associated with better health among Aboriginal and Torres Strait Islander people. In 2004–05, Indigenous Australians aged 18–34 years with higher levels of schooling were more likely than those with lower levels to report better health and lower levels of psychological distress. They were also less likely to regularly smoke, drink alcohol at risky or high-risk levels and be physically inactive (ABS & AIHW 2008). Results from the 2006 Census show that one-quarter (23%) of Indigenous adults completed Year 12 as their highest year of school completed, compared with one-half (49%) of non-Indigenous adults (ABS & AIHW 2008).

Not only does education affect health but the reverse can also be true. For example, the common middle ear condition otitis media is twice as common among Indigenous children as non-Indigenous children and the hearing loss it causes has been linked to learning difficulties.

Employment

As with education, employment status is also strongly related to health status and this is true of both Indigenous and non-Indigenous Australians (see later section in this chapter).

Labour force participation by Aboriginal and Torres Strait Islander people remains considerably lower than for other Australians. In 2006, the labour force participation rate for Indigenous persons aged 15–64 years was 54%, compared with 75% for non-Indigenous persons in the same age range. Of Indigenous Australians who were in the labour force (which includes persons who are employed or looking for work), 16% were unemployed, over 3 times the rate for other Australians (5%) (ABS & AIHW 2008).

Generally, poor health status and disability have been associated with unemployment among Indigenous Australians (Ross 2006). For example, findings from the 2004–05 NATSIHS show that those who were unemployed were more likely than those who were employed to be current smokers (76% versus 42%), drink at short-term risky or high-risk levels in the last 12 months (67% versus 61%), report heart or circulatory problems (28% versus 23%), and to be obese (35% versus 30%) (AIHW 2009a).

Housing conditions

Overcrowded dwellings and poor-quality housing have also been associated with poor physical and mental health among the occupants (Waters 2001). Many Indigenous people live in houses that are overcrowded and that do not satisfy the basic Australian standards for shelter, safe drinking water and adequate waste disposal.

In 2006, an estimated 14% of Indigenous households (nearly 21,000) in Australia were overcrowded compared with 5% of other households. This equates to around 102,400 Indigenous Australians (27% of the total Indigenous population) living in overcrowded accommodation (AIHW 2009a). Overcrowding varied significantly by tenure type, with the highest rates being in rented Indigenous community housing (40%); and by remoteness, where Indigenous community housing is most common (ABS & AIHW 2008). There was a slight decrease in the proportion of Indigenous households that were overcrowded between 2001 and 2006, from 16% to 14%.

The 2006 Community Housing and Infrastructure Needs Survey collected data on dwelling condition and main source of water, sewerage and electricity for 17,177 permanent dwellings in 1,187 Indigenous communities. Across Australia, an estimated 6,674 Indigenous community housing dwellings (31%) required major repair or replacement. Dwellings located in remote and very remote areas tended to be in the poorest condition (ABS & AIHW 2008).

Poor nutrition, physical inactivity, and overweight or obesity

Over a long period, the traditional fibre-rich, high-protein, low saturated fat diet of many Indigenous communities has changed to one which is high in refined carbohydrates and saturated fats. The 2004–05 NATSIHS indicates that less than half (41%) of Indigenous Australians living in non-remote areas have the recommended daily intake of fruit (two or more serves daily) and only 10% have the recommended daily intake of vegetables (five or more serves daily) (NHMRC 2003a,b). In comparison, over half of non-Indigenous Australians have the recommended daily fruit intake and 14% of non-Indigenous Australians have the recommended daily vegetable intake (AIHW 2009a).

For Indigenous Australians living in remote areas, access to a range of food items, including fruit and vegetables, is limited. This is due to the higher costs for handling and transporting goods to remote communities, the lack of appropriate storage facilities within communities and the lack of suitable local produce to purchase (NHMRC 2000). The 2004–05 NATSIHS showed that in remote areas 20% of Indigenous Australians aged 12 years and over reported no usual daily fruit intake compared with 12% in non-remote areas. The disparity was even greater for vegetables, where 15% of Indigenous Australians in remote areas reported no usual daily vegetable intake compared with 2% in non-remote areas.

According to the 2004–05 NATSIHS, three-quarters of Indigenous respondents aged 15 years and over living in non-remote areas had sedentary or low levels of physical activity in the 2 weeks before the survey. A higher proportion of Indigenous females than males reported a sedentary level of physical activity. When age differences were taken into account, Indigenous people were 1.5 times as likely as non-Indigenous people to report being sedentary (AIHW 2009a). Also, Indigenous persons who had low or sedentary levels of physical activity were more likely to report having heart or circulatory problems (28%) and diabetes (14%) than those who had high levels of physical activity (each 11%).

In the same survey, of those who reported their height and weight, 36% of Indigenous people aged 15 years and over had a healthy weight, 29% were overweight and 31% were obese. After adjusting for age differences, Indigenous females were around 1.5 times as likely to be overweight or obese as non-Indigenous females, whereas the rates were similar among Indigenous and non-Indigenous males. Indigenous persons who were overweight or obese were more likely to report having diabetes (18%) and heart or circulatory problems (29%) than those who were not overweight or obese (9% and 21% respectively) (AIHW 2009a).

Smoking and alcohol consumption

The 2004–05 NATSIHS found that around half of the Indigenous population aged 18 years or over were daily smokers. After adjusting for age differences, Indigenous adults were more than twice as likely to be current daily smokers as other Australians (Table 5.4).

Smoking during pregnancy is a risk factor for complications such as spontaneous miscarriage and is associated with poor outcomes such as fetal growth restriction, pre-term birth, low birthweight, perinatal death and congenital abnormalities (AIHW 2004). In 2006, Indigenous mothers were more than 3 times as likely to report smoking during pregnancy as non-Indigenous mothers (52% compared with 16%). Indigenous children (0–14 years) are also much more likely (28%) than non-Indigenous children (9%) to be exposed to tobacco smoke in the home (AIHW 2009a). Passive smoking is associated with increased risk of respiratory diseases, lung cancer and coronary heart disease (NHMRC 1997).

Table 5.4: Smoking and alcohol use of persons aged 18 years and over, by Indigenous status, 2004–05 (per cent)

	Males		Females		Total	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
Current daily smoker	48	24	45	18	46	21
Long-term risky or high-risk alcohol consumption[(a)]	18	15	13	12	15	14
Short-term risky or high-risk alcohol consumption[(b)]	21	12	14	5	17	8

(a) Long-term risk level based on respondent's alcohol consumption in week before interview.

(b) Persons who consumed alcohol at short-term risky or high-risk levels at least once every week in the 12 months before interview.

Note: Proportions are directly age-standardised to the 2001 Australian Standard Population.

Source: AIHW 2009a.

Overall, Indigenous Australians are considerably less likely to drink alcohol than non-Indigenous Australians. However, among those who drink, a higher proportion of Indigenous Australians drink at risky or high-risk levels. Among those Australian adults who drank in 2004–05, after adjusting for differences in age structure between the two populations, the rate of long-term risky or high-risk drinking of Indigenous Australians was 34% compared with 22% of non-Indigenous Australians. Indigenous Australians were also twice as likely as non-Indigenous Australians to drink at short-term risky or high-risk levels.

The 2004–05 NATSIHS found that Indigenous adults were more likely to report being a current smoker if they drank at short-term or long-term risky or high-risk levels, had low levels of exercise and reported a self-assessed health status of fair or poor than if they drank at safe levels, were physically active and had excellent or very good self-assessed health status (AIHW 2009a).

Socioeconomic status

As with other Australians, the worse the socioeconomic status of Indigenous Australians the more they are likely to have health risk factors. A strong socioeconomic gradient exists for risk factors among Indigenous people, as it does for other Australians (see Section 5.3). This section uses data from the 2004–05 NATSIHS to show the relationship between health risk factors and education, labour force status and income.

Indigenous people with low levels of educational attainment were more likely than those who had completed Year 12 to regularly smoke, consume alcohol at risky or high-risk levels and engage in low levels of exercise, and were also less likely to eat fruit or vegetables daily (Table 5.5). Indigenous people who were unemployed were more likely to be current daily smokers than those who were employed, and those with lower incomes were more likely than those with average or higher incomes to smoke and less likely to eat fruit or vegetables daily.

Table 5.5: Health risk factors by selected socioeconomic characteristics, Indigenous persons, 2004–05 (per cent)

	Highest year of school completed		Labour force status		Equivalised household income	
Selected risk factor	**Year 12**	**Year 9 or below**	**Employed**	**Unemployed**	**Average and above**	**Lowest**
Current daily smoker	34.3	54.9	45.2	66.3	39.7	55.4
Risky or high-risk alcohol consumption	12.2	17.2	19.1	20.4	18.4	15.5
Has used illicit substances in last 12 months	27.6	35.4	26.0	27.9	28.4	29.3
Sedentary or low level of exercise	70.5	81.9	73.7	69.4	75.2	74.5
Overweight or obese	56.2	61.9	58.7	51.4	57.0	56.7
Does not eat fruit daily	9.4	16.9	14.3	14.4	10.4	16.6
Does not eat vegetables daily	3.8	7.7	5.0	4.0	1.0	7.4

Source: ABS & AIHW 2008.

The high level of health risk factors among Indigenous Australians suggest that policies need to deal with the risk factors in their own right, as well as tackling the social conditions that promote them and cause ill health and premature death. The COAG targets (Box 5.1) provide a means of monitoring progress in improving both the social determinants of health and the overall health status of Aboriginal and Torres Strait Islander people.

5.2 Rural Australians

While the characteristics of Australia's rural areas are quite diverse, rural Australians share several common features. In particular, they live large distances away from major cities and services, and are generally not as healthy as their city counterparts. There can be many reasons for their generally poorer health, including the lower economic advantages of many rural communities (lower levels of education, income and employment), occupational risks from farm or mining work, greater levels of smoking and alcohol abuse, less access to health services and staff, and the hazards of driving over long road distances (AIHW 2008a,b).

Also, Indigenous Australians are known to suffer many health disadvantages and they make up a considerably larger part of some rural populations, especially the more remote communities (26%), than they do in the cities (1%). However, it should be noted that the health disadvantages of rural Australia, on average, are by no means as marked as those of Aboriginal and Torres Strait Islander people as a whole (see Section 5.1).

Despite this general health picture, many people live in rural areas because of the areas' unique and enjoyable lifestyle. Compared with urban areas, personal safety, community connection and general wellbeing are higher in some rural areas (Cummins et al. 2005). All these factors—positive and negative—affect health in various ways.

This section examines the differences in health between those living in rural and urban areas, and concludes with information on access to health services in rural areas.

The geography and classification of rural areas

Geographically, rural areas vary greatly in character, from sparsely populated outback and tropical rainforest areas to 'sea change' communities, regional centres and mining towns. Generally, however, rural areas are more likely to have a harsher environment than urban areas. Drought is one example; it can impose a mental health burden as well as an economic burden on people in rural communities (Morrissey & Reser 2007). Other natural disasters, such as bushfires, can cause widespread death and damage, and can have long-term psychosocial effects on those affected. Furthermore, it is predicted that climate change will increase the frequency and severity of events such as flooding, heatwaves, droughts, bushfires and outbreaks of plant disease. All of these factors disproportionately affect rural communities, and in many cases their health and their local health services (Bi & Parton 2008).

The great diversity of rural areas and the diverse populations they contain mean that putting them into categories is difficult. This section uses the ABS Australian Standard Geographical Classification Remoteness Areas classification to describe an area's relative remoteness (see Box 5.4).

Box 5.4: Defining rural areas

This section mostly uses the Australian Bureau of Statistics (ABS) Australian Standard Geographical Classification Remoteness Area classification (ABS 2006b). The classification allocates one of five remoteness categories to areas depending on their distance from different-sized urban centres, where the population size of the urban centre is considered to govern the range and type 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*. It should be noted that these categories are broad and that health status may vary within them. For example, there is evidence that death rates can be lower in coastal *Inner regional* areas compared with inland *Inner regional* areas (AIHW 2007).

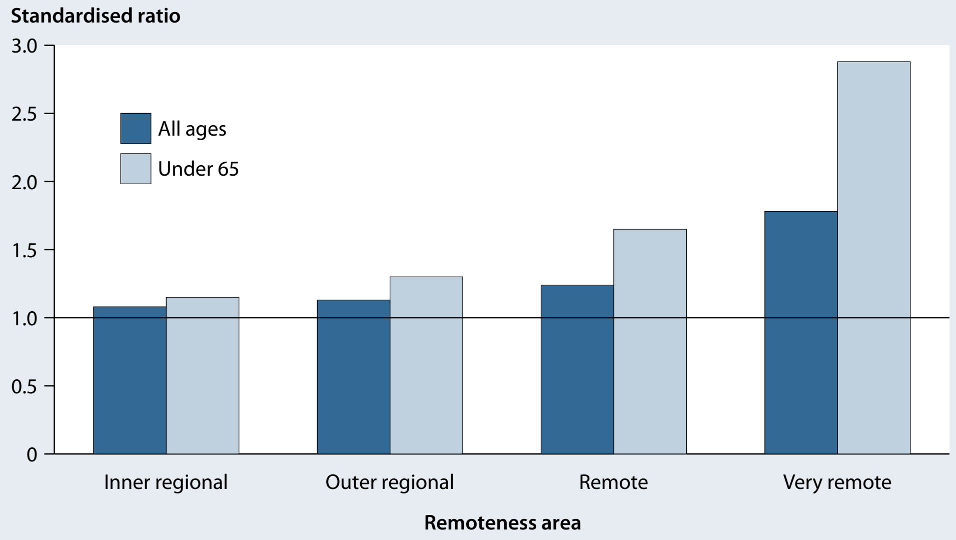
Because of the small sample sizes involved in population surveys covering *Remote* and *Very remote* areas, these surveys are not always able to produce reliable estimates for these areas. For this reason, data for these areas are combined or included with data from *Outer regional* areas in some of the analyses presented here. Additionally, results from the National Survey of Adult Oral Health use a 'capital city/non-capital city' comparison. When referring to the oral health data here, the term *Major cities* is used for 'capital cities'.

Health status

Mortality

Overall mortality rates increase with remoteness (Figure 5.3). For example, in 2004–2006, *Inner and outer regional* areas had death rates 1.1 times as high as *Major cities,* while death rates in *Very remote* areas were 1.8 times as high. Some of this difference in mortality can be explained by the high proportion of Indigenous people who live in more remote areas, and who tend to have higher death rates than non-Indigenous people (Hayes et al. 2005).

In the same period, mortality within specific age groups also varied by remoteness. Compared with *Major cities,* death rates for those aged less than 65 years ranged from 1.1 times as high in *Inner regional* areas to 2.9 times as high in *Very remote* areas (Figure 5.3). These were mostly influenced by comparatively high death rates among those aged 15–44 years outside *Major cities*. So-called 'external causes' (such as motor vehicle accidents and suicide) accounted for much of the higher death rates among young adults living outside *Major cities*. In contrast, mortality differences were less among those aged 65 years and over. Compared with *Major cities*, death rates among this older age group in other areas were only 1.1 times as high.



Note: The difference in rates between *Major cities* and other areas is shown using a standardised mortality ratio, where *Major cities* is equal to 1.00 (horizontal line). This ratio tells us how much higher death rates in other areas were than expected if *Major cities* rates had applied everywhere.

Source: AIHW analysis of the National Mortality Database.

Figure 5.3: Mortality ratios compared with *Major cities*, by remoteness area, 2004–2006

In 2004–2006, there were about 4,600 excess deaths annually outside *Major cities*—that is, deaths above the number expected if these areas had the same death rates as *Major cities*. The causes of death that contributed most to this excess were coronary heart disease (20% of excess deaths), 'other' circulatory disease (17%), chronic obstructive pulmonary disease (9%) and motor vehicle accidents (8%). Suicide, which is more common outside *Major cities*, contributed 4% of the excess, amounting to about 184 deaths. Injuries contributed 80% of excess deaths among 15–24 year olds outside *Major cities*, and 55% of excess deaths among 25–44 year olds. These findings highlight the potential benefits in reducing preventable causes of death, such as motor vehicle accidents, among young people in rural areas.

It is important to note that mortality rates across all regions fell steadily in the period 1997–2006, not just those in *Major cities* (Figure 5.4). However, the mortality gap between the *Major cities* and other areas has remained fairly constant during this time, with death rates being about 10% higher each year in those other areas.

Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of the National Mortality Database.

Figure 5.4: Deaths from all causes by area, 1997–2006

Health conditions

In the 2007–08 National Health Survey (NHS), people living outside *Major cities* were more likely to report certain chronic diseases such as arthritis, bronchitis and osteoporosis than residents of *Major cities* (Table 5.6). Moreover, people living outside *Major cities* were much less likely than their city counterparts to report their health status as being excellent or very good.

Table 5.6: Selected health status indicators, by remoteness area, 2007–08

Health status	Major cities	Inner regional	Outer regional/ Remote[(a)]	Outside Major cities
		Standardised ratio[(b)]		
Reported excellent or very good health	1.00	*0.96	0.90	*0.94
Incidence of cancer (2003–05)	1.00	*0.96	*0.93	*0.95
Reported osteoporosis	1.00	*1.27	*0.70	*1.07
Reported bronchitis	1.00	*1.24	0.99	*1.16
Reported injury	1.00	*1.26	*1.48	*1.33
Reported arthritis	1.00	*1.37	1.13	*1.29
Lifetime mental disorder (2007)	1.00	1.07	1.11	*1.08
Lifetime substance use disorder (2007)	1.00	*1.20	*1.33	*1.25

* Statistically significant (see Glossary) difference from *Major cities*.

(a) With the exception of cancer incidence, no data are available for *Very remote* areas.

(b) The difference in rates between *Major cities* and regional and remote areas is shown using a standardised ratio, where *Major cities* is equal to 1.00. This ratio tells us how much higher rates in regional and remote areas were than expected if *Major cities* rates had applied everywhere.

Sources: AIHW analysis of National Cancer Statistics Clearinghouse data; AIHW analysis of NHS 2007–08; AIHW analysis of National Survey of Mental Health and Wellbeing 2007 data.

Cancer

The National Cancer Statistics Clearinghouse shows that in 2003–2005 the incidence of cancer decreased slightly with remoteness, with combined rates in *Outer regional, Remote* and *Very remote* areas 7% lower than *Major cities.* Accordingly, the incidence of most types of cancer was lower outside *Major cities*, the exceptions being head and neck cancer (5% higher than *Major cities*), melanoma (8% higher) and lip cancer (60% higher). The cancers showing higher incidence outside *Major cities* are generally preventable and occur either through smoking and alcohol consumption (lip, head and neck cancers) or sun exposure (melanoma). Melanoma had a particularly high incidence among females in *Inner* and *Outer regional* areas. Overall, this pattern is similar to that for previous years.

Mental health

In 2007, people living outside *Major cities* were 1.1 times as likely as their city counterparts to have had a mental disorder at some point in their life (lifetime mental disorder) (Table 5.6). Rates of substance use disorders were higher outside *Major cities*, due mainly to the higher rates of risky alcohol consumption in these areas (Table 5.7). Overall there were no significant regional differences in the prevalence of anxiety and affective disorders (including depression) in *Outer regional* and *Remote* areas. However, affective and anxiety disorders were higher among females in these areas than males. Among people living outside *Major cities,* substance use disorders were much more common among males.

There is evidence to suggest that the higher prevalence of mental health problems in rural communities is due to socioeconomic disadvantage, a harsher natural and social environment, loneliness and isolation, and fewer available health services (Morrissey & Reser 2007). In 2004–2006, suicide deaths were 1.3 times as common in areas outside *Major cities* as in *Major cities*. In particular, suicide rates among male farmers and farm workers are higher than those among the general male population (Fragar et al. 2007).

Dental health

Adults living outside *Major cities* were also more likely to have poorer dental health, such as more tooth loss and untreated decay. They were also less likely to have visited the dentist in the previous 12 months than those in *Major cities* (AIHW 2009d). Among persons aged 55–74 years, those living outside *Major cities* were nearly twice as likely to have no teeth as their city counterparts.

Health determinants

Some of the difference in health status between urban and rural areas can be attributed to risk factors such as smoking, heavy alcohol use and other harmful behaviours. In 2007–08, people living outside *Major cities* were 1.2 times as likely as their city counterparts to smoke daily. This gap was slightly higher for females (1.5 times as likely) than for males (1.1).

In addition to smoking, there are some other notable differences in health-related behaviours. For example, based on self-reports, males living outside *Major cities* were 1.4 times as likely and females 1.3 times as likely as their city counterparts to drink at risky or high-risk levels. Males were also 1.2 times as likely as their city counterparts to be sedentary, while there were no significant regional differences in this behaviour for females. However, the measure of sedentary behaviour does not take into account work activity. People living outside *Major cities* may be more active during working hours, given that many of them work in primary production and mining jobs (AIHW 2008a).

People living outside *Major cities* were also 1.3 times as likely as their city counterparts to report high blood pressure and 1.1 times as likely to report high cholesterol. They were also more likely to be classified as overweight or obese (based on measured height and weight data).

Although several risk factors are more prevalent outside *Major cities* (Table 5.7), there may be some exceptions. For example, in 2007–08, based on self-reported information, people living outside *Major cities* were less likely to eat too few vegetables, and males were less likely to use illicit drugs. In 2006 there were also only modest regional differences in health literacy. For example, 42% of those in *Major cities* had adequate or better health literacy, compared with 39% of those in *Remote* areas (ABS 2008).

Table 5.7: Selected health risk factors by remoteness area, self-reported, 2007–08

Risk factor	Major cities	Inner regional	Outer regional/ Remote[(a)]	Outside Major cities
		Standardised ratio[(b)]		
Smoking	1.00	*1.13	*1.46	*1.24
Risky or high-risk alcohol consumption	1.00	*1.25	*1.44	*1.32
Sedentary levels of physical activity	1.00	*1.05	*1.16	*1.09
Insufficient fruit intake[(c)]	1.00	1.01	1.10	*1.04
Insufficient recommended vegetable intake[(c)]	1.00	*0.93	0.97	*0.94
Overweight/obese [(d)]	1.00	*1.16	1.13	*1.15

* Statistically significant (see Glossary) difference from *Major cities*.

(a) No data are available for *Very remote* areas.

(b) The difference in rates between *Major cities* and regional and remote areas is shown using a standardised ratio, where *Major cities* is equal to 1.00. This ratio tells us how much higher rates in regional and remote areas were than expected if *Major cities* rates had applied everywhere.

(c) Dietary guidelines recommend at least two serves of fruit and five serves of vegetables per day.

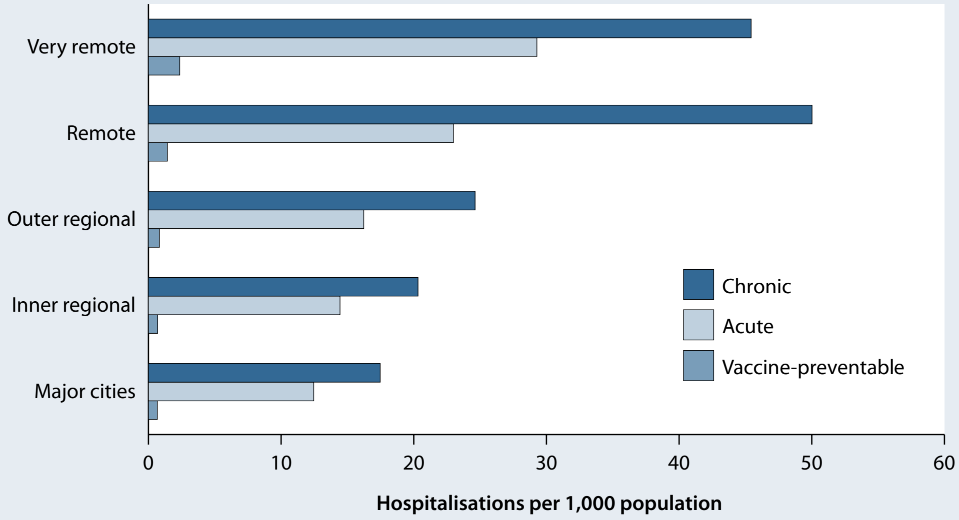
(d) Based on measured height and weight.

Source: AIHW analysis of NHS 2007–08.

Health care in rural and remote areas

The health-care system in rural and remote areas can be influenced by common factors such as larger client capture areas, smaller populations, fewer general and specialist medical professionals, and fewer health services overall. People in rural and remote areas also have different patterns of service use. For example, they may make greater use of hospital emergency departments as a source of primary care than people in *Major cities*. This can complicate the interpretation of data on health resource use and access to services in regional and remote areas.

Overall, hospitalisation rates differed across geographical areas. In 2007–08, hospitalisation rates were highest in *Very remote* and lowest in *Inner regional* areas (AIHW 2009e). This is consistent with the generally lower availability of health professionals in these areas (see tables S38–42 🖱). People living outside *Major cities* were also more likely to be admitted to hospital for conditions that could have potentially been prevented through the provision of non-hospital services and care—events known as potentially preventable hospitalisations. Rates for potentially preventable hospitalisations in 2007–08 were highest in *Very remote* areas (Figure 5.5). Hospitalisation rates for diseases that are preventable with proper vaccination, such as whooping cough, were over 3 times as high in *Very remote* areas as in *Major cities*.



Notes

1. Hospitalisations for which the care type was reported as *Newborn* with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.
2. Hospitalisations per 1,000 population were age-standardised to the June 2001 Australian population.
3. Potentially preventable vaccine-preventable conditions include influenza, bacterial pneumonia, tetanus, measles, mumps, rubella, pertussis and polio. Potentially preventable acute conditions include dental conditions; dehydration/gastroenteritis; ear, nose and throat infections; convulsions and epilepsy; cellulitis; kidney infections; pelvic inflammatory disease; and appendicitis. Potentially preventable chronic conditions include diabetes complications, chronic obstructive pulmonary disease, angina, congestive heart failure, asthma and iron deficiency anaemia.

Source: AIHW 2009e.

Figure 5.5: Rates of potentially preventable hospitalisations by broad categories, by remoteness area of usual residence, 2007–08

National debate about Australia's health workforce often focuses on the supply of health workers in rural Australia. In 2007, the supply of primary care practitioners ranged from 95 full time equivalent (FTE) per 100,000 population in *Major cities* to 84 in *Outer regional* areas (AIHW 2009f). For more information on the supply of primary care practitioners, specialists, nurses and dentists in remote areas, see Chapter 8.

Bulk billing—where the bill for the health service is sent directly to Medicare—can provide people with access to health services regardless of their financial situation. However, in 2008, people aged 15–64 years outside *Major cities* were 10% less likely to be bulk-billed for GP consultations than their counterparts in *Major cities*. The exception to this general picture is that those living in *Very remote* areas were slightly more likely to be bulk-billed than those in *Major cities* (AIHW unpublished analysis of data from the Australian Government Department of Health and Ageing).

5.3 Socioeconomically disadvantaged people

Health and wellbeing is 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 relatively advantaged. This pattern occurs consistently within countries across the world, despite vast differences between countries in their overall wealth.

Furthermore, this variation in health status is not only evident at the extreme ends of the socioeconomic spectrum but follows a gradient, with overall health tending to improve with each step up the socioeconomic ladder (Marmot et al. 1984). 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. So it is not only a matter of disadvantage but also of less advantage. This gradient exists within many population groups (for example, Indigenous Australians; see Section 5.1).

Disadvantaged people tend to come from disadvantaged families. Family factors and personal experience of lower income, and fewer opportunities for education and employment can all affect a person's health in many ways. This may mean less satisfactory early development before and after birth, less opportunity for health literacy, and a greater influence of family and friends towards unhealthy behaviours such as smoking, heavy alcohol use and a poor diet.

Despite the complexity of their causes and effects the key point is that socioeconomic inequalities should be largely avoidable. A society that can reduce these inequalities is likely to achieve strong health gains.

Measuring socioeconomic status

Education, employment and income are the most commonly used measures of socioeconomic status. However, many other factors can be used, such as housing, family structure and occupation as well as access to resources. Some measures can be used on a single characteristic and others may be composite. While similar patterns between health and socioeconomic status are found regardless of the measure, estimates of the effects of socioeconomic status on health will vary (Adler & Ostrove 1999; Krieger et al. 2005). This section first presents a composite measure known as the Index of Relative Socio-Economic

Disadvantage (Box 5.5). The section then uses a single measure, employment status, to explore variations between the health of the employed and unemployed.

Box 5.5: Socioeconomic status and the Index of Relative Socio-Economic Disadvantage

The Index of Relative Socio-Economic Disadvantage (IRSD) is one of four Socio-Economic Indexes for Areas (SEIFA) compiled by the Australian Bureau of Statistics (ABS) after each Census of Population and Housing. The SEIFA aims to represent the socioeconomic status (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.

Typically, the IRSD areas used are the 38,700 ABS Collection Districts. They 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 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 'lowest SES fifth'. The 20% at the other end of the scale—the top fifth—is described as the 'highest SES fifth'.

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 (Krieger et al. 1997). Being an average, the score is also likely to reduce the apparent differences between areas (Glover et al. 2004).

Socioeconomic status and health

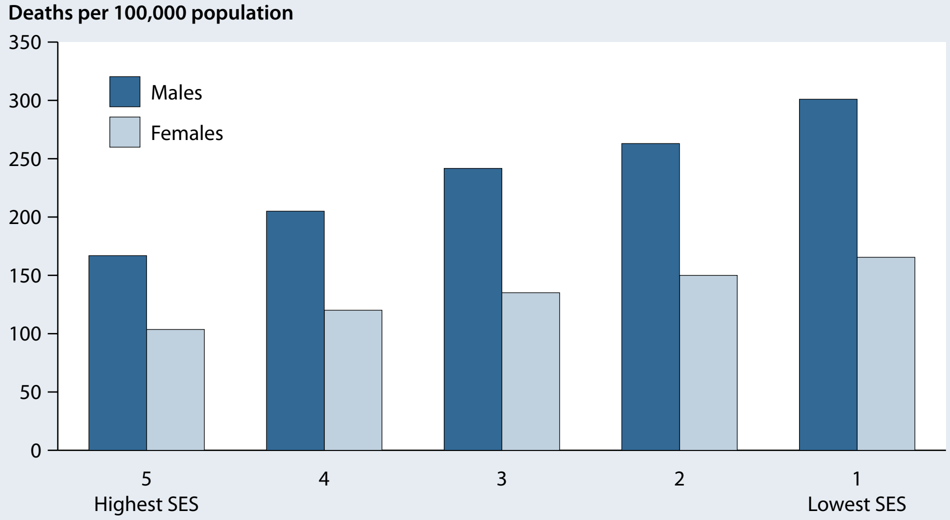
A study of people living in areas of relatively low socioeconomic status (SES) in 2003 reported that they experienced a 32% greater burden of disease than people living in high SES areas (Begg et. al 2007). This burden is a summary measure that takes into account premature mortality and years lived with disability (see Section 2.7). For this reason, this section examines these health components individually, as well as others.

Death and disability

Studies of death rates in Australia reveal substantial socioeconomic inequality. The most recent study of SES and overall mortality (for 1998–2000) found that for all age groups and both males and females, there was a graded relationship between death rates and levels of SES (Draper et al. 2005). The same study found a life expectancy gap between the highest and lowest SES groups of 4 years for males and 2 years for females.

In more recent times, studies considering death from specific health conditions confirmed similar socioeconomic gradients for cardiovascular disease (AIHW: Moon & Waters 2006), diabetes (AIHW 2008c), non-melanoma skin cancer (AIHW & CA 2008) and injuries among young Australians (AIHW: Eldridge 2008).

Moreover, rates of premature death decrease with improving socioeconomic status (Figure 5.6). In 2002–2006, death rates among 15–64 year olds in the lowest SES group were 70% higher than those in the highest SES group.



SES Socioeconomic status.

Note: See Box 5.5 for an explanation of the SES measure used here.

Source: Public Health Information Development Unit 2009.

Figure 5.6 Premature deaths at ages 15–64 years, by sex and socioeconomic status, 2002–2006

Lower socioeconomic status is also correlated with disability. Analysis of the 2006 Australian Census for capital cities found severe disability was more common in those suburban areas where residents had relatively few economic resources than in areas whose residents had more: 3.1% of people living in the lowest of these SES areas had severe disability, compared with 1.3% in the highest areas (AIHW 2009g).

Selected health conditions and risk factors

Much of Australia's burden of disease can be attributed to lifestyle risk factors such as smoking, physical inactivity and being overweight or obese (Begg et al. 2007). Results from the 2007–08 NHS indicate that these factors are generally more common as socioeconomic status declines—risky alcohol use is the exception (Table 5.8). In particular, the prevalence of daily smoking in the lowest SES group was over twice that of the highest group. These SES patterns were also evident among Indigenous Australians (see Section 5.1).

Table 5.8: Prevalence of selected health measures by socioeconomic status, 2007–08 (per cent)

Characteristics	Highest SES:5	4	3	2	Lowest SES:1
Health risk factors					
Daily smoking	11.1	15.1	18.8	21.1	28.6
Sedentary exercise level	24.9	31.0	38.1	38.8	45.4
Risky or high-risk alcohol consumption	12.7	12.6	13.3	13.6	10.1
Overweight or obese	37.9	41.2	42.7	42.2	42.5
Health condition					
Depression	3.5	3.3	3.5	4.0	4.4
Diabetes (Type 2)	2.9	3.7	4.1	4.3	6.2
Chronic respiratory disease	2.2	2.7	2.8	3.1	3.3
Cardiovascular disease	17.3	17.1	21.0	22.2	23.8
Severe/profound disability	2.9	4.1	4.6	5.3	6.1

Notes

1. Data are based on persons aged 15 years and over, except smoking and alcohol consumption (18 years and over).
2. Data are age-standardised to the 2001 Australian population.

Source: AIHW analysis of NHS 2007–08.

People living in the lowest SES areas were also more likely to report depression, Type 2 diabetes, chronic respiratory disease and cardiovascular disease. Again, the likelihood of reporting any of these conditions increased in a graded fashion as socioeconomic status decreased. In the case of Type 2 diabetes and severe or profound disability, rates in the lowest SES areas were over double those in the highest.

Consistent with these findings, people in the lowest SES group were much less likely (48%) than those in the highest (64%) to report being in very good or excellent health.

Unemployed people

Employment is an important contributor to a person's socioeconomic status. Participation in work instils self-esteem and a positive sense of identity, while also providing the opportunity for social interaction and personal development. Although Australia has low unemployment rates compared with similar countries, the average number of unemployed Australians at any given time—around 562,000 in 2008–09—is still very significant (ABS 2009b).

As well as the direct financial and social effects, unemployment is also associated with greater mortality, worse health (particularly mental health) and more disability (Jin et al. 1995; Mathers 1994; Mathers & Schofield 1998). There is also evidence to suggest that, in general, the associations are greater for males than females, and particularly for males aged 25–44 years (for example, see Andersen 2007).

Although long-term studies suggest that people are more likely to develop poor health and disability following unemployment rather than the reverse, it can be difficult to separate cause and effect (Bartley et al. 1999). For example, characteristics related to poor health, such as low levels of education, may not only increase a person's risk of unemployment but also influence how unemployment affects their emotional and physical health.

Measuring unemployment

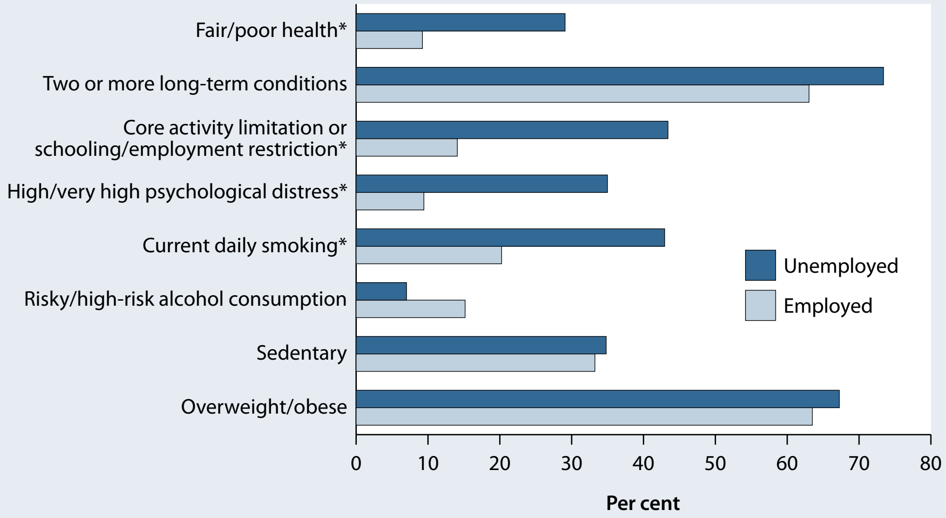
There are some major difficulties in exploring the effect of unemployment on health. First there is the direction of the effect, with poor health being able to cause unemployment as well as vice versa. Second, poor health may be due to factors associated with unemployment, rather than to unemployment itself. Third, there are various kinds and degrees of unemployment. And fourth, the small samples of unemployed people in surveys make it harder to confidently determine real differences between the employed and unemployed. In an effort to account for some of this variation, analysis here is restricted to those who are aged 25–64 years and who have been unemployed for 6 months or more.

For most household social surveys, Australian agencies use a definition of unemployment that is consistent with the definition they use in gathering labour force statistics—those aged 15 years and over who were not employed in the reference week of the survey, who actively looked for work sometime during the previous 4 weeks, and were available to start within the following 4 weeks (ABS 2007c). Together, unemployed and employed people constitute Australia's labour force.

Unemployment and health

Despite the difficulties in assessing the effects of unemployment, the data strongly suggest an effect on health. Results from the 2007–08 NHS indicate that unemployed Australians aged 25–64 years were 3 times as likely as their counterparts in current employment to describe their health as only poor or fair, and 4 times as likely to experience high or very high psychological distress (Figure 5.7). This is consistent with evidence of higher rates of mental health conditions, particularly anxiety and depression, among people unemployed (Comino et al. 2003; Slade et al. 2009). As expected, people with a core activity limitation, or a schooling or employment restriction, were much more likely to be unemployed (43% compared with 14%). Daily smoking was also over twice as likely among the unemployed. (No data can be provided here on the possible relationship between unemployment and mortality, however. This is because death certificates do not include information on employment status.)

People who are unemployed are not the only population group that may be disadvantaged in their employment opportunities as a consequence of their health. There may be people who report that they are not actively looking for work (not in the labour force) because they believe there is no work available, or there may be those who are classified as employed but in reality are working for very few hours per week or are in an insecure employment arrangement. Also, there may be informal carers who cannot actively pursue paid employment due to their caring responsibilities, and people with disability who may wish to work but feel there is not adequate support to do so.



* Indicates statistically significant difference between groups.

Notes

1. Data are for people unemployed 6 months or more.
2. See Box 5.6 for definitions of core activity limitation and schooling/employment restriction.

Source: AIHW analysis of NHS 2007–08.

Figure 5.7: Prevalence of health-related factors by employment status, people aged 25–64 years, 2007–08 (per cent)

5.4 People with disability

There are an estimated 3.9 million Australians with disability. Although many enjoy good health many others may have poor health, either as a result of the underlying cause of their disability or for reasons unrelated to that cause. This has important implications for their needs as a group, particularly if their health conditions affect their participation in the community.

This section aims to describe the health of the population of people with disability. The data show that, overall, people with disability are more likely than others to have poor physical and mental health and higher rates of health risk factors, such as smoking and overweight. Among other things, the data help to confirm that the more severe a person's disability—that is, the greater their limitation or restriction (see Box 5.6)—the poorer their health.

For the first time, Australia's NHS in 2007–08 included information on people with disability along with standard questions relating to health. This survey, along with other population surveys such as the 2007 National Survey of Mental Health and Wellbeing (SMHWB) and the 2003 Survey of Disability Ageing and Carers, provides new opportunities to explore the health status of people with disability and their use of health services. However, in using the NHS data there is an important limitation in exploring the possible effects of disability on health. The NHS data do not identify health disorders that are responsible for a person's disability, so their particular influence cannot be adjusted for in any analysis.

Caring for people with disability can also affect the health and wellbeing of the carers. For further information on the wellbeing of carers, see AIHW 2009h.

Box 5.6: Gaining a profile of people with disability

Three different population measures of disability are used in Australia: the Survey of Disability Ageing and Carers (SDAC), the Australian Bureau of Statistics' (ABS) Short Disability Module (see Section 2.4), and the disability questions of the 2006 Census. Whereas the prevalence of disability can only be obtained from the SDAC, the ABS Short Disability Module, used in both the National Health Survey and the Survey of Mental Health and Wellbeing, provides a basis for comparing the health of people with and without disability. This module identifies people with disability by assessing their severity of limitation on the basic (core) activities of everyday life, such as self-care and communication, or any restrictions they may have in participating in schooling or employment. In this section the following disability status categories are used:

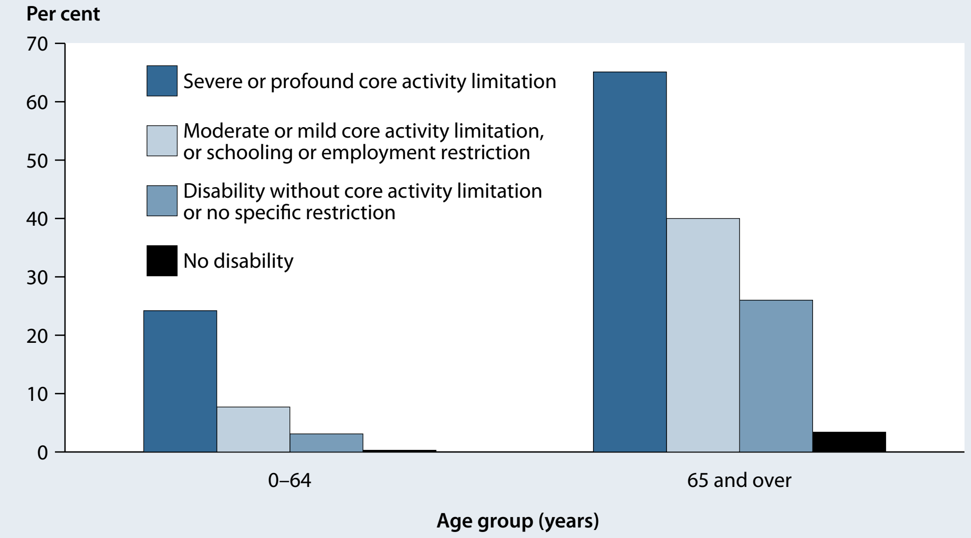
- severe or profound core activity limitation—where the individual sometimes or always needs help with at least one core activity: self-care, communication or mobility
- moderate or mild core activity limitation, or schooling or employment restriction—where the individual does not need assistance but has difficulty performing a core activity (moderate); or has no difficulty performing a core activity but uses aids or equipment because of disability (mild), or has restriction in schooling or employment participation only
- no specific core activity limitation, or schooling or employment restriction—where the individual is identified by the ABS Short Disability Module as having disability but without having specific limitations or restrictions
- no disability.

For disability prevalence estimates from the SDAC, see Section 2.4.

Health status

Results from the 2007–08 NHS show that people with disability are more likely than those without ('other Australians') to have poor health. Rates for all health conditions selected for analysis (asthma, cancer, cardiovascular disease, diabetes, arthritis, osteoporosis and injuries) were higher among this group (Table S13 🖱). Looking specifically at people aged under 65 years, the rate of arthritis among those with disability was over 5 times as high as for other Australians, and rates of diabetes and osteoporosis over 4 times as high. In addition, the likelihood of having 3 or more of these health conditions at the same time was much greater among people with disability than those without (Figure 5.8). For example, people with a severe or profound core activity limitation were much more likely (around 80 times) than other Australians to experience this.

Also, rates of disease and comorbidity (having 2 or more conditions at the same time) increased with the severity of the disability. For example, 8% of people with a moderate or mild core activity limitation or specific restriction had 3 or more health conditions, while the corresponding figure for people with a severe or profound core activity limitation was 24%.



(a) Health conditions are asthma, cancer, cardiovascular disease, diabetes, arthritis, osteoporosis and injuries.

Note: See Box 5.6 for definitions of disability status.

Source: Table S13 .

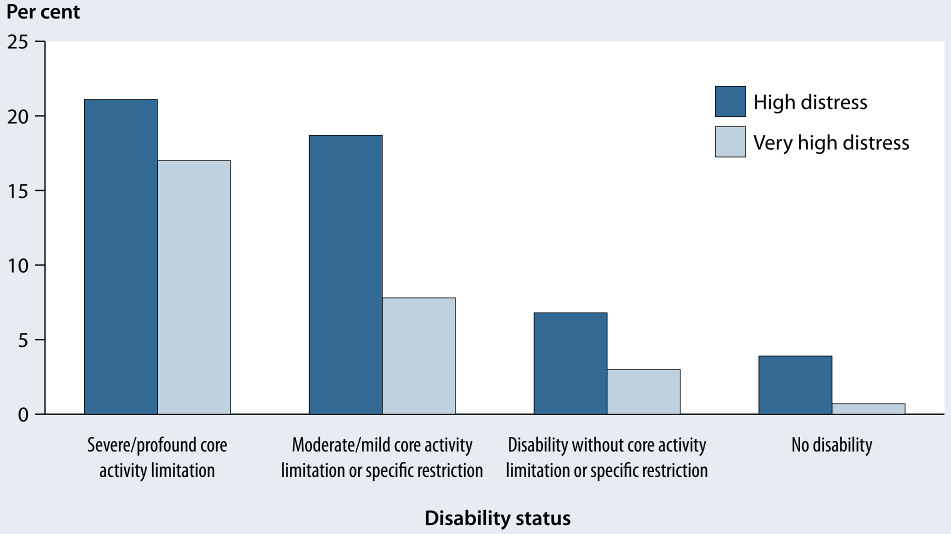
Figure 5.8: Percentage of people with three or more health conditions[(a)], by age group and disability status, 2007–08

In addition, people with disability were 4 times as likely as others to report severe or very severe levels of pain, the rates increasing with the severity of limitations (Table S13). Nearly 40% of people aged 15–64 years with a severe or profound core activity limitation had such pain compared with just 4% of other Australians.

Mental health

High and very high levels of distress can be indicators of mental illness. According to data from the 2007 SMHWB, people with a severe or profound core activity limitation were far more likely (around 8 times) than those without disability to experience high or very high levels of distress (Figure 5.9). Similarly, in 2007, over two-thirds of people with a severe or profound limitation had a recent mental disorder, compared with just over a third of people without disability.

Anxiety and mood disorders such as depression and bipolar affective disorder are also common among people with disability. Those with severe or profound core activity limitation were twice as likely as other Australians to have an anxiety disorder and 6 times as likely to have a mood disorder.

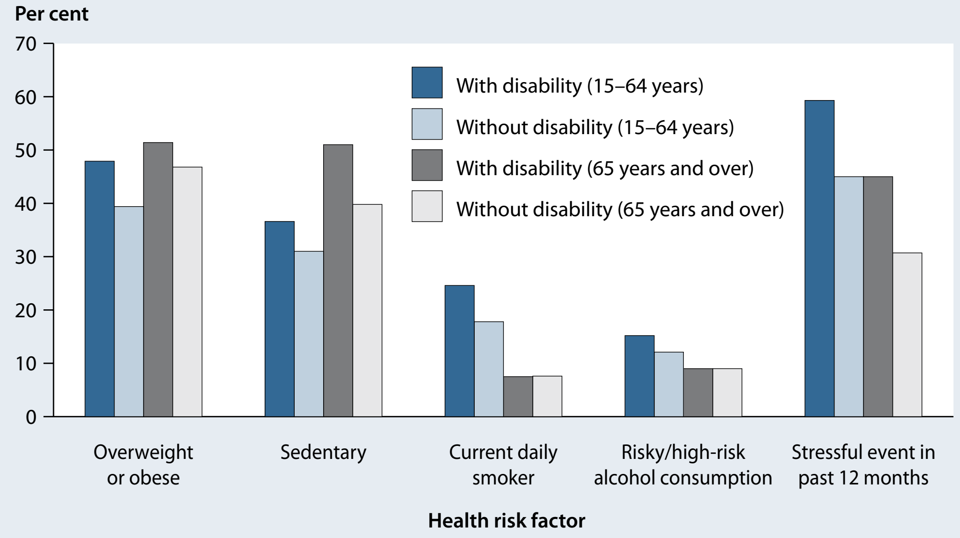


Note: See Box 5.6 for definitions of disability status.
Source: AIHW analysis of NHS 2007–08.

Figure 5.9: Percentage of people who experience high and very high levels of psychological distress, by disability status, 2007–08

Health determinants

Based on the 2007–08 NHS, people with disability are also more likely than other Australians to have behavioural risk factors such as smoking and experiencing stressful life events. In particular, 15–64 year olds with disability were more likely to be overweight or obese (48% compared with 39%) and to smoke daily (Figure 5.10). They were also more likely to have experienced a stressful event in the 12 months before their interview (60% compared with 45%). In contrast, 15–64 year olds with disability were only slightly more likely than others to drink alcohol at risky or high-risk levels, and the rates were the same among people aged 65 years and over.



Note: Overweight or obese for people aged 18–64 years only.

Source: AIHW analysis of NHS 2007–08.

Figure 5.10: Selected health risk factors among people with and without disability, 2007–08

Health services

The use of health services by people with disability helps to maximise their participation in community life, along with maintaining their health. There are many factors that influence participation in health services, such as location, finance, and social and cultural barriers, as well as a person's awareness of services and their own personal needs.

As would be expected, data from the 2007–08 NHS show that people aged 15–64 years with a disability were much more likely than other Australians to have visited a specialist in the 12 months before their interview (Table 5.9). A higher proportion of people with a severe or profound core activity limitation reported doing this (56%) compared with those with a disability but no limitation or specific restriction (28%) and those without disability (16%).

The proportion of people with disability who reported visiting a specialist was similar regardless of their household income (around 6–7% from each of the 5 income groups). However, of the people with a severe or profound core activity limitation who reported visiting a specialist, a much higher proportion (16%) was in the lowest income group compared with the highest (3%).

Table 5.9: People aged 15–64 years who visited a specialist in a 12-month period, by disability status and household income, 2007–08 (per cent)

	Disability status				
Household income quintile[(a)]	**Severe/profound core activity limitation**	**Moderate/mild core activity limitation or specific restriction**	**Disability without core activity limitation or specific restriction**	**Total with disability**	**No disability**
Lowest	15.9	7.6	2.5	5.8	0.8
Second	12.9	6.8	3.2	5.6	2.1
Third	8.8	8.0	5.3	6.6	2.8
Fourth	7.4	6.5	6.8	6.7	3.1
Highest	3.1	6.0	6.6	6.0	4.5
Unknown	7.9	5.3	3.7	4.7	2.6
Total	**55.9**	**40.5**	**28.0**	**35.4**	**15.9**

(a) These quintiles represent five equal groupings of households ranked by income, with 'lowest' representing households with relatively low income and 'highest' representing those with relatively high income.

Note: See Box 5.6 for definitions of disability status.

Source: AIHW analysis of NHS 2007–08.

While data from the NHS are not able to identify the extent to which the health needs of people with disability are met, previous AIHW analysis has shown that higher levels of disability are associated with lower levels of health care need being met (AIHW 2009i). There has been substantial research on why this may be the case, particularly in the field of intellectual disability. Some factors include lack of adequate training of health professionals to work effectively with people with disability (Torr et al. 2008) and the greater possibility for health conditions to be misdiagnosed or untreated (Wallace & Beange 2008).

It is also possible that disability-specific health resources may be under-used by the people who need them. Recently, the Australian Government funded, under Medicare, health assessments for people with intellectual disability. These GP-conducted assessments are a systematic annual review of physical, mental and social function. They provide an opportunity to diagnose chronic conditions as well as to intervene early for other health problems and health risk factors. Across Australia, around 5,600 assessments were conducted in 2007–08 and around 7,100 in 2008–09 (AIHW analysis of Medicare data). NHS statistics, however, suggest that far more Australians may be eligible for these checks, given there are an estimated 640,000 people with an intellectual disability or restrictive long-term health condition (AIHW analysis of NHS 2007–08).

5.5 Prisoners

Although the number of prisoners in Australia is small compared with other disadvantaged groups, they have a high level of need. Prisoners often come from disadvantaged backgrounds, with low levels of education and employment, and they have some of the worst health in the community, with generally higher levels of chronic and communicable diseases and mental illness than Australians overall. Prisoners also have far greater levels of smoking, and alcohol and illicit drug use.

Limited information existed on the health of prisoners until recently. Established in 2009, the National Prisoner Health Data Collection provides an opportunity to examine the health of Australia's prisoners comprehensively for the first time (Box 5.7). Drawing mostly on these data, this section provides a brief outline of the prison population, followed by a profile of the health of people entering prison compared with the general population, with a focus on certain chronic conditions, mental health, and alcohol and other drug use. It concludes with a summary of the health of Indigenous prisoners, who are greatly over-represented in Australia's prisons.

Box 5.7: National Prisoner Health Data Collection

Responsibility for providing health services to prisoners rests with state and territory governments, whose current health policy and practices vary greatly. Between 2008–09, the AIHW, in conjunction with state and territory representatives and experts in the field, developed the National Prisoner Health Data Collection (NPHDC).

The NPHDC gathered most of its data from the first National Prisoner Health Census conducted over 1 week during 2009. During this census week, data were collected on all prisoners entering prison (either on remand or a sentence), as well as on visits to the prison health clinics and on prisoners' medications. All jurisdictions provided some data for this collection, although the scope and coverage of data varied (see AIHW 2010).

This new collection allows the reporting of key prisoner health indicators (AIHW 2009j). These indicators, structured on the National Health Performance Framework (see chapters 1 and 9), will help in monitoring the health of prisoners, and planning and evaluating services for them.

The National Prisoner Health Indicators cover a broad range of topics including chronic health conditions, communicable diseases, head injury, mental health, self-harm and mortality; health behaviours such as alcohol and other drug use; and the effectiveness, responsiveness, accessibility and efficiency of the services provided by prison health clinics (AIHW 2009j).

Who are Australia's prisoners?

Australia's prison population is increasing, both in terms of overall numbers and imprisonment rates. At 30 June 2009 there were around 27,300 adults in prison. This includes those who were sentenced and those on remand (awaiting trial or sentencing), but excludes those on periodic detention, in immigration detention centres, or in police or court cells (ABS 2009c).

In 2009, most adult prisoners were male (93%) and born in Australia (81%). The median age of prisoners was 33 years. One-quarter of the prison population was Indigenous (25%), despite Indigenous people representing only 2% of the adult Australian population.

The median time spent on remand was 2.9 months, and the median sentence length was 3 years. This means that, each year, thousands of prisoners are released back into the community. Therefore the health problems of prisoners are also important for health planning and service delivery at a population level.

People entering prison

The profile of the 549 prison entrants during the 2009 prisoner health census week was broadly similar to the general prisoner population described above. In the census there was a lower proportion of males (89%), and a slightly higher proportion of Indigenous prisoners (26%) than among the general prison population. This probably reflects the different profiles of entrants and prisoners who are already in custody. Prisoners on remand or shorter sentences are more common among prison entrants. The majority of prisoners at a single point in time are those on longer sentences.

The median age of prison entrants was 29 years, with a slightly higher proportion of Indigenous entrants aged 18–24 years (36%) compared with non–Indigenous entrants (30%). A higher proportion of non–Indigenous entrants (24%) was aged 35 years or over compared with 14% of Indigenous entrants.

Entrants generally had low levels of education compared with the general community, with Year 10 schooling or less being the highest completed level of education for almost three-quarters (74%). For over two-thirds of entrants (68%) this was not their first time in prison, and almost one-quarter (24%) had been in juvenile detention at some time.

Health conditions

The prisoner health census asked prison entrants whether they currently had certain chronic conditions: asthma, arthritis, cardiovascular disease, diabetes and cancer. The results are presented here in Table 5.10 alongside results from the 2007–08 NHS, which similarly estimated the proportions of the general Australian population with these same conditions based on self-reports (ABS 2009d).

Younger prison entrants (25–34 years) were more likely than their counterparts in the Australian population to have asthma (15% compared with 10%) and diabetes (2% compared with 1%). The latter finding reflects the large proportion of Indigenous Australians among prison entrants and the higher prevalence of diabetes in this group compared with non-Indigenous Australians. Rates of arthritis, cancer and cardiovascular disease were similar among prisoners and the general population. This is not surprising considering these conditions are not common in this age group.

A similar picture emerged for those aged 35–44 years, but these entrants were twice as likely as their counterparts in the general population to have cardiovascular disease.

Table 5.10: Prevalence of selected chronic conditions, prison entrants and all Australians (per cent)

Chronic condition	Prison entrants (2009)		All Australians (2007–08)	
	25–34 years	35–44 years	25–34 years	35–44 years
Asthma	15	20	10	10
Arthritis	5	9	5	9
Cardiovascular disease	1	4	0.7	2
Diabetes	2	5	0.5	2
Cancer	1	1	0.3	1

Sources: ABS 2009d; National Prisoner Health Census 2009.

Mental health

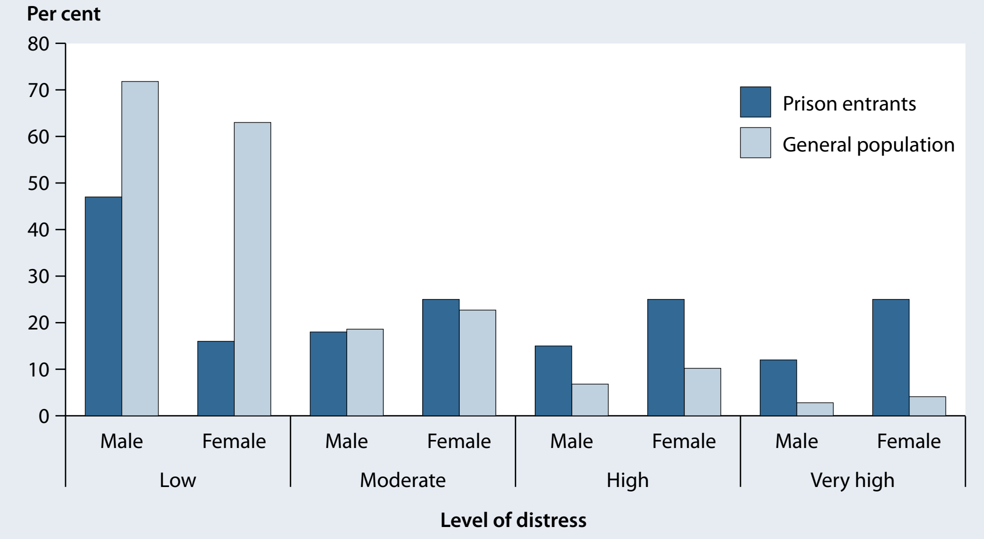
The 2007 SMHWB collected information on the prevalence of mental disorders in people who had been imprisoned. In the 12 months preceding the survey interview, the incidence of any mental disorders among individuals who had at some time been imprisoned was greater than among those who had not. Of the 100 people who reported they had ever been imprisoned, 41% had had a mental disorder at some time in the 12 months before the interview, which was more than twice the prevalence of people who reported they had never been imprisoned (19%).

Findings from the prisoner health census similarly suggest a higher prevalence of mental health problems among prison entrants than the general population, particularly among females. Almost one-third of prison entrants were referred to prison mental health services as a result of their initial health assessment, and over one-third of the 549 entrants (205 or 37%) reported ever being told by a doctor, psychiatrist, psychologist or nurse that they had a mental disorder. A history of mental health problems was more common among females; with almost three-fifths (57%) reporting ever having a mental disorder, compared with just over one-third (35%) of males.

A total of 98 prison entrants (18%) reported being currently on medication for a mental disorder. This represents 48% of those who reported ever having such a disorder. A greater proportion of female entrants (28%) than male entrants (17%) was currently on medication.

Non-Indigenous prison entrants were more likely (41%) than Indigenous prison entrants (26%) to report having ever been told (as above) they had a mental disorder, and were more than twice as likely to be currently taking medication for a mental health condition (20% and 9% respectively).

Levels of psychological distress in the 4 weeks immediately preceding imprisonment were measured for prison entrants, and the results compared with the general Australian population. Prison entrants in this census, particularly females, reported consistently higher levels of psychological distress than the general Australian population (Figure 5.11). Half of the female prison entrants reported high or very high levels of distress, compared with 14% of the general female adult population. For males, this applied to over one-quarter (27%) compared with 10%. A far higher proportion of the general population experienced only low levels of distress than did prison entrants, with the difference most striking in females (63% of the general population, compared with 16% of prison entrants).



Note: Figure includes NSW, Vic, Qld, WA, SA, ACT.

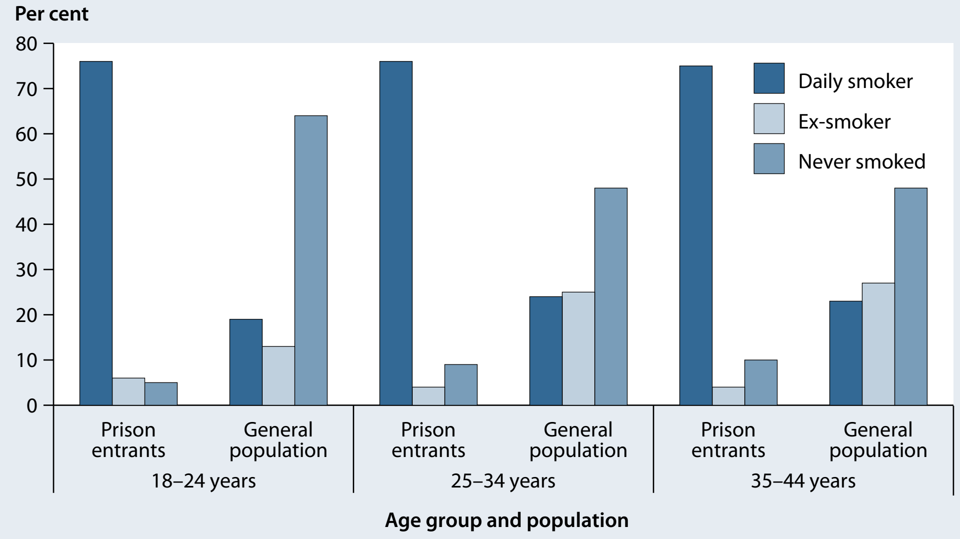
Sources: ABS 2009d; National Prisoner Health Census 2009.

Figure 5.11: Levels of psychological distress, prison entrants (2009) and general Australian population (2007–08), by sex

Alcohol and other drug use

Tobacco smoking

Prison entrants were over 3 times as likely as those in the general population to be daily tobacco smokers (74% compared with 20%), while a higher proportion of the general population were either ex-smokers or had never smoked (Figure 5.12). Prison entrants also started smoking at an early age (at around 14 years of age, on average), with 6% smoking their first cigarette when aged under 10 years. The 2007 National Drug Strategy Household Survey found that, nationally, smokers began at an average age of 15 years for males and 16 years for females.



Note: Figure includes NSW, Vic, Qld, WA, SA, ACT.

Source: ABS 2009d; National Prisoner Health Census 2009.

Figure 5.12: Smoking status of prison entrants (2009) and the general population (2007–08) by age

Risky alcohol use

The prisoner health census uses a subset of questions from the Alcohol Use Disorders Identification Test (AUDIT) to assess alcohol consumption and its potential effects on the health of prisoners. The AUDIT was developed by the World Health Organization and provides an accurate measure of risk across different world populations. A score of 6 or more on the three consumption questions was used as indicating a risk of alcohol-related harm. Just over half (51%) of prison entrants drank alcohol at levels that placed them at risk of alcohol-related harm. Alcohol consumption at this level was found in almost two-thirds of Indigenous entrants (65%) compared with less than half of non-Indigenous entrants (47%). However, these figures may be underestimated, given that for 15% of entrants the measure of alcohol-related harm was unknown or invalid.

Illicit drug use

The great majority of prison entrants (71%) had used illicit drugs in the 12 months before the census. As in the general community, recent illicit drug use was found most frequently in the younger age groups of prison entrants. The highest proportion of illicit drug use was by entrants aged 25–34 years (77%) and the lowest by entrants aged 45 years or over (43%).

The most frequently used illicit substances by prison entrants were cannabis/marijuana (52% of all prison entrants), followed by meth/amphetamine (30%), heroin (19%) and analgesics/pain killers (18%) (see Table S14 🖱).

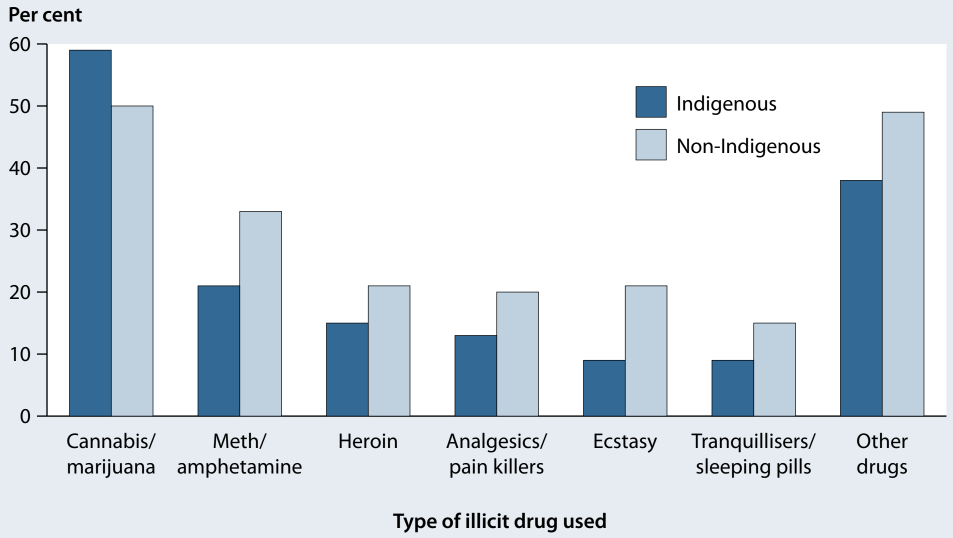
Prison entrants were over 5 times as likely as those in the community to have used illicit drugs in the preceding 12 months (71% compared with 13%). In each age group and for each type of illicit drug, a far greater proportion of prison entrants had used the drug during the last 12 months, compared with the general population (Table 5.11). The differences were most marked in the older age groups. The use of heroin was also markedly higher among prison entrants (between 12 and 27%) than in the general community (1% or less). Around 59% of prison entrants had used more than one type of illicit drug during the last 12 months, and 12% had used at least six different types of drugs.

Table 5.11: Use of illicit drugs during the last 12 months, prison entrants and all Australians, latest year available (per cent)

	Prison entrants (2009)			All Australians (2007)		
Illicit drug used	**18–24 years**	**25–34 years**	**35–44 years**	**18–24 years**	**25–34 years**	**35–44 years**
Cannabis/marijuana	60	54	45	21	17	9
Meth/amphetamine	28	35	30	5	7	2
Heroin	12	27	20	0	1	0
Analgesics/pain killers	15	22	19	3	3	3
Ecstasy	24	17	13	11	9	2
Tranquillisers/sleeping pills	8	21	12	3	3	1

Sources: AIHW 2007 National Drug Strategy Household Survey; National Prisoner Health Census 2009.

The illicit drugs of choice differed for Indigenous and non-Indigenous prison entrants (Figure 5.13). Cannabis/marijuana was the only illicit drug used by a greater proportion of Indigenous (59%) than non-Indigenous (50%) entrants. The differences were most notable for synthetic drugs such as meth/amphetamines (33% of non-Indigenous entrants, compared with 21% of Indigenous) and ecstasy (20% compared with 9%). The use of heroin, analgesics or pain killers and tranquillisers or sleeping pills was also reported more commonly by non-Indigenous than Indigenous prison entrants.



Notes

1. Percentages do not add to 100% as prisoners may have used more than one type of drug.
2. Figure includes NSW, Vic, Qld, WA, SA, ACT.

Source: National Prisoner Health Census 2009.

Figure 5.13: Prison entrants, illicit drug use by Indigenous status, 2009

Prescribed medication

The prisoner health census collected data on prescribed medications administered to any prisoners in custody during the census week, not just entrants. These data were collected in Queensland, Western Australia, South Australia, Tasmania and the Australian Capital Territory (12,538 prisoners in total). Over two-fifths (41%) of prisoners were taking prescribed medications during the census week, with this being more common among females (56%) than males (39%). Three-fifths (60%) of males taking medication and 69% of such females took more than one type of medication. At least five different medications were taken by 10% of prisoners, up to a maximum of 15 medications.

Two out of the three most common types of medication were for mental health problems. The most common type of medication administered was for depression or mood stabilisation (16% of all medications), followed by antipsychotics, pain medication and antiinflammatories or arthritis medication, each at 9% of medications prescribed (Table S15 🖱).

The health of Indigenous prisoners

Indigenous prisoners are greatly over-represented in the prison population (making up around one-quarter of the prison population compared with 2% of the Australian population of the same age). As Section 5.1 outlines, Indigenous Australians have poorer health than non-Indigenous Australians. However, results from the prisoner health census were not always consistent with this general pattern—there was less difference between Indigenous and non-Indigenous prisoners than may have been expected. For example, smoking and illicit drug taking were found at similar levels for Indigenous and non-Indigenous prisoners. For mental health, the pattern was reversed, with lower levels of mental health problems among Indigenous than non-Indigenous prisoners. One-quarter (26%) of Indigenous prison entrants reported experiencing high or very high levels of psychological distress in the 4 weeks immediately preceding imprisonment, as measured by the Kessler–10 scale (K10), compared with 31% of non-Indigenous entrants. This is in direct contrast to the finding that, in the general community, Indigenous people (27%) were twice as likely as non-Indigenous people (13%) to report high or very high levels of distress, as measured by the K5 subscale of the K10 (AIHW 2009b). Interestingly, the rates of high or very high distress among both Indigenous prison entrants and Indigenous people in the general community were the same, whereas the levels for non-Indigenous people were far higher among prison entrants than their counterparts in the general community.

In relation to health conditions, 3 in 10 prison entrants, both Indigenous (30%) and non-Indigenous (29%), reported ever having been told they have asthma. However, for some health conditions, such as diabetes, higher rates were found among Indigenous (5%) than non-Indigenous prisoners (2%), which is consistent with the pattern among the general community.

These mixed results for the health of Indigenous prisoners may be due to the generally poorer health of prisoners than the general population. Prisoners may be a somewhat self-selected group as certain health matters found in prison entrants, such as mental health problems and use of illicit drugs, are also matters that may increase the likelihood of someone being sent to prison.

5.6 Overseas-born people

Australia is an ethnically diverse nation. The estimated number of overseas-born Australians is about 5.5 million, representing a quarter of the total Australian population (ABS 2009e). Migrants come from over 200 different countries, although people born in the United Kingdom continue to be the largest group of overseas-born residents (23%). Over the past 60 years the overseas-born population has increased from about 1.3 to 5.5 million.

Migrants bring to Australia their unique health profiles. Research has found that most migrants enjoy health that is as good as, if not better than, that of the Australian-born population. This is known as the 'healthy migrant effect'. Immigrant populations often have lower death and hospitalisation rates, as well as lower rates of disability and lifestyle-related risk factors (AIHW: Singh & de Looper 2002). To some extent, this can be explained by the fact that most migrants are partly selected on the basis of their health and, in some cases, their relatively high socioeconomic status. They may also be less exposed to risk factors for cardiovascular and other non-communicable diseases before their relocation to Australia (Razum 2006). However, it has been observed that the migrant health advantage often diminishes with length of stay (Young 1992). Also, the healthy migrant effect does not apply to all overseas-born people. For example, vulnerable new arrivals such as refugees are hidden within these trends due to small sample sizes and the difficulty of collecting adequate data about their health status.

Despite these general advantages among those born overseas, certain health risk factors and diseases are more common among migrants from some countries, reflecting diverse socioeconomic, cultural and genetic influences. Moreover, some migrants can experience barriers in their access to the best health care, for example in understanding health information or navigating pathways of care. This is particularly the case for those born in countries where English is not the main language. Language is one of the primary barriers to participation, and religious beliefs, cultural practices and lack of access to culturally specific care can also contribute (AIHW: Thow & Waters 2005).

This section summarises the health of overseas-born people, with a focus on mortality, mental health and health risk factors. The participation of people from non-English-speaking backgrounds in health services is also considered briefly in relation to breast screening and mental-health-related services.

Health status

Mortality

Table 5.12 shows how death rates for overseas-born people compare with those of Australian-born people. (If a number in the columns is less than 1 and is marked with an asterisk, it means that the overseas-born death rate for that cause of death is significantly lower than the Australian-born rate; and correspondingly the rate is significantly higher if the number is more than 1 and has an asterisk.)

In the 3-year period from 2005–2007, the overall death rate for people born overseas was 7% below that for people born in Australia. But rates varied markedly by country, and they were particularly low for Asian-born people. For example, compared with Australian-born death rates they were up to 41% lower for Vietnam, 40% lower for the Philippines, 35% lower for China and 33% lower for Malaysia. While death rates for people born in New Zealand and Poland were similar to those for people born in Australia, the rates were slightly higher for people born in the United Kingdom and Ireland.

For most of the causes in Table 5.12, the rates for overseas-born people were lower than for the Australian-born, lending support to the 'healthy migrant effect'. However, this was not always the case and, compared with the relevant death rate among Australian-born people, death rates for overseas-born people were higher for:

- lung cancer among those born in the Netherlands, and the United Kingdom and Ireland
- diabetes among those born in Germany, Greece, India, Italy, Lebanon and Poland
- coronary heart disease among those born in Poland
- influenza and pneumonia among those born in the United Kingdom and Ireland.

Table 5.12: Standardised mortality ratios[(a)] by selected causes of death and countries of birth, people aged 15 years and over, 2005–2007

Country of birth	Colorectal cancer	Lung cancer	Diabetes	Coronary heart disease	Cerebrovascular disease	Influenza & pneumonia	All causes of death[(b)]
China	*0.74	1.00	*0.79	*0.49	*0.86	*0.57	*0.65
Croatia	0.96	0.83	1.25	*0.77	0.89	0.75	*0.81
Germany	0.86	1.09	*1.38	0.99	0.95	*0.60	*0.94
Greece	*0.83	*0.72	*1.28	*0.76	*0.69	*0.75	*0.77
India	*0.51	*0.67	*1.78	0.96	*0.77	0.77	*0.75
Italy	0.92	*0.91	*1.67	*0.84	*0.76	*0.82	*0.87
Lebanon	*0.65	0.83	*2.18	0.99	0.91	0.84	*0.86
Malaysia	*0.55	*0.56	1.09	*0.58	*0.76	0.75	*0.67
Netherlands	*0.79	*1.32	1.09	*0.93	*0.88	0.93	*0.93
New Zealand	1.06	0.95	*0.78	1.03	1.02	1.08	0.98
Philippines	*0.68	*0.72	0.96	*0.48	0.95	0.60	*0.60
Poland	0.99	1.15	*1.36	*1.16	0.97	1.02	1.01
South Africa	0.72	0.73	0.67	*0.74	0.85	0.90	*0.81
UK & Ireland	*0.88	*1.30	*0.92	1.01	*0.94	*1.13	*1.01
Vietnam	*0.43	*0.69	1.28	*0.36	*0.82	*0.40	*0.59
All overseas	*0.87	*1.07	*1.24	*0.96	0.91	*0.96	*0.93

* Statistically significant difference (see Glossary) from Australian-born population.

(a) The standardised mortality ratio is a measure of death from a specific condition in the overseas-born population relative to the Australian-born population. If the ratio is 1.00 this means the overseas-born would have the same mortality rate as the Australian-born. Ratios greater than 1.00 indicate a greater mortality rate in the overseas-born population, and those below 1.00 indicate a lower mortality rate. Data are age-standardised to the Australian population as at 30 June 2001.

(b) Also includes all other causes of death.

Source: AIHW National Mortality Database.

Mental health

Results from the 2007 SMHWB show that people born in other countries were much less likely to report ever having a mental disorder (lifetime mental disorder) (28.9 per 100,000 population) than those born in Australia and other mainly English-speaking countries (48.7 and 50.2 respectively) (Table 5.13).

Similar patterns were found when mental disorders with recent symptoms (in the last 12 months) were considered. The prevalence of 12-month mental disorders was similar for those born in Australia and mainly English-speaking countries (21.8 and 21.0 per 100,000 population respectively) and much lower (12.3) for those born in other countries.

Table 5.13: Mental disorder (lifetime and symptoms in the last 12 months) by country of birth, people aged 16–85 years, 2007

Country of birth	Per 100,000 population[(a)]
Lifetime[(b)]	
Australia	48.7
Mainly English-speaking countries[(c)]	50.2
Other countries	28.9
12-month[(d)]	
Australia	21.8
Mainly English-speaking countries[(c)]	21.0
Other countries	12.3

(a) Age-standardised to the Australian population at 30 June 2001.

(b) Diagnosis of mental disorder at some point in life.

(c) Mainly English-speaking countries include Canada, Ireland, NZ, South Africa, UK and USA.

(d) Diagnosis of lifetime mental disorder with symptoms of that disorder in the 12 months before survey interview.

Source: AIHW analysis of 2007 SMHWB.

Health risk factors

The prevalence of risk factors varies by country of birth (Table 5.14). For example, in 2007–08 people from South-East Asia were less likely than Australian-born people to smoke, drink alcohol at risky or high-risk levels and be overweight or obese. In contrast, those born in Southern and Eastern Europe had a higher prevalence of risk factors, with the exception of daily smoking and risky or high-risk alcohol consumption. People from Other Oceania, United Kingdom and Southern and Eastern Europe were more likely to be overweight or obese than those born in Australia.

Table 5.14: Selected health risk factors by country of birth group, people aged 15 years and over, 2007–08 (per cent)

Country of birth group	Current daily smoker	Risky/high-risk alcohol consumption	Sedentary/ low exercise level	Overweight/ obese[(a)(b)]	Inadequate fruit and vegetable consumption[(b)(c)(d)]
Australia	19.9	14.1	71.3	63.1	93.4
Other Oceania	22.2	16.0	69.5	67.4	93.0
United Kingdom	14.4	14.8	68.3	66.0	92.8
Other North-West Europe	16.9	14.3	70.6	62.9	91.4
Southern & Eastern Europe	14.6	*5.9	74.9	67.1	95.7
North Africa & the Middle East	23.2	**	91.0	64.6	96.7
South-East Asia	6.6	*1.2	79.1	38.8	97.4
All other countries	11.4	5.3	76.4	45.0	96.4

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

** Estimate has a relative standard error greater than 50% and is considered too unreliable for general use.

(a) Based on measured body mass index (BMI). BMI cut-off points for overweight and obese may not be appropriate for all ethnic groups due to differences in body type, size and composition.

(b) Persons aged 15–17 years are excluded.

(c) Includes those who do not eat fruit or vegetables at all.

(d) Usual daily intake of fruit or vegetables refers to the number of serves (excluding drinks and beverages) usually consumed each day.

Source: ABS 2009d.

Health services participation

There is evidence to suggest that people who speak a language other than English at home participate less in health services than those who speak English at home (for example, see Weber et al. 2009). This section focuses briefly on participation in breast screening and mental health-related services.

In 2005–2006, females in the target breast-screening population (50–69 years) who spoke a language other than English at home were less likely than English-speaking females to participate in breast screening: 45% and 59% respectively (AIHW 2009k).

Similarly, analysis of the 2007 SMHWB showed that people who mainly speak a language other than English were less likely than those who mainly speak English to use health services in the 12 months before the survey for a lifetime mental disorder (26 per 100,000 population compared with 48) (AIHW unpublished analysis of 2007 SMHWB).

5.7 Defence Force members

Australian Defence Force (ADF) members are a special population group in Australia for many reasons. They are of particular interest from a health perspective because they tend to have better health than those in the general community, they have access to special health services and they are exposed to a wide range of occupational hazards.

Military populations reflect a strong 'healthy worker effect'. This occurs because people who are in work are fit enough to work, whereas the general population is composed of both those who are fit enough to work and those who are unable to work because of illness or disability. In addition, members of the ADF are selected partly because of their better health and are then required to maintain that health at a level that is higher than the rest of the community.

However, ADF personnel can work in challenging environments, including remote areas of the world that may have low levels of physical safety and restricted access to the necessities of life, such as shelter, food and water. Therefore, the very nature of their work may sometimes place members at higher risk of injury or disease than the general population. (For further information on current ADF deployments see <www.defence.gov.au>.)

This section provides a brief profile of permanent ADF members, followed by an overview of their health compared with the general population of similar age (20–50 years). Data from a number of sources are used (Box 5.8).

Characteristics of Defence Force members

At 30 June 2009, the ADF comprised around 55,000 permanent members (Department of Defence 2009). Members serve in the Australian Army (51%), the Royal Australian Air Force (26%) or the Royal Australian Navy (23%).The great majority of ADF members are male (87%), with females making up around 18% of the Navy and Air Force, and 10% of the Army.

Overall, ADF members are younger (median age 30 years) than the Australian workforce (39 years) (ABS 2009f) and the great majority (92%) of members were aged under 50 years (unpublished Department of Defence data). However, the average age of ADF personnel has risen slightly following a recent increase of the retirement age from 55 to 60 years.

Box 5.8: Australian Defence Force health data systems

The health of Australian Defence Force (ADF) personnel is assessed regularly through medical, dental and physical fitness assessments. All members have access to specialised health care services (see Section 7.4). Data are collected during these routine health assessments and when a member makes additional visits to a health service or is involved in a work-related incident. While a number of electronic databases support the storage and use of ADF health data, data presented in this section are from the following:

- the EpiTrack health surveillance system, which monitors members' attendance at primary health centres, hospital admissions and referrals to other health services, as well as days of restricted duty and days off all duty because of disease or injury. About a third of ADF health facilities routinely use EpiTrack
- HealthKEYS, an electronic health record system used in primary health care clinics. About 40% of all ADF members have an electronic health record, but the quality and scope of each record varies
- the NOTICAS (Notification of Casuality) reporting system, which provides the initial reports on work-related injuries and incidents, including fatalities that occur within Australia and overseas. Because reports are preliminary, data drawn from this system may be incomplete. Other incidents (including workplace accidents, near misses and deaths) are also reported in accordance with occupational health and safety legislation.

Health status

Mortality

Overall, the leading causes of death are similar for ADF personnel and the general Australian population of similar age—injuries, cancer and cardiovascular disease feature prominently in both groups. Of the 190 deaths among ADF members between 2003–04 and 2008–09, land transport crashes accounted for about 28%, cancer for 16%, suicide for 15% and cardiovascular disease for 9%. The corresponding figures for the general population aged 20–50 years were 9%, 27%, 13% and 15%. However, after taking into account age and sex differences in the two populations, death rates for members of the ADF were significantly lower overall, as well as in particular for cancer, cardiovascular disease and suicide (Table 5.15). This is likely to be partly due to the strong 'healthy worker effect'.

The two causes of death that were significantly elevated for ADF personnel related to air and land transport. Based on 12 deaths over the 6-year period, ADF members were more than 12 times as likely as the general Australian population to die from air transport accidents. This elevated death rate was largely a result of several air accidents in recent years, including a helicopter crash on the Indonesian island of Nias in 2005, in which nine ADF personnel died, and a single death from each of a helicopter crash in 2006, a light aircraft crash in 2007 and a glider crash in 2008.

Deaths from land transport are about 1.5 times as high as in the general Australian population. ADF personnel are highly mobile, often posted far from their families and, anecdotally, spend more of their time driving (at work and during leisure hours). In recognition of members' mobility, the ADF has a wide range of policies to reduce deaths from land transport crashes.

Table 5.15: Standardised mortality rates (SMRs)[(a)] and 95% confidence intervals (CIs)[(b)] for all full-time ADF members for selected causes of death, 2003–04 to 2008–09

Causes of death	SMR	Lower 95% CI	Upper 95% CI
All causes	0.63	0.55	0.73
Air transport	12.36	6.35	20.34
All neoplasms (including cancer)	0.42	0.29	0.59
Cardiovascular disease	0.42	0.24	0.64
Land transport	1.50	1.13	1.93
Suicide	0.62	0.41	0.87

(a) SMRs are the actual number of deaths divided by the expected number of deaths (if the ADF population had the same rates as the Australian population), controlling for age, sex and year of death.

(b) Confidence intervals describe 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. For example, in this table, there is a 95% or higher chance of the SMR for cardiovascular diseases falling between 0.24 (lower 95% CI) and 0.64 (upper 95% CI).

Notes

1. Figures include all deaths, both within and outside Australia, which occurred in the ADF from 1 July 2003 to 30 June 2009, compared with rates of death in Australia (2003–04 to 2005–06).
2. Data are based on initial reports recorded in NOTICAS (see Box 5.8) and may be incomplete.

Source: AIHW analysis of unpublished data from the Australian Defence Force.

Morbidity

Based on EpiTrack data for 2007–08 and 2008–09, the top five reasons for health service attendance by ADF personnel were injuries and musculoskeletal disorders; respiratory tract conditions; skin conditions; symptoms, signs and ill-defined conditions; and diseases of the ear, nose and throat. These groups of conditions were also the five most common reasons for restricted duty. By comparison, the five most common groups of conditions responsible for lost work days (sick leave) were injuries and musculoskeletal disorders; respiratory tract conditions; mental health disorders, stress reaction, symptoms, signs and ill-defined conditions; and intestinal infectious diseases.

Although the data sources are not directly comparable, it is interesting to note that the top reasons for primary health care attendance for ADF personnel seem to differ somewhat from the general population of similar age. Excluding check-ups, the top three problems managed by GPs for Australians aged 20–50 years in 2008–09 were depression, upper respiratory tract infection and preventive vaccination (AIHW analysis of data from the Bettering the Evaluation and Care of Health survey: BEACH). For males of this age in particular, upper respiratory tract infections, depression, hypertension and back complaints were the most commonly managed conditions.

Injuries

The total number of occupational health and safety incidents among ADF personnel decreased over the 3-year period 2006–07 to 2008–09 (Table 5.16). In particular, the number of incidents that resulted in a person being unable to work for 30 consecutive days or more (incapacity) was down by more than 50%. In contrast, there was a rise in deaths in 2008–09 that were reported to Comcare. This was mostly attributed to deaths from natural causes, such as heart attacks, that occurred at the workplace and were therefore reportable to Comcare. Deaths that occur on operational service or during off-duty hours are not reportable through the same process. There was also a rise in reports for serious personal injury and dangerous occurrences, although this is thought to be due to an improvement in reporting rather than a true increase. More detailed analysis of these reports over the next year, when more incidents have been coded, will enable more accurate interpretation of the data.

Table 5.16: Reported incidents among ADF members[(a)], by casualty type, 2006–07 to 2008–09

	2006–07	2007–08	2008–09[(b)]
Total incident reports[(c)]	18,474	16,389	14,207
Comcare notifiable[(d)]			
Deaths[(e)]	3	3	9
Serious personal injury[(f)]	897	1,119	1,214
Incapacity[(g)]	241	166	104
Dangerous occurrence[(h)]	1,249	1,337	1,358
Total Comcare	*2,390*	*2,625*	*2,685*

(a) Includes all people working for, or affected by, Defence undertakings; that is, ADF, Australian Public Service, Reserves, contractors and members of the public.

(b) Data are preliminary as a large number of Comcare reportable incidents are still to be coded.

(c) An incident report records an event that causes, or has potential to cause, injury or illness to Defence employees or other people, as a result of a Defence undertaking. These data are not static but are annually adjusted to reflect incident reports received after the end of the financial year. This includes minor injuries.

(d) Comcare reportable incidents are those for which a compensation claim has been made or may be made under the relevant legislation.

(e) Comcare reportable deaths (these do not include deaths on operational service or during off-duty hours).

(f) Serious personal injury is defined as an injury or disease in a person caused by work-related employment for which the person needs to be given emergency treatment by a registered medical practitioner, treated in a hospital as a casualty without being admitted to hospital, or admitted to hospital.

(g) Incapacity is when an employee is unable to perform work for 30 or more consecutive days or shifts.

(h) A dangerous occurrence is a near miss event that could have, but did not, result in fatality, serious personal injury or incapacity.

Source: Australian Government Department of Defence.

Risk factors

Obesity

Obesity is a serious health concern in Australia due to its association with a number of chronic diseases (see Table 3.1).

Analysis of 2007–09 HealthKEYS data—based on measured height and weight—found that about 14% of the ADF population is obese (body mass index (BMI) 30 or above) and 48% overweight (BMI 25 to less than 30) (see Box 3.10 for a description of BMI). Data from the 2007–08 NHS showed the corresponding figures for the general population aged 20–50 years were 21% and 35%. In the ADF more males were overweight or obese (65%) than females (38%), a pattern consistent with the general population of similar age (64% and 49% respectively).

From March 2005, applicants have been able to enter the ADF with a BMI up to 33, subject to passing a physical fitness test and the absence of any factors such as high blood pressure, high blood cholesterol and any evidence of cardiovascular or other metabolic disease. However, while BMI is a useful tool to assess and monitor changes in body mass at the population level, it may not be the most appropriate measure for ADF personnel, who are often required to have high muscle mass to perform the physical tasks of their job.

Alcohol

Like obesity, excessive drinking is responsible for a significant burden of disease and injury. The ADF routinely uses the AUDIT (see Section 5.5) to assess the alcohol consumption of its members and its potential effects on their health. The AUDIT is administered to all ADF personnel at periodic health assessments, to those on return from operational service and to individuals when clinically required. From the records drawn from routine health assessments during 2007–09, the great majority (84%) drank at levels of low risk to their health, 15% drank at levels of moderate risk and a very small proportion (0.2%) drank at high-risk levels.

5.8 The veteran community

Veterans are a distinct population within the Australian community because of their unique service to the country. In more recent years, the profile of Australia's veteran population has changed as the number of World War II veterans declines. Furthermore, recent deployments to East Timor, Iraq, Afghanistan, Bougainville and the Solomon Islands have created new groups of younger veterans.

It is difficult to obtain a complete picture of the health of Australian veterans because data are only available for those current and former defence personnel who have applied for and receive benefits or services from the Australian Government Department of Veterans' Affairs (DVA). A number of those who are serving or have served in the ADF are potentially eligible but have not applied for government assistance.

Current information about the health and wellbeing of Australian veterans relies mostly on data relating to DVA clients, known as the 'veteran community'. Existing health studies of DVA clients generally focus on a single deployment or occupational group that may have distinctive experiences as a result of their service. Examples include Korean, Vietnam and Gulf War veterans, and ADF personnel involved in the F-111 Deseal/Reseal Program (for example, see <http://www.dva.gov.au/adf/health/adf_health_studies.htm>).

It is important to note, however, that the veteran community is not limited to those who have had operational service. It also includes serving and former Defence Force members who have not had operational experience, eligible Australian Federal Police members with overseas service, war widows and widowers, dependants and carers. At March 2009, there were over 400,000 active DVA clients receiving benefits (DVA 2009). They may receive compensation, age and service pensions, health care and other benefits.

This section provides a profile of the veteran community and a summary of their health compared with the general Australian population of similar age.

Box 5.9: Department of Veterans' Affairs entitlements

Department of Veterans' Affairs (DVA) clients may be eligible for a range of services and support provided by DVA. In addition to being considered for income support and compensation payments, eligible veterans, war widows and widowers, and dependants may be issued with Repatriation Health Cards that reflect their level of health care coverage—gold, white or orange.

Holders of a gold card are entitled to the full range of health-care services at DVA's expense. This includes medical and allied health care, assistance in the home, and support services through arrangements with registered health care providers and hospitals, both public and private.

Holders of a white card are entitled to the full range of health-care services at DVA's expense but generally only for those disabilities or illnesses accepted as service-related.

The Repatriation Pharmaceutical Benefits Scheme (RPBS) provides a comprehensive range of pharmaceuticals and wound dressings to eligible members. It includes all items available to the general public under the Pharmaceutical Benefits Scheme, as well as a list of items exclusive to the veteran community. Access to unlisted items is also available on a case-by-case basis under the RPBS Prior Approval arrangements.

An orange card provides pharmaceutical benefits under the RBPS to British Commonwealth and Allied veterans who have World War II qualifying service, are aged 70 years or over and have lived in Australia for 10 years or more.

A profile of the veteran community

DVA clients may be eligible for support under one or more of three legislative Acts: the *Veterans' Entitlements Act 1986* (VEA), the *Safety, Rehabilitation and Compensation Act 1988* (SRCA) and the *Military Rehabilitation and Compensation Act 2004* (MRCA).

The demographic profile of clients varies depending on the support they receive. The majority of VEA clients are aged 80 years and over, while the majority of SRCA and MRCA clients are younger (aged under 55 years). In addition, MRCA and SRCA clients are more likely to be male, while there are slightly more female clients under the VEA due to the large proportion of war widows aged 80 years and over. Nevertheless, this profile is expected to change over time because the SRCA and VEA Acts were superseded by the MRCA Act on 1 July 2004.

This varied profile should be borne in mind for parts of the following discussion that are about the veteran community overall.

Health status

In 2006, a study was conducted into the health and wellbeing of members of the DVA veteran community. The Your Lives, Your Needs survey evaluated two specific client groups: VEA clients (of whom almost 80% of those surveyed were aged 65 years or older) and SRCA clients (of whom almost 60% of those surveyed were aged under 45 years). Data from this survey and administrative client data are presented in this section.

VEA (the older) clients were less likely than the general Australian community aged 65 years and over to rate their health as very good or excellent (21% compared with 36%) (ABS 2009d; DVA 2008). For SRCA (the younger) clients, this pattern was more pronounced, with only 10% reporting their health as very good or excellent compared with over 60% of the general population aged less than 45 years.

Health conditions and medicine use

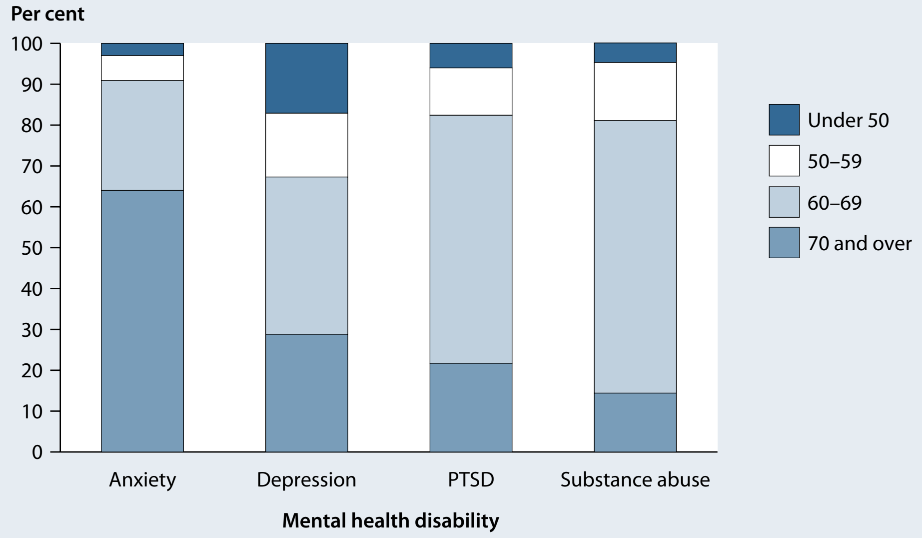
In general, older clients reported similar health conditions to the general Australian population aged 65 years and over. The most common health conditions reported by older clients were vision problems that are corrected by glasses or contact lenses (90%), followed by deafness, mobility problems and osteoarthritis or rheumatoid arthritis (affecting just over half of those surveyed), and back trouble or high blood pressure (both 47%). Around 40% of respondents reported sunspots, mild memory loss or sleep disturbances or insomnia. This is consistent with the most common self-reported health conditions in the general population aged 65 years and over: vision problems, arthritis, high blood pressure and deafness (ABS 2009d).

In contrast, younger clients reported quite different health conditions from their counterparts in the general population. Mobility problems were most commonly reported (76%), followed by back trouble (70%) and falls or loss of balance (64%). This is in comparison to the vision problems, respiratory disease and musculoskeletal problems that were most commonly reported by the general population aged under 45 years (ABS 2009d).

Data on medicine use can complement information on health status. Eligible veterans, war widows and widowers and their dependants are also entitled to access subsidised medicines under the Repatriation Pharmaceutical Benefits Scheme (RPBS) (see Box 5.9). In 2007–08, the average number of prescriptions was 50.5 per RPBS patient per year. The top three categories of medicines prescribed (categorised according to body systems) were for the cardiovascular system (for example, blood pressure), the nervous system (for example, for pain and sedation), and the alimentary tract and metabolism (for example, for indigestion and ulceration of the gastrointestinal tract).

Mental health

At May 2009, close to 50,000 DVA clients (18% of all such clients receiving health care treatment) had one or more accepted mental health disability claims—that is, a mental health disability assessed as being caused by war or service. Most of these clients (83%) were aged 60 years or over. Their most common disabilities were disorders of post-traumatic stress, anxiety, substance abuse (including alcohol dependence) and depression (Figure 5.14). Clients with anxiety were more likely to be older (64% were aged over 70 years) while around two-thirds of those with post-traumatic stress disorder or a substance use disorder were aged 60–69 years.



PTSD Post-traumatic stress disorder.

(a) These figures include disability claims accepted under the VEA, MRCA or SRCA.

Note: A client may have more than one accepted mental health disability The number of clients is: anxiety (14,521), depression (8,790), post-traumatic stress disorder (27,964), substance abuse (12,339) and any mental health disorder (48,651).

Source: Australian Government DVA.

Figure 5.14: DVA clients with an accepted mental health disability claim[(a)] by age group, May 2009

References

ABS (Australian Bureau Statistics) 2006a. National Aboriginal and Torres Strait Islander Health Survey, 2004–05. ABS cat. no. 4715.0. Canberra: ABS.

ABS 2006b. Statistical geography volume 1: Australian Standard Geographical Classification (ASGC). ABS cat. no. 1216.0. Canberra: ABS.

ABS 2007a. Population distribution, Aboriginal and Torres Strait Islander Australians. ABS cat. no. 4705.0. Canberra: ABS.

ABS 2007b. 2006 Census of Population and Housing: media releases and fact sheets, 2006. ABS cat. no. 2914.0.55.002. Canberra: ABS.

ABS 2007c. Labour statistics: concepts, sources and methods, April 2007. ABS cat. no. 6102.0.55.001. Canberra: ABS.

ABS 2008. Health Literacy, Australia 2006. ABS cat. no. 4233.0. Canberra: ABS.

ABS 2009a. Experimental life tables for Aboriginal and Torres Strait Islander Australians, 2005–2007. ABS cat. no. 3302.0.55.003. Canberra: ABS.

ABS 2009b. Labour force, Australia, October 2009. ABS cat. no. 6202.0. Canberra: ABS.

ABS 2009c. Prisoners in Australia, 2009. ABS cat. no. 4517.0. Canberra: ABS.

ABS 2009d. National Health Survey: Summary of results 2007–08. ABS cat. no. 4364.0. Canberra: ABS.

ABS 2009e. Migration Australia 2007–08. ABS cat. no. 3412.0. Canberra: ABS.

ABS 2009f. Australian labour market statistics, October 2009. ABS cat. no. 6105.0. Canberra: ABS.

ABS & AIHW (Australian Institute of Health and Welfare) 2008. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2008. ABS cat. no. 4704.0, AIHW cat no. IHW 21. Canberra: ABS & AIHW.

Adler NE & Ostrove JM 1999. Socioeconomic status and health: what we know and what we don't. Annuals of New York Academy of Science 896:3–15.

AHMAC (Australian Health Ministers' Advisory Council) 2006. Aboriginal and Torres Strait Islander Health Performance Framework 2005. Canberra: AHMAC.

AHMAC 2008. Aboriginal and Torres Strait Islander Health Performance Framework 2008 report. Canberra: AHMAC.

AIHW 2004. Heart, stroke and vascular diseases—Australian facts 2004. Cardiovascular disease series no. 22. Cat. no. CVD 27. Canberra: AIHW & National Heart Foundation of Australia.

AIHW 2007. Rural, regional and remote health: a study on mortality, 2nd edn. Rural health series no. 8. Cat. no. PHE 95. Canberra: AIHW.

AIHW 2008a. Australia's health 2008. Cat. no. AUS 99. Canberra: AIHW.

AIHW 2008b. Rural, regional and remote health: indicators of health system performance. Rural health series no. 10. Cat. no. PHE 103. Canberra: AIHW.

AIHW 2008c. Diabetes: Australian facts 2008. Diabetes series no. 8. Cat. no. CVD 40. Canberra: AIHW.

AIHW 2009a. Aboriginal and Torres Strait Islander Health Performance Framework 2008 report: detailed analyses. Cat. no IHW 22. Canberra: AIHW.

AIHW 2009b. Measuring the social and emotional wellbeing of Aboriginal and Torres Strait Islander peoples. Cat. no. IHW 24. Canberra: AIHW.

AIHW 2009c. Mental health services in Australia 2006–07. Mental health services series no. 11. Cat. no. HSE 74. Canberra: AIHW.

AIHW 2009d. Geographic variation in oral health and use of dental services in the Australian population 2004–06. Cat. no. DEN 188. Canberra: AIHW.

AIHW 2009e. Australian Hospital Statistics 2007–08. Health services series no 33. Cat. no. HSE 71. Canberra: AIHW.

AIHW 2009f. Medical labour force 2007. National health labour force series no. 44. Cat. no. HWL 45. Canberra: AIHW.

AIHW 2009g. The geography of disability and economic disadvantage in Australian capital cities. Cat. no. DIS 54. Canberra: AIHW.

AIHW 2009h. Australia's welfare 2009. Australia's welfare series no. 9. Cat. no. AUS 117. Canberra: AIHW.

AIHW 2009i. Disability in Australia: multiple disabilities and the need for assistance. Disability series. Cat. no. DIS 55. Canberra: AIHW.

AIHW 2009j. From corrections to the community: a set of indicators of the health of Australia's prisoners. AIHW Cat. no. AUS 120. Canberra: AIHW.

AIHW 2009k. BreastScreen Australia monitoring report 2005–06. Cat. no. CAN 44. Canberra: AIHW.

AIHW 2010. The health of Australia's prisoners 2009. Cat no. PHE 123. Canberra: AIHW.

AIHW: Eldridge D 2008. Injury among young Australians. Bulletin no. 60. Cat. no. AUS 102. Canberra: AIHW.

AIHW: Moon L & Waters AM 2006. Socioeconomic inequalities in cardiovascular disease in Australia: current picture and trends since the 1990s. Bulletin no. 37. Cat. no. AUS 74. Canberra: AIHW.

AIHW: Penm E 2008. Cardiovascular disease and its associated risk factors in Aboriginal and Torres Strait Islander peoples 2004–05. Cardiovascular disease series no. 29. Cat. no. CVD 41. Canberra: AIHW.

AIHW: Singh M & de Looper M 2002. Australian health inequalities: birthplace. Bulletin no. 2. Cat. no. AUS 27. Canberra: AIHW.

AIHW: Thow, AM & Waters AM 2005. Diabetes in culturally and linguistically diverse Australians: identification of communities at high risk. Cat. no. CVD 30. Canberra: AIHW.

AIHW & Cancer Australia 2008. Non-melanoma skin cancer: general practice consultations, hospitalisation and mortality. Cancer series no. 43. Cat. no. CAN 39. Canberra: AIHW.

Andersen HL 2007. 'On the effect of unemployment on mortality, Denmark'. Paper presented at iHEA 2007 6th World Congress: explorations in health economics, 18 June.

Bartley M, Ferrie J & Montgomery SM 1999. Living in a high-unemployment economy: understanding the health consequences. In: Marmot M & Wilkinson RG (eds). Social determinants of health. New York: Oxford University Press.

Begg S, Vos T, Barker B, Stevenson C, Stanley L & Lopez A 2007. The burden of disease and injury in Australia 2003. Cat. no. PHE 82. Canberra: AIHW.

Bhat PN 2002. General growth balance method: a reformulation for populations open to migration. Population Studies 56: 23–34.

Bi P & Parton KA 2008. Effect of climate change on Australian rural and remote regions: What do we know and what do we need to know? Australian Journal of Rural Health 16:2–4.

Carson B, Dunbar T, Chenhall R & Bailie R 2007. Social determinants of Indigenous health. Sydney: Allen & Unwin.

Comino EJ, Harris E, Chey T, Manicavasagar V, Penrose Wall J, Powell Davies G et al. 2003. Relationship between mental health disorders and unemployment status in Australian adults. Australian and New Zealand Journal of Psychiatry 37:230–5.

Cummins RA, Davern M, Okerstrom E, Lo SK & Eckersley R 2005. Australian Unity Wellbeing Index: special report on city and country living. Report 12.1. Geelong: Deakin University.

Department of Defence 2009. Defence annual report 2008–09, vol 1. Canberra: Department of Defence. Viewed 17 December 2009, <http://www.defence.gov.au/budget/08-09/dar/index.htm>.

DVA (Department of Veterans Affairs) 2008. 2006 Survey of entitled veterans, war widow(er)s, SRCA clients and their carers. Canberra: DVA.

DVA 2009. Stats at a glance, March 2009. Canberra: DVA.

Draper G, Turrell G & Oldenburg B 2005. Health inequalities in Australia: mortality. Health inequalities monitoring series no. 1. Cat. no. PHE 55. Canberra: Queensland University of Technology and AIHW.

Fragar L, Henderson A, Morton C & Pollock K 2007. The mental health of people on Australian farms—the facts. Canberra: Rural Industries Research and Development Corporation & Australian Centre for Agricultural Health and Safety.

Glover J, Rosman D & Tennant S 2004. Unpacking analysis relying on area-based data: are the assumptions supportable? International Journal of Health Geographics 3: 30.

Hayes LJ, Quine S & Taylor R 2005. New South Wales trends in mortality differentials between small rural and urban communities over a 25-year period, 1970–1994. Australian Journal of Rural Health 13:71–6.

Jin RL, Shah CP & Svoboda TJ 1995. The impact on unemployment on health: a review evidence. Canadian Medical Association Journal 153: 529–40.

Jose M, Livingston B, McDonald S & Gorham G 2008. End-stage kidney disease among Indigenous peoples of Australia and New Zealand. In: McDonald S, Excell L & Livingston B (eds). ANZDATA Registry Report 2008. Adelaide: Australia and New Zealand Dialysis and Transplant Registry.

Krieger N, Williams DR & Moss NE 1997. Measuring social class in US public health research: concepts, methodologies and guidelines. Annual Review of Public Health 18:341–78.

Krieger N, Chen JT, Coull BA & Selby JV 2005. Lifetime socioeconomic position and twins' health: an analysis of 308 pairs of United States women twins. PLos Medicine 2:645–53.

Marmot MG, Shipley MJ & Rose G 1984. Inequalities in death-specific explanations of a general pattern? Lancet 323(8384):1003–6.

Mathers C 1994. Health differentials among adult Australians aged 25–64 years. Canberra: AIHW.

Mathers CD & Schofield DJ 1998. The health consequences of unemployment: the evidence. Medical Journal of Australia 168:178–82.

McDonald SP, Maguire GP & Hoy WE 2003. Renal function and cardiovascular risk markers in a remote Australian Aboriginal community. Nephrology Dialysis Transplantation 18: 1555–61.

Morrissey SA & Reser JP 2007. Natural disasters, climate change and mental health considerations for rural Australia. Australian Journal of Rural Health 15:120–25.

NHMRC (National Health and Medical Research Council) 1997. The health effects of passive smoking: a scientific information paper. Canberra: NHMRC.

NHMRC 2000. Nutrition in Aboriginal and Torres Strait Islander peoples: an information paper. Canberra: NHMRC.

NHMRC 2003a. Dietary guidelines for children and adolescents in Australia incorporating the infant feeding guidelines for health workers. Canberra: NHMRC.

NHMRC 2003b. Dietary guidelines for Australian adults. Canberra: NHMRC.

Public Health Information Development Unit 2009. Monitoring inequality in Australia: premature mortality. Adelaide. Viewed 17 August 2009, <http://www.publichealth.gov.au/monitoring-inequality/monitoring-inequality-in-australia-introduction.html >.

Preston SH & Hill KJ 1980. Estimating the completeness of death registration. Population studies 34:349–66.

Razum O 2006. Commentary: Of salmon and time travellers—musing on the mystery of migrant mortality. International Journal of Epidemiology 35: 919–21.

Ross R 2006. Recent evidence on health and employment status for Indigenous Australia. Australian Journal of Labour Economics 9(1):65–81.

Slade T, Johnston A, Teesson M, Whiteford H, Burgess P, Prikis J et al. 2009. The mental health of Australians 2: report on the 2007 National Survey of Mental Health and Wellbeing. Canberra: Australian Government Department of Health and Ageing.

Torr J, Lennox N, Cooper S, Rey-Conde T, Ware R, Galea J et al. 2008. Psychiatric care of adults with intellectual disabilities; changing perceptions over a decade. Australian and New Zealand Journal of Psychiatry 42:890–97.

Vos T, Barker B, Stanley L & Lopez A 2007. The burden of disease and injury in Aboriginal and Torres Strait Islander peoples 2003. Brisbane: School of Population Health, The University of Queensland.

Wallace R & Beange H 2008. On the need for a specialist service within the generic hospital setting for the adult patient with intellectual disability and physical health problems. Journal of Intellectual Developmental Disability 33(4):354–61.

Waters A 2001. Do housing conditions impact on health inequalities between Australia's rich and poor? Melbourne: AHURI. Viewed 14 January 2008, <http://www.ahuri.edu.au/publications/projects/p30002>.

Weber MF, Banks E, Smith DP, O'Connell D & Sitas F 2009. Cancer screening among migrants in an Australian cohort; cross-sectional analyses from the 45 and Up Study. BMC Public Health 9:144.

Young C 1992. Mortality, the ultimate indicator of survival: the differential experience between birthplace groups. In: Donovan J, d'Espaignet E, Merton C & van Ommeren M (eds). Immigrants in Australia: a health profile. Canberra: Australian Government Publishing Service, 34–70.

Health across the life stages

6

KEY POINTS

- The proportion of females having caesarean sections has continued to increase over the latest decade, from 21% in 1998 to 31% in 2007.
- The perinatal death rate of babies born to Indigenous mothers in 2007 was twice that of other babies (20.1 compared with 9.8 per 1,000 births).
- Death rates among children and young people halved in the two decades to 2007, largely due to fewer deaths from transport accidents.
- More children are being vaccinated against major preventable childhood diseases, with 91% (the target level) being fully vaccinated at 2 years of age—but only 82% of 5 year olds are covered.
- Land transport accidents and intentional self-harm accounted for 2 in every 5 deaths (42%) among young Australians (aged 15–24 years) in 2007.
- The main causes of death in 25–64 year olds in 2007 were coronary heart disease for males (14% of their deaths) and breast cancer for females (12%).
- For older people, the main causes of death are heart disease, stroke and cancer.
- At age 65, Australian males can now expect to live a further 19 years to almost 84 years of age, and females a further 22 years to almost 87.

Health can be discussed in many ways and this chapter presents a 'life stages' view of the health of Australians. It covers a range of age groups, from babies (and their mothers), through the early childhood and adolescent stages to the 'working age' years and finally to those aged 65 years and over.

The chapter begins with an overview of how some general factors vary with age, such as self-assessed health status, death rates and the main causes of death. It then discusses the five age groups in turn, sketching their special social and personal features, and summarising the main aspects of their health.

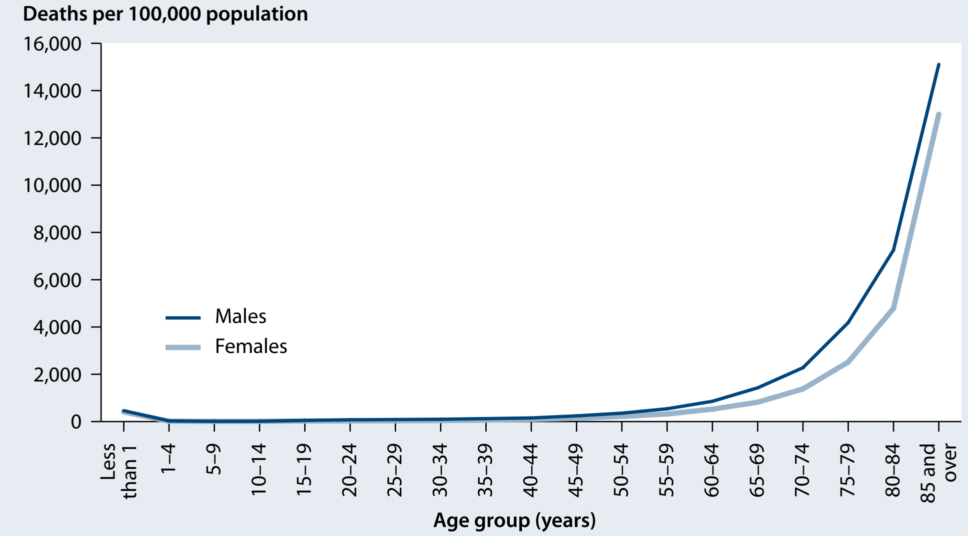
Why take this life stage perspective? First, several of these age groups are already a long-established focus of the health system. For example, there are specialist health professionals and services dedicated to expectant mothers and childbirth, to infants and other children, and to the elderly. This chapter should be of special interest to those professionals.

Second, this approach can help to lay out a whole-of-life story that is difficult to obtain in other ways. It can be seen that some health problems are largely confined to certain age groups but a range of problems—such as injury—run throughout life and only their prominence varies with age. Also, many problems may only become pronounced in older ages but their seeds begin in childhood with factors such as smoking, poor diet and obesity (see Chapter 3). Information such as this provides a long-range view that is important for health planning.

However, readers should note that the story presented here is only a rough guide to how health changes across the life stages because it relies on a 'snapshot' view of the various age groups as they are now, rather than following individuals over time. When today's children reach their later decades, for example, new social and medical circumstances may give them a different health profile from today's elderly.

6.1 How does health status vary with age?

Most aspects of health status vary with age, with problems usually increasing over the life stages. For example, based on data from the Australian Bureau of Statistics' (ABS) 2007–08 National Health Survey (NHS), the proportion of people aged 15 years and over who rated their health as only fair or poor generally doubled between each life stage, from 7% of 15–24 year olds to 13% of 25–64 year olds and to 31% of people aged 65 years and over. In 2007, death rates also increased markedly with age. The exception was in the infant group (aged under 1 year) where death rates were much higher than for children overall and were exceeded only by people from the age of 55 years and over (Figure 6.1). After infancy, the death rate dropped dramatically and was at its lowest among those aged 5–14 years. It then increased progressively and was highest among those aged 85 years and over (see also Table 2.1).



Source: ABS 2008b.

Figure 6.1: Number of deaths by age group, 2007

The leading causes of death also vary with age, reflecting different exposure to environmental factors and to the underlying ageing processes (see Section 2.6). For example, the most common causes of death for infants are conditions emerging from the perinatal period, followed by congenital anomalies (ABS 2009a). Injury and poisoning is the most common cause of death among children and young people, and remains the leading cause for males aged 25–44 years. However, for females aged 25–44 years, cancer emerges as the most common cause of death. Cancer then becomes the most common cause of death for males and females aged 45–64 years, followed by cardiovascular disease. This pattern persists for males aged 65–84 years but cardiovascular disease becomes the most prominent cause of death for females of this age. For both males and females aged 85 years and over, cardiovascular disease is the leading cause of death.

In the remainder of this chapter, information is presented for each selected life stage and also by sex where important differences exist between males and females. Sections include information about various aspects of health (for example, self-reported health status, health conditions, disability, mortality and use of health services) and key risk and protective factors for health (for example, smoking and alcohol consumption).

6.2 Mothers and babies

Recent years have seen some notable trends in births and the health of Australian mothers and babies. During the 17 years to 2007, the number of births fluctuated between about 254,000 and 263,000 per year until 2004, before increasing sharply to over 290,000 in 2007. During this period, the proportion of multiple births increased, as did rates of caesarean section. This section presents information on these topics, as well as others including birthweight, pre-term births and congenital anomalies.

Mothers

Maternal age

There has been an upward trend in maternal age in recent years. Data from the National Perinatal Data Collection show that in 2007 the average age of all females who gave birth was 29.9 years, compared with 28.9 in 1998. The average age of first-time mothers was 28.2 years in 2007, an increase from 27.0 in 1998. In 2007, 4.1% of all females who gave birth were aged less than 20 years (compared with 5.1% in 1998) and 22.3% were aged 35 years or more, a marked increase from 15.7% in 1998.

Method of birth

In 2007, about 6 in 10 females who gave birth had spontaneous vaginal births, about 3 in 10 had caesarean sections and just over 1 in 10 had births involving forceps or vacuum extraction delivery (Table 6.1).

Nationally, the proportion of females having caesarean sections has increased progressively and markedly over the latest decade (from 21.1% in 1998 to 30.9% in 2007). However, the 2007 rate was only marginally higher than that in 2006 (30.8%). In 2007, of all females who gave birth, 18.1% had a caesarean section without labour while 12.8% had a caesarean section following labour. The proportion of females having caesarean sections was much higher in private hospitals than in public hospitals (41.5% and 27.8% respectively) in 2007.

Table 6.1: Method of birth, all mothers, by state and territory, 2007

Method of birth	NSW[(a)]	Vic[(a)]	Qld	WA[(a)]	SA	Tas	ACT[(b)]	NT[(a)]	Australia
					Number				
Total mothers	94,588	71,189	59,228	29,630	19,467	6,216	5,419	3,759	289,496
					Per cent				
Non-instrumental vaginal	60.3	55.6	58.5	54.1	56.5	61.4	58.7	63.6	57.9
Forceps	3.5	5.6	2.0	2.5	4.1	3.2	6.2	1.9	3.6
Vacuum extraction	7.2	8.0	6.5	10.7	7.1	7.3	6.1	4.9	7.5
Caesarean section	29.0	30.8	33.1	32.7	32.3	28.0	28.9	29.6	30.9
Labour	12.2	13.0	12.7	12.6	15.1	13.7	10.9	14.0	12.8
No labour	16.8	17.8	20.4	20.2	17.3	14.4	18.0	15.6	18.1
Not stated	—	—	—	—	—	—	—	—	—
Not stated	0.1	—	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

— Nil or rounded to zero.

(a) For these four jurisdictions, 'Non-instrumental vaginal' includes all females who had a vaginal breech birth, whether or not instruments were used. For the remaining jurisdictions, vaginal breech births are only included where instruments were not used.

(b) 16.1% of females who gave birth in the ACT were non-ACT residents. Care must be taken when interpreting percentages. For example, 27.5% of ACT resident females had a caesarean section compared with 36.4% of non-ACT residents who gave birth in the ACT.

Note: For multiple births, the method of birth of the first-born baby was used.

Source: Laws & Sullivan 2009.

Statistics from 2007 show differences between the states and territories in the use of interventions to assist in births (Table 6.1). Western Australia, South Australia and Queensland reported caesarean rates above the national average (32.7%, 32.3% and 33.1% respectively). The Australian Capital Territory and Victoria recorded the highest percentages of forceps delivery (6.2% and 5.6%). The percentage of vacuum extractions varied considerably, from a high of 10.7% in Western Australia to 4.9% in the Northern Territory.

Aboriginal and Torres Strait Islander mothers

Aboriginal and Torres Strait Islander mothers tend to be younger than non-Indigenous mothers, with average ages of 25.2 years and 30.1 years respectively among those giving birth in 2007 (Laws & Sullivan 2009). One in 5 (19.5%) Aboriginal or Torres Strait Islander mothers were teenagers, compared with 3.5% of non-Indigenous mothers.

Indigenous mothers had higher rates of non-instrumental vaginal birth (70.6%) than non-Indigenous mothers (57.4%) and lower rates of delivery by caesarean section (24.2% and 31.1% respectively).

Maternal mortality

A maternal death is defined as:

> the death of a woman while pregnant or within 42 days of the termination of the pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes (WHO 1992).

Maternal deaths occur infrequently in Australia. In the most recent triennial report, covering the period 2003–2005, there were 65 maternal deaths reported over the 3 years (Sullivan et al. 2008).

Maternal deaths are classified as direct deaths (those from pregnancy complications such as obstetric embolisms and bleeding) and indirect deaths (those from pre-existing diseases aggravated by pregnancy, such as heart disease). There were 29 direct maternal deaths (44.6%) and 36 indirect deaths (55.4%) reported in 2003–2005. The maternal mortality ratio, calculated using direct and indirect deaths, was 8.4 deaths per 100,000 females who gave birth (Sullivan et al. 2008).

International comparisons are difficult due to differences in definitions and lack of denominator data. The maternal mortality ratio for the United Kingdom was 13.95 per 1,000 maternities for 2003–2005 (defined as pregnancies resulting in a livebirth at any gestation or stillbirth occurring at 24 weeks or more) (Lewis 2007).

Babies

Births

In 2007, there were 294,205 births reported to the National Perinatal Data Collection, an average of 806 per day (Laws & Sullivan 2009). These births included 292,027 live births, 2,177 fetal deaths and 1 for which the outcome was undetermined. Over the decade up to 2007, the number of births fluctuated between about 254,000 and 257,000 per year between 1998 and 2004, before increasing sharply by 5.9% between 2004 and 2005, 3.6% between 2005 and 2006, and then a further 4.3% between 2006 and 2007 (Figure 6.2).

Numbers of births registered with the various Registrars of Births, Deaths and Marriages in Australia are very similar to those reported to the National Perinatal Data Collection. In 2007, there were 285,200 live births registered, the highest number ever recorded. The previous peak was in 1971 when 276,400 births were registered. The number of births fell sharply during the remainder of the 1970s, before increasing from the early 1980s to reach 264,200 in 1992. Over the following decade, the number of registered births generally declined, but increased from 2002 (ABS 2008a).

The total fertility rate, which is the number of babies per female, was 1.93 in 2007. Compared with projections for 2005–2010, Australia's rate is lower than those of the United States (2.1) and New Zealand (2.0), and most developing countries. The world average is 2.6 babies per female (ABS 2008a).

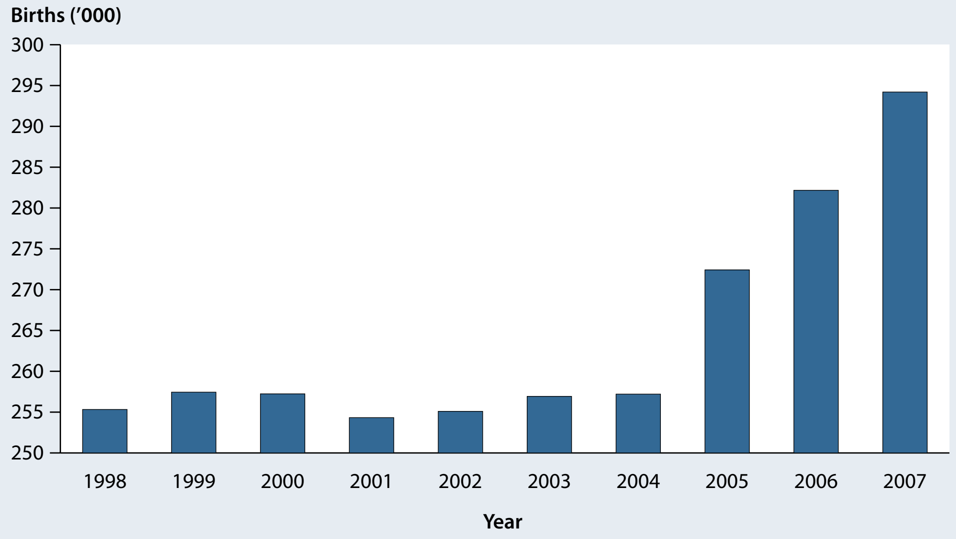
Data from the Australian and New Zealand Assisted Reproduction Database show that there were 9,842 births to females who had assisted reproduction technology (ART) treatment in Australia in 2007. These births included 9,717 live births, 114 fetal deaths and 11 babies with an unknown birth outcome.

Sex

Male births exceed female births in Australia, as in other developed countries. In 2007, Australia's male births accounted for 51.4% of all live births (149,977 males compared with 141,995 females) (Laws & Sullivan 2009). This proportion was similar across the states and territories, and has changed little over time.

Multiple births

The rate of multiple births in Australia has risen steadily since the early 1980s. This can be attributed to an increasing average age of mothers giving birth, and growing use of fertility drugs and assisted conceptions.



Source: Laws and Sullivan 2009.

Figure 6.2: Number of births reported to the National Perinatal Data Collection, 1998 to 2007

There were 9,115 twin and 228 triplet births in 2007, representing 3.1% and 0.1% of all births in Australia, respectively. The associated multiple birth rate was 31.8 per 1,000 births, up from 29.8 in 1998.

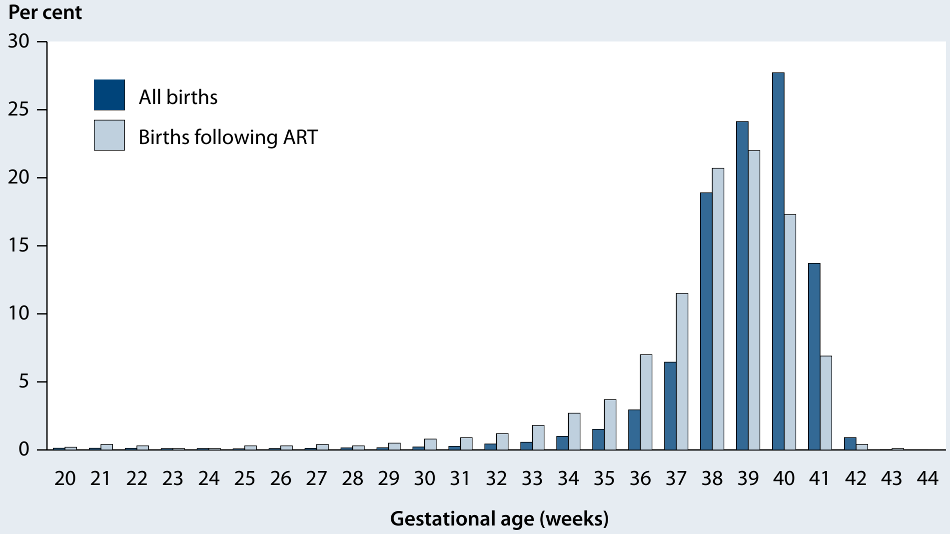
Of the 9,842 births resulting from ART treatment, 18.7% (1,844) were multiple births. This included 1,796 twins (18.2%) and 48 higher order multiples (0.5%).

Gestational age

In 2007, the average gestational age of all babies born was 38.8 weeks. For babies of at least 20 weeks' gestation born to females who had ART treatment, the average was 37.7 weeks. Figure 6.3 shows the differing distributions in gestational age at birth of all babies and babies born following ART.

The great majority of babies (90.9%) were born at term—that is, 37–41 weeks' gestation. Only 0.9% were born post-term, at 42 weeks' or more gestation. Preterm births—those occurring before 37 weeks' gestation—may be associated with neonatal problems that cause significant illness and mortality in newborn babies and are sometimes associated with long-term disabilities. Of all births in 2007, 23,953 (8.1%) were preterm. The Northern Territory had the highest proportion of preterm births, at 10.4% of all births, and New South Wales reported the lowest, at 7.4%.

Preterm birth was more likely for babies of multiple births. Whereas 6.6% of single births were preterm, 53.7% of twins and almost all triplets (99.6%) were preterm. Over one-fifth of babies born following ART treatment were preterm (21.0%). Of ART twins, 64.9% were preterm, and all higher order multiples were preterm.



ART Assisted reproduction technology.

Note: '20 weeks' includes four babies of less than 20 weeks' gestation.

Sources: Australian and New Zealand Assisted Reproduction Database; National Perinatal Data Collection.

Figure 6.3: Distribution of gestational age for all births and births following ART, 2007

Birthweight

A key indicator of infant health is the proportion of babies with low birthweight. This is because these babies have a greater risk of poor health and dying, require a longer period of hospitalisation after birth and are more likely to develop significant disabilities. For babies, a 'low birthweight' means less than 2,500 grams, 'very low birthweight' means less than 1,500 grams and 'extremely low birthweight' means less than 1,000 grams.

In 2007, 17,976 (6.2%) liveborn babies were of low birthweight. Of these, 2,956 (1.0% of the total) were of very low birthweight and, of these, 1,288 (0.4% of the total) were of extremely low birthweight. There has been very little change in the proportion of liveborn babies of low birthweight over the last 10 years. Across the states and territories, the proportion ranged from 5.7% in New South Wales to 7.9% in the Northern Territory. Female liveborn babies were more likely to be of low birthweight (6.9%) than male babies (5.9%). Of liveborn babies conceived after ART, 15.7% were of low birthweight.

The average birthweight of liveborn babies in Australia in 2007 was 3,374 grams (Table 6.2). Averages by state and territory ranged from 3,290 grams in the Northern Territory to 3,395 grams in Tasmania. The average birthweight of liveborn male babies (3,430 grams) was 123 grams higher than female babies (3,307 grams). For liveborn single babies, the average birthweight was 3,404 grams, higher than for twins (2,387 grams), and triplets and other multiple births (1,648 grams). The average birthweight of liveborn babies conceived after ART was 3,141 grams.

Table 6.2: Live births by birthweight and state and territory, 2007

Birthweight (g)	NSW	Vic	Qld	WA	SA	Tas	ACT[a]	NT	Australia
Average	3,382	3,370	3,385	3,357	3,359	3,395	3,365	3,290	3,374
					Number				
Total	95,387	71,778	59,827	29,885	19,620	6,268	5,495	3,767	292,027
					Per cent				
Less than 1,000	0.4	0.5	0.4	0.4	0.5	0.4	0.6	0.6	0.4
1,000–1,499	0.5	0.6	0.6	0.5	0.6	0.7	0.6	1.1	0.6
1,500–1,999	1.1	1.3	1.3	1.3	1.1	1.4	1.9	1.4	1.3
2,000–2,499	3.7	3.9	3.9	4.0	4.2	4.2	4.2	4.8	3.9
2,500–2,999	14.9	15.3	14.4	15.5	15.7	14.0	14.6	19.0	15.0
3,000–3,499	36.4	35.7	35.0	36.6	36.0	33.9	34.8	35.7	35.9
3,500–3,999	31.1	30.7	31.6	30.5	30.4	31.5	30.5	27.1	30.9
4,000–4,499	10.2	10.1	10.7	9.4	10.0	11.8	10.8	8.9	10.2
4,500 and over	1.7	1.8	1.9	1.5	1.5	2.1	2.0	1.4	1.8
Not stated	0.1	—	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Less than 1,500	*0.9*	*1.1*	*1.1*	*1.0*	*1.1*	*1.1*	*1.2*	*1.6*	*1.0*
Less than 2,500	*5.7*	*6.3*	*6.3*	*6.4*	*6.4*	*6.7*	*7.2*	*7.9*	*6.2*

— Nil or rounded to zero.

(a) 16.1% of females who gave birth in the ACT were non-ACT residents. Care must be taken when interpreting percentages. For example, the percentage of live births of ACT residents who gave birth in the ACT where the birthweight was less than 1,500 grams was 0.7% and where the birthweight was less than 2,500 grams the percentage was 5.0%.

Source: Laws & Sullivan 2009.

Babies of Aboriginal and Torres Strait Islander mothers

Among mothers recorded in the National Perinatal Data Collection who identified as being Aboriginal or Torres Strait Islander, there were 10,879 live births and 147 fetal deaths in 2007, representing 3.7% of all births.

Indigenous babies are much more likely to be preterm and of low birthweight than those born to other Australian mothers. In 2007, 13.7% of babies of Aboriginal and Torres Strait Islander mothers were classified as preterm compared with 7.9% of babies of non-Indigenous mothers. The proportion of low birthweight in liveborn babies of Aboriginal and Torres Strait Islander mothers was 12.5% in 2007, twice that of babies of non-Indigenous mothers (5.9%). The average birthweight of liveborn babies of Indigenous mothers was 3,182 grams.

Admission to special care or intensive care nurseries

Among all liveborn babies in 2007, 14.5% were admitted to a special care nursery (SCN) or neonatal intensive care unit (NICU). The proportion was higher for multiple births, and especially for triplets. Of all liveborn triplets, 93.8% were admitted to a SCN or NICU, compared with 57.1% of twins and 13.1% of single babies. For live births of Indigenous mothers, the proportion admitted to a SCN or NICU was 19.9%, and for live births of non-Indigenous mothers the proportion was 14.3%.

Perinatal mortality

Perinatal deaths are those that occur in the period shortly before or after birth. In this report, the count of perinatal deaths includes stillbirths (fetal deaths) and deaths of infants within the first 28 days of life (neonatal deaths), where the fetus or infant weighed at least 400 grams or was of at least 20 weeks' gestation.

In 2007, there were 3,024 perinatal deaths reported to the National Perinatal Data Collection—2,177 fetal deaths, 846 neonatal deaths and 1 death where the outcome was undetermined. The main causes of perinatal death in the jurisdictions where data were available were congenital abnormalities (anomalies) (23.5%), maternal conditions (13.8%) and unexplained antepartum death (12.6%).

The perinatal death rate for 2007 using data from the National Perinatal Data Collection was 10.3 per 1,000 births. Overall, the perinatal death rate has remained at around 10 per 1,000 births over the most recent decade (fluctuating between 9.8 and 10.5 per 1,000 births between 1998 and 2007). Fetal deaths (7.4 per 1,000 births) accounted for 72.0% of perinatal deaths, and neonatal deaths (2.9 per 1,000 live births) for 28.0%. Young maternal age, maternal Indigenous status and multiple gestation were associated with higher rates of perinatal deaths. The perinatal death rate of babies born to Indigenous mothers was 20.1 per 1,000 births, whereas it was 9.8 for babies born to non-Indigenous mothers.

Congenital anomalies

Congenital anomalies are structural or functional defects that occur during fetal development and are present at birth. These lifelong conditions are among the most common causes of childhood mortality, illness and disability. The rates of congenital anomalies are monitored in each jurisdiction, with the exception of the Northern Territory (AIHW NSPU: Abeywardana & Sullivan 2008a). Table 6.3 gives descriptions and rates for the most common congenital anomalies reported to the Australian Congenital Anomalies Monitoring System for the 2-year periods 1998–1999, 2000–2001 and 2002–2003.

Table 6.3: Most common congenital anomalies reported to the Australian Congenital Anomalies Monitoring System

Specific congenital anomalies	Among births[(a)]			Among pregnancies[(b)]		
	1998–1999	2000–2001	2002–2003	1998–1999	2000–2001	2002–2003
	Number per 10,000 total births[(c)]					
Transposition of the great vessels: abnormal development of the heart where the aorta exits from the right ventricle and the pulmonary artery from the left ventricle.	4.1	3.8	4.2	4.2	4.5	4.7
Cystic kidney: abnormal development of the kidney(s) resulting in the formation of multiple cysts.	4.7	4.8	4.6	5.7	6.0	5.3
Renal agenesis/dysgenesis: abnormal development of the kidney(s) resulting in the complete absence or disorganised development of the kidneys	5.1	4.9	4.9	6.5	5.7	5.6
Hydrocephaly: dilation of the brain's ventricles (fluid spaces) with or without head enlargement, but not associated with neural tube defects or primary brain atrophy.	4.9	5.1	4.8	7.5	7.2	6.8
Trisomy 18 (Edwards syndrome): presence of all or part of an extra chromosome 18, resulting in multi-system anomalies	2.4	1.7	2.0	6.6	6.1	7.1
Polydactyly: abnormal development of the hands and/or feet resulting in extra digits (fingers or toes)	8.7	9.1	8.9	9.6	10.2	9.7
Neural tube defects: abnormal development of the brain and/or spinal cord due to incomplete closure of the neural tube in the very early part of pregnancy	4.8	4.6	4.2	11.6	11.0	9.8
Cleft lip and/or cleft palate: abnormal development of the mouth resulting in a gap in the upper lip and/or roof of the mouth	17.0	17.2	17.3	19.0	18.9	18.8
Hypospadias: abnormal development of the male external genitalia resulting in an abnormal site for the opening of the urethra (tube from the bladder)[(d)]	52.5	50.3	46.4	59.6	54.1	47.5
Trisomy 21 (Down syndrome): the presence of all or part of an extra chromosome 21, resulting in multi-system anomalies	11.2	11.9	11.1	22.3	24.3	26.3

(a) Data about congenital anomalies at birth are collected by all states and territories except the Northern Territory about all births (live births and stillbirths, including terminations of pregnancy, occurring after 20 weeks' gestation).

(b) New South Wales, Victoria, Western Australia and South Australia collect information about congenital anomalies from terminations of pregnancy before 20 weeks' gestation and this is combined with information collected about congenital anomalies from births to generate rates in pregnancy.

(c) The rate of anomalies among births and among pregnancies (births and terminations of pregnancy before 20 weeks' gestation combined) are both calculated using the number of total births in the calendar year in which the pregnancy ended for the denominator.

(d) Hypospadias occurs only in male babies. Rates are thus calculated using the total number of male births in the calendar years in which the pregnancy ended for the denominator.

Sources: Abeywardana et al. 2007; Abeywardana & Sullivan 2008a.

Individual conditions vary in severity and in their potential for long-term disability. Babies born with renal agenesis or trisomy 18 do not usually survive infancy. Cleft lip, cleft palate and hypospadias can be corrected surgically, and may need no further intervention. Polydactyly does not always require intervention. For an affected baby, these anomalies can occur alone or with other anomalies. Some frequently seen groups are described as syndromes. Down syndrome and Edwards syndrome, more correctly referred to as trisomy 21 and trisomy 18 respectively, are now known to be due to additional chromosomal material in individual cells. Pregnancy affected by these two chromosomal conditions can occur at any age, but the risks increase sharply after a woman reaches the age of 35 years.

Prenatal screening and diagnostic tests are available to detect most of these conditions during pregnancy. The prenatal diagnosis of a major birth defect can assess the severity of the condition(s) before delivery. This allows parents to make an informed decision about continuing a pregnancy if the condition is known to be incompatible with life or result in an extremely poor quality of life. If the pregnancy is continued, parents have time before the birth to adjust to the situation. Arrangements can be made for the mother to give birth at a centre with facilities for the baby's care and treatment.

Preventing neural tube defects in pregnancy

Three serious malformations (anencephaly, spina bifida and encephalocoele) result when the neural tube fails to close properly in the first few weeks of pregnancy. (The neural tube is a structure in the embryo that develops into the brain and spinal cord.) Closure requires the substance folate, derived from the vitamin folic acid, which cannot be stored in the body. To ensure adequate levels of folate in the first weeks of pregnancy, females need to ensure they have ample intake in their diet before conception. Since many pregnancies are not planned, reducing neural tube defects in the community means that all females of reproductive age need to consume an adequate amount of folic acid.

Various programs have been tried over the past 20 years to increase folic acid consumption: health promotion campaigns, providing supplements and voluntary fortification of food with folic acid. However, these have not produced a sustained increase in folic acid intake among the target female populations. Mandatory folic acid fortification of foods has been a more successful way to increase folic acid intake. In the United States there was a 19% reduction (Honein et al. 2001) and in Canada a 46% reduction (De Wals et al. 2007) in neural tube defects within 3 years of mandatory food fortification with folic acid.

Table 6.3 shows little decrease in the rate of neural tube defects among pregnancies in Australia between 1998 and 2003. Since 13 September 2009, it has been mandatory for industry to fortify bread flour in Australia with 200–300 µg folic acid per 100 grams of flour. The effect of this will be assessed after 2 years (Abeywardana & Sullivan 2008b).

6.3 Children and young people

Childhood and youth spans a number of major developmental phases in life—infancy, early childhood, 'school age' childhood, adolescence and early adulthood. It is a crucial period for establishing positive health and social behaviours at a time when children and young people are undergoing rapid emotional, physical and intellectual changes, and when they begin the transition from childhood to adolescence to independent adulthood. During this period, children and young people acquire a wide range of skills and behaviours through their family, social and community environments. Along with biological factors, this influences their physical and psychological health, their social development and their educational achievements. This section provides an overview of the health and wellbeing of Australia's children and young people. For more detailed information refer to *A picture of Australia's children 2009* and *Young Australians: their health and wellbeing 2007* (AIHW 2007c, 2009a).

In this report, children are defined as those aged 0–14 years and young people as those aged 15–24 years.

Children

Most Australian children enjoy good health, as indicated by low and declining rates of infant and childhood deaths; declines in specific conditions such as communicable diseases, asthma and injuries; and improved survival from cancer, particularly leukaemia. Most children are also physically active and almost all children are immunised. However, there are a number of areas of concern—diabetes and dental decay are on the rise and too many children spend more than the recommended time in front of a video screen (including television and computers), are overweight or obese, and are not eating recommended amounts of vegetables.

In 2008, there were almost 4.1 million children aged 0–14 years in Australia, accounting for almost one-fifth (19%) of the total population—2.1 million boys and 2 million girls. As proportions of their respective populations, Indigenous children made up 36% compared with 19% for non-Indigenous children. This reflects the younger age structure of Aboriginal and Torres Strait Islander people.

Health and disability

To present a picture of the health of Australia's children, various measures of health status have been included in this section, such as the burden of disease, the prevalence and incidence of long-term conditions, hospitalisations and mortality. Table 6.4 shows the main health conditions that cause ill health and mortality among children, according to these measures.

Burden of disease and long-term health conditions

The 'burden of disease' measure is described in Chapter 2. Briefly, it measures the combined effects of premature death, illness or disability for various disorders or injuries. Chronic and long-term conditions account for a large proportion of the burden of disease among children, and can affect growth and physical, social and emotional development. It is estimated that, in 2003, almost one-quarter of the burden of disease in children was due to mental disorders—anxiety and depression, attention-deficit hyperactivity disorder and autism spectrum disorders. Another 18% was due to chronic respiratory conditions (mostly asthma) and 16% to neonatal conditions (Table 6.4). Less than one-quarter of the burden was due to deaths. Asthma was the leading specific cause of disease burden for both male and female children. Among males this was followed by autism spectrum disorders, anxiety and depression, and low birthweight; in females, the next leading causes were anxiety and depression, low birthweight, and birth trauma and asphyxia (Begg et al. 2007).

These results are consistent with prevalence data from the 2007–08 NHS, where asthma was the most frequently reported long-term condition among children (affecting an estimated 415,200 Australian children: 10%). Hayfever and allergic rhinitis (7%) and undefined allergies (5%) were also common conditions reported among children. Long-term mental or behavioural problems were also identified in the survey as a significant childhood problem, affecting around 5% or 213,800 Australian children, according to parents' reports (Table 6.4). Commonly reported problems were behavioural and emotional problems with usual onset in childhood or adolescence (2.2%), anxiety-related problems (1.8%) and problems of psychological development (1.7%). (Note that more than one problem may have been reported for a child.)

Although many children have a long-term condition, not all these conditions result in limitations to activities or participation that restrict the child's full involvement in society. According to the 2007–08 NHS, 27% or 1.5 million Australian children had at least one long-term condition and, of these, over a third (532,100) also had disability.

Long-term conditions such as cancer and diabetes are uncommon in childhood, but a considerable number of children are affected by them each year. Type 1 diabetes most often appears during childhood or adolescence and requires ongoing management to control and reduce the risk of complications. According to the National Diabetes Register, in 2007 there were 987 new cases of Type 1 diabetes among children, an increase since 2000 when there were 758 new cases. The rate of new cases in 2007 (24 per 100,000 children) was significantly higher than that in 2000 (19 per 100,000). Incidence rates were similar for boys and girls and increased with age, with rates twice as high among 10–14 year olds as for 0–4 year olds (31.3 per 100,000 compared with 15.1 in 2007) (AIHW 2009d).

For cancer, there were an average of 572 new cases diagnosed annually among children between 2002 and 2006—a rate of 14 per 100,000 children (15 and 13 per 100,000 boys and girls respectively), the same rate as in the 5-year period 1996–2000. The most common types in these cases were lymphoid leukaemia, cancer of the brain and myeloid leukaemia (4.2, 1.9 and 1.1 per 100,000 children respectively). In 2006, these cancers accounted for half of all cancers diagnosed among children (AIHW Australian Cancer Database). Overall survival from cancer, and for leukaemia in particular, continues to improve. Five-year relative survival for children with leukaemia increased from 64% to 83% between 1982–1986 and 1998–2004. For all childhood cancers the corresponding increase was from 67% to 79%.

Hospitalisations

Similar to the picture for prevalence and burden of disease, respiratory conditions were the most common cause for hospitalisations among children in 2007–08. They accounted for 103,742 hospitalisations—19% of the 558,791 total for children that year (Table 6.4). Upper respiratory tract diseases and chronic lower respiratory diseases were the most common reasons for these respiratory hospitalisations, accounting for 27% and 21% respectively.

The second leading cause of hospitalisation for children was injury and poisoning (67,767 hospitalisations: 12% of the total), and this was the leading cause of hospitalisation for those aged 10–14 years. Overall, boys were 1.6 times as likely to be hospitalised for injury as girls (2,031 compared with 1,248 per 100,000 respectively). The most common reason for these hospitalisations was falls, accounting for around 39% of all child injury hospitalisations, while land transport accidents (traffic and non-traffic) accounted for a further 13%.

Table 6.4: Leading conditions that cause ill health and mortality, various measures, children aged 0–14 years

Parent-reported prevalence (2007–08)		Hospitalisations (2007–08)		Infant mortality (2007)		Child (1–14 years) mortality (2007)		Burden of disease and injury (DALYs)[a] (2003)	
Condition	**Per cent of all children**	**Condition**	**Per cent of all child hospitalisations**	**Condition**	**Per cent of all infant deaths**	**Condition**	**Per cent of all child deaths**	**Condition**	**Per cent of all child DALYs**
Respiratory diseases	17.4	Respiratory conditions	18.6	Perinatal conditions	47.7	Injury and poisoning	36.8	Mental disorders	22.6
Eye and adnexa disorders	10.1	Injury and poisoning	12.1	Congenital anomalies	25.8	Cancer	17.0	Chronic respiratory	18.1
Ill defined conditions[b]	6.7	Perinatal conditions	10.3	Ill defined conditions[b]	12.1	Diseases of the nervous system	9.9	Neonatal conditions	15.6
Mental and behavioural problems	5.3	Digestive conditions	10.2	Injury and poisoning	3.0	Circulatory conditions	6.3	Congenital conditions	11.6
Ear and mastoid disorders[c]	3.2	Ill defined conditions[b]	6.9	Diseases of the nervous system	2.3	Ill defined conditions[b]	6.3	Injuries	7.4

(a) Disability-adjusted life years (see Chapter 2).

(b) Parent-reported prevalence, hospitalisations and deaths from Ill defined conditions include those for which a more specific diagnosis could not be made or where signs or symptoms could not be determined. This refers to the ICD-10 chapter 'Signs, symptoms, and abnormal clinical and laboratory findings' (WHO 1992).

(c) Diseases of skin and subcutaneous tissue were in equal 5th position with ear and mastoid disorders.

Note: The conditions listed above are based on the ICD-10 chapter level headings, except for the burden of disease data, where conditions are grouped using a different methodology.

Sources: ABS 2009b; AIHW National Hospital Morbidity Database; AIHW National Mortality Database; Begg et al. 2007.

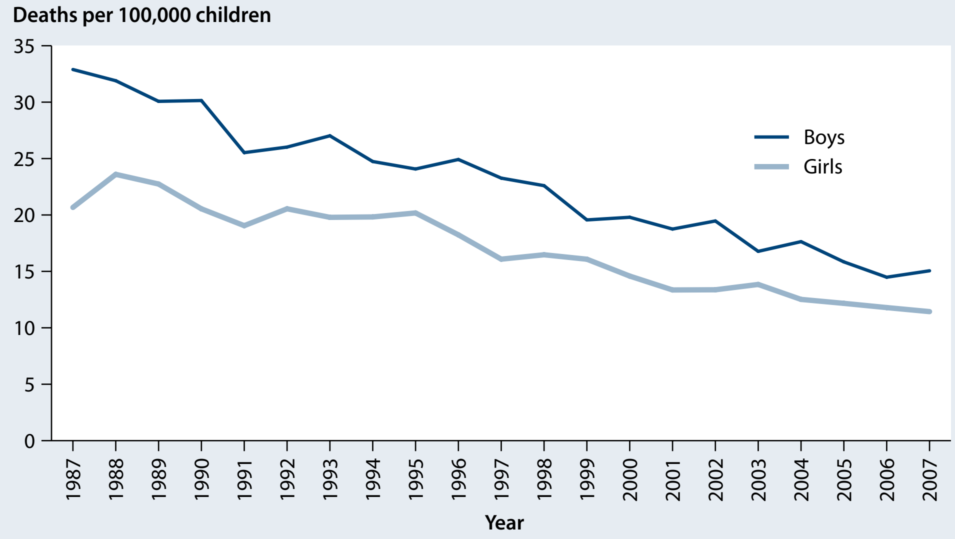
Mortality

Infant and child death rates provide insight into the social and environmental conditions in which Australia's children grow and develop. In 2007, there were 1,709 deaths among children, with over two-thirds (70%) of these deaths occurring among infants (children aged less than 1 year). There were 1,203 infant deaths—a rate of 4.2 deaths per 1,000 live births (4.5 for males and 3.9 for females; see the Glossary for the definitions of infant and child mortality rates). The number of deaths among 1–14 year olds was considerably lower—506 deaths (a rate of 13 per 100,000: 15 and 11 deaths per 100,000 for boys and girls respectively).

Over the last two decades there has been a large decline in the child death rate (including infants). Infant mortality rates almost halved between 1987 and 1998 (from 8.7 to 5.0 deaths per 1,000 live births), but remained comparatively stable between 1998 and 2007. The death rate for those aged 1–14 years declined steadily over the 21-year period, with rates halving from 27 to 13 deaths per 100,000 children (Figure 6.4). This decrease is mainly due to a large decline in transport accident death rates over the period (AIHW 2009a).

Mortality rates among Indigenous children are much higher than those among non-Indigenous children—almost two and a half times as high in 2003–2007. For infants the respective death rates were 10 and 4 deaths per 1,000 live births; and for those aged 1–14 years the rates were 30 and 14 deaths per 100,000 children. Note that these data are based on deaths in New South Wales, Queensland, Western Australia, South Australia and the Northern territory only, due to data quality issues.

The death rate in 2003–2007 among children aged 0–14 years living in remote and very remote areas was also twice as high as that for children living in major cities, reflecting the high proportion of Indigenous children living in outlying areas.



Source: AIHW National Mortality Database.

Figure 6.4: Mortality for children aged 1–14 years, 1987–2007

The leading causes of death differ for infants and 1–14 year olds (Table 6.4). In 2007, the leading causes of death among infants were perinatal conditions (48% of all infant deaths), congenital anomalies (26%), and ill defined conditions (12%; mostly sudden infant death syndrome (SIDS)). Among those aged 1–14 years the leading causes were injuries (37% of total deaths), cancer (17%) and diseases of the nervous system (10%). The leading causes of injury death among 1–14 year olds were land transport accidents and accidental drowning (61 and 39 deaths respectively).

Health determinants

The health of children and adults is influenced by the interaction of many so-called protective or risk factors. Protective factors promote positive health and development and include factors such as good dental health, infant breastfeeding, physical activity and sound nutrition. Factors that increase the risk of ill health in children include overweight and obesity, tobacco use and exposure to tobacco smoke. Wider environmental influences also play a major role in children's health and wellbeing, such as the educational, social and emotional wellbeing of families. Those wider issues are covered elsewhere in this report and in other special Australian Institute of Health and Welfare (AIHW) reports about children (AIHW 2009a). The following discussion covers a selection of important influences.

Dental health

Good oral health in childhood contributes to better teeth and gums in adulthood—less decay and the loss of fewer natural teeth. While Australia compares favourably internationally on child dental decay, ranking 7th out of 27 OECD (Organisation for Economic Co-operation and Development) countries in 2002, tooth decay among our children has been increasing in recent years. The latest available data on dental decay are from the 2003–04 Child Dental Health Survey, where it was reported that over half of all children aged 6 and 12 years were free from dental decay (51% and 58% respectively), although only 45% of 14 year olds were. Between 1999 and 2003–04, the proportion of children free from dental decay declined by 8 percentage points each for children aged 6 and 14 years, and 7 percentage points for children aged 12 years (Child Dental Health Survey, unpublished data).

Immunisation coverage and vaccine-preventable diseases

Immunisation against childhood diseases is important in preventing childhood illness and mortality, and over the last decade immunisation coverage has increased considerably although coverage among older children is still below the target. The coverage needs to exceed 90% of the population in order to interrupt the spread of vaccine-preventable diseases (Lister et al. 1999).

According to the Australian Childhood Immunisation Register, most 1 and 2 year olds were fully immunised as at 30 September 2009—92% and 91% respectively. However, coverage at 5 years of age was 83%, which was below the target. Between September 1998 and September 2009 the proportion of 2 year olds who were fully immunised increased from 69% to 91%, while among 6 year olds coverage increased from 81% to 88% between September 2002 and September 2008 (see Section 3.5 for further information on immunisation coverage). Note that, from 31 March 2008, the age of reporting for the proportion of fully immunised older children on the Australian Childhood Immunisation Register changed from 6 to 5 years of age, so no data will be available for the proportion of fully immunised 6 year olds after September 2008.

In line with increased immunisation coverage, notification rates for a number of vaccine-preventable diseases have fallen dramatically over the last decade. Between 1998 and 2008, there were no notifications for poliomyelitis or diphtheria among children, and only 1 notification for tetanus. Notification rates for rubella and measles fell from 7 and 6 notifications per 100,000 children in 1998 to 0.1 and 0.6 respectively in 2008. Notification rates for pneumococcal disease declined rapidly between 2002 and 2008, from 23 to 8 notifications per 100,000 children. However, the notification rate for pertussis (whooping cough) increased sharply between 2007 and 2008, from 16 to 118 per 100,000. Periodic epidemics of pertussis occur every 3–5 years in Australia, as the protection from the childhood vaccine decreases in adolescents and adults, resulting in the transmission of the disease to children who have not completed the recommended doses of the vaccine.

Breastfeeding

Infants are born with an immune system that is not fully developed. Breastmilk contains antibodies from their mothers so that, along with the superior nutritional value of breastmilk, this provides the best start for infants and reduces the risk of illness and death from infectious diseases.

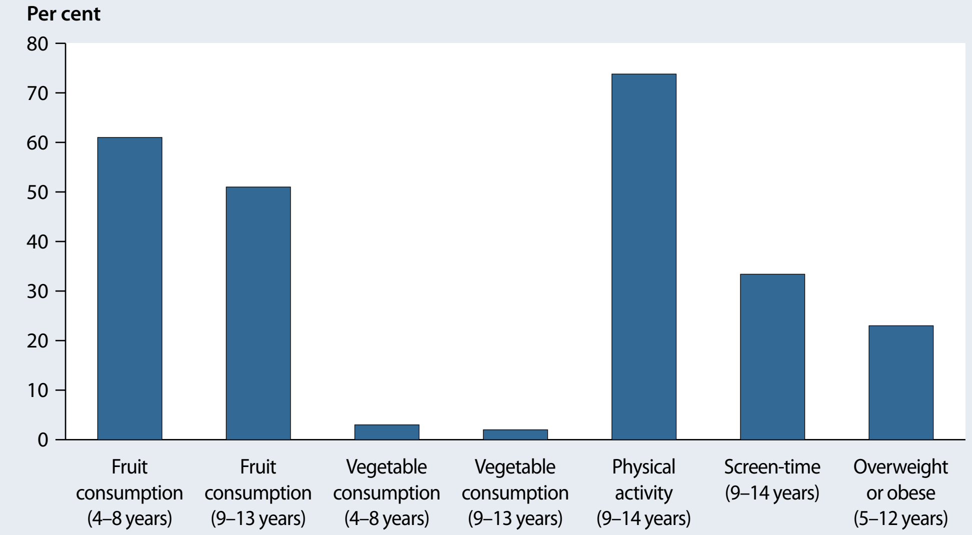
Growing up in Australia: the Longitudinal Study of Australian Children provides information on 'predominantly breastfed' infants in 2004 (studying 5,000 infants aged 0–1 year). For this group, the proportion of infants predominantly breastfed (that is, the infant's main source of nourishment is breastmilk) fell from 91% at birth to 46% at 4 months of age and 14% at 6 months. Notably, the proportion dropped by 11 percentage points between birth and 1 week of age. As that proportion declined with age, there was an increase in the proportion of infants who were 'complementary breastfed' (that is, receiving food and liquid in addition to breastmilk). For example, at 6 months of age, 40% of infants were complementary breastfed, compared with 11% at 1 month (see AIHW 2009a for more information).

Nutrition, physical activity and body weight

Regular physical activity and good nutrition reduce cardiovascular risk, both in their own right and by improving levels of cardiovascular risk factors such as overweight and obesity, high blood pressure and Type 2 diabetes. They may also improve the psychosocial wellbeing of children (Biddle 2004).

Nutrition

Good nutrition is important in supporting the rapid growth and development that occurs during infancy and childhood. Specific dietary guidelines have been developed for this age group. The Dietary Guidelines for Children and Adolescents in Australia (NHMRC 2003) recommend that 4–11 year olds eat one serve of fruit and two to three serves of vegetables daily, and 12–18 year olds eat three serves of fruit and four serves of vegetables daily. Based on data from the 2007 Australian National Children's Nutrition and Physical Activity Survey, 61% of children aged 4–8 years and around half (51%) of children aged 9–13 years met the recommendations for daily serves of fruit (excluding juice). This increased to 93% and 90% respectively with the inclusion of juice. However, very few children met the recommended daily serves of vegetables (excluding potatoes)—3% of 4–8 year olds and 2% of 9–13 year olds. Even with the inclusion of potatoes, the proportions remained low (22% and 14% respectively) (Figure 6.5).



Notes

1. For fruit and vegetable consumption, physical activity and screen time use, per cent refers to the proportion of children meeting the guidelines.
2. Data for overweight and obese children are from the 2007–08 NHS (see ABS 2009b).

Source: 2007 Australian National Children's Nutrition and Physical Activity Survey, unpublished data; ABS 2009b.

Figure 6.5: Children meeting recommended fruit, vegetable, physical activity and screen time guidelines, and who are overweight or obese, 2007

Physical activity

National physical activity guidelines have been developed around the intensity, duration and frequency of physical activity that is good for children's health. Based on the 2007 Australian National Children's Nutrition and Physical Activity Survey, three-quarters of 9–14 year olds met the national physical activity guidelines for moderate to vigorous physical activity—that is, up to several hours of moderate to vigorous physical activity every day of the week. The guidelines also recommend that children not exceed more than 2 hours of non-educational screen time per day (for example, watching movies or playing computer games). In 2007, only one-third of children aged 9–14 years met the guidelines for screen time use. Boys were more likely to meet the guidelines for physical activity, whereas girls were more likely to meet the guidelines for screen time (AIHW 2009a).

Overweight and obesity

Overweight and obesity increases a child's risk of poor health and is a risk factor for developing asthma, cardiovascular conditions and Type 2 diabetes later in life. Based on measured height and weight in the NHS surveys, the prevalence of overweight or obesity increased among children aged 5–12 years from 21% in 1995 to 23% in 2007–08 (ABS 2009b). The corresponding increase was larger for those aged 13–17 years—from 21% to 29%. Of the 23% of 5–12 year olds who were overweight or obese in 2007–08, 16% were overweight but not obese and 7% were obese. However, over three-quarters (77%) of children aged 5–12 years were within the normal weight range in 2007–08. The prevalence of overweight or obesity was similar between boys and girls overall (22% and 23% respectively).

Exposure to tobacco smoke and tobacco use among children

Infants and children are particularly vulnerable to the harmful effects of environmental tobacco smoke because they have less developed respiratory, immune and nervous systems, and have limited control over their exposure. Based on the AIHW National Drug Strategy Household Survey in 2007, around 8% of Australian households with children under 15 years of age had at least one household member who smoked inside the home—a large decrease from 31% in 1995 (see Figure 3.6). This decline coincided with an increase in the proportion of households where someone smoked only outside the home (from 17% to 29%) (AIHW 2009a).

Tobacco use at a young age is a key predictor of continued smoking in adulthood. According to the 2005 Australian Secondary Students' Alcohol and Drug Survey, an estimated 44,200 (or 5%) of 12–14 year olds were current smokers, a considerable decline from 1984 when the rate was 17%.

Young people

Most young Australians—defined here as those aged 15–24 years—are generally healthy and well. This is indicated by declining death rates, particularly from transport accidents; declines in some chronic diseases, such as asthma and cancer; and declines in vaccine-preventable diseases. However, there are a number of areas of concern. There are rising rates of obesity and sexually transmissible infections (such as chlamydia and gonococcal infections), and far too many young people are not meeting recommended levels of physical activity or vegetable consumption, are using an illicit drug, are consuming alcohol at harmful levels, are involved in road transport accidents, and are burdened by mental disorders.

In 2008, there were almost 3 million young people aged 15–24 years in Australia, accounting for 14% of the total population (1.5 million males and 1.5 million females). Indigenous young people only accounted for 4% of all young people in that year (108,400). However, they accounted for a higher proportion of their population than did non-Indigenous young people among theirs (20% compared with 14% respectively).

Health and disability

Various health status measures can be used to provide a profile of the health of young Australians. The following measures have been included in this section: burden of disease, prevalence and incidence of long-term conditions, hospitalisations and mortality. Table 6.5 shows the main health conditions that cause ill health and mortality among young people, according to these measures. Depending on what measure is examined, the leading causes of illness and mortality differ because they measure different aspects of health at different stages of the disease process.

Burden of disease and long-term health conditions

Long-term health conditions (also called chronic conditions) remain a significant challenge for Australia's young people because these conditions can affect normal growth and development, quality of life, long-term health and wellbeing, and successful participation in society, education and employment. Each condition's overall effect can be described as a 'burden of disease', a summary measure that is described in Chapter 2. In 2003, almost half (49%) of the estimated burden of disease in young people was due to mental disorders (accounting for 47% of the male burden and 51% of the female burden), 18% was due to injuries (largely road traffic accidents and suicide and self-inflicted injuries) and 9% was due to neurological and sense disorders (Table 6.5). Around one-fifth of the burden was due to mortality. Anxiety and depression was the leading specific cause of disease burden for both males and females. The next leading specific causes of disease burden then differ markedly for males and females—substance use disorders, road traffic accidents, and schizophrenia for young males; and asthma, migraine and eating disorders for young females (Begg et al. 2007).

Prevalence data from the ABS 2007 National Survey of Mental Health and Wellbeing confirm that many young people experience mental health disorders. An estimated 1 in 4 young people aged 16–24 years (26%; 671,100) had experienced a mental health disorder in the 12 months before the survey—a higher proportion than any other age group. In 2007, females aged 16–24 years were more likely to have experienced a mental health disorder than males of the same age (30% and 23% respectively). The most commonly reported mental health disorders among 16–24 year olds were anxiety disorders (15%), substance use disorders (13%) and affective disorders (6%).

Almost two-thirds (64%; 1.8 million) of young people had at least one long-term condition in 2007–08, and of these almost a third (569,200) also had disability, according to the NHS. The most frequently reported long-term conditions were hayfever and allergic rhinitis (17%) and short-sightedness (17%), followed by asthma (11%). The prevalence of self-reported asthma has declined since 2001, when the rate was 16%. Of the estimated 318,800 young people with asthma in 2007–08, over one-third (38%) had taken at least one health action for their asthma in the previous 12 months—25% discussed asthma self-management with a general practitioner (GP) or specialist, and 18% had days away from work, school or study (ABS 2009b).

In young people, diabetes is relatively uncommon, although still important. In 2007, there were 443 new cases of Type 1 diabetes among young people aged 15–24 years—a rate of 15 new cases per 100,000 young people, the same as in 2000, according to the National Diabetes Register. The number and rate for young people was substantially lower than for children. The incidence rate for Type 1 diabetes was significantly higher for young males than for young females (19 compared with 12 per 100,000 respectively).

Cancer is another disease that is relatively uncommon in young people, but it is still one of their leading causes of death. Over the period 2002–2006, an average of 874 new cases of cancer were diagnosed annually among those aged 15–24 years—a rate of 31 per 100,000 of that age (33 and 30 per 100,000 males and females respectively). The most common types diagnosed in young people were melanoma of the skin and Hodgkin lymphoma (7.7 and 3.9 per 100,000 young people respectively) and cancer of the testis (3.5 per 100,000 males). In 2006, these cancers accounted for 47% of all cancers diagnosed among young people (AIHW Australian Cancer Database).

As with other age groups, cancer survival among young people continues to improve—their 5-year relative survival rates for melanoma of the skin and Hodgkin lymphoma increased from 93% to 96% and 87% to 97% respectively between 1982–1986 and 1998–2004. For their overall cancer survival the corresponding increase was from 78% to 86%.

Table 6.5: Leading conditions that cause ill health and mortality, various measures, for young people aged 15–24 years

Self-reported prevalence (2007–08)		Hospitalisations (2007–08)		Mortality (2007)		Burden of disease and injury (DALYs)[(a)] (2003)	
Condition	**% of all youth**	**Condition**	**% of all youth hospitalisations**	**Condition**	**% of all youth deaths**	**Condition**	**% of all youth DALYs**
Disorders of eye and adnexa	28.2	Pregnancy and childbirth	20.8	Injury and poisoning	66.8	Mental disorders	48.9
Respiratory diseases	27.7	Digestive conditions	17.2	Cancer	9.9	Injuries	18.3
Musculoskeletal diseases	13.8	Injury and poisoning	14.7	Ill defined conditions[(b)]	5.6	Neurological and sense disorders	8.6
Mental and behavioural problems	12.2	Mental and behavioural disorders	7.4	Nervous system diseases	4.7	Genitourinary diseases	4.8
Ill defined conditions[(b)]	7.8	Ill defined conditions[(b)]	5.4	Diseases of the circulatory system	4.5	Chronic respiratory diseases	4.5

(a) Disability-adjusted life years (see Chapter 2).

(b) Parent-reported prevalence, hospitalisations and deaths from Ill defined conditions include those for which a more specific diagnosis could not be made or where signs or symptoms could not be determined. This refers to the ICD-10 chapter 'Signs, symptoms, and abnormal clinical and laboratory findings' (WHO 1992).

Note: The conditions listed above are based on the ICD-10 chapter level headings, except for the burden of disease data, where conditions are grouped using a different methodology.

Sources: ABS 2009b; AIHW National Hospital Morbidity Database; AIHW National Mortality Database; Begg et al. 2007.

Sexually transmissible infections can cause significant long-term health problems and they remain a major public health concern in Australia (DoHA 2005). In 2008, there were 39,582 notifications for chlamydia, donovanosis, syphilis and gonococcal infections among young Australians—a rate of 1,319 notifications per 100,000 young people and 57% of all notifications for sexually transmissible infections that year. Over the decade from 1998 to 2008, chlamydia notification rates increased fivefold (from 241 to 1,195 notifications per 100,000 young people), and gonococcal infection notification rates also increased (from 83 to 113). In contrast, syphilis notification rates are low and fell slightly between 2006 and 2008 (from 13 to 11 notifications per 100,000 young people) (NNDSS 2009). In 2008, there were 112 HIV notifications for those aged 18–24 years (87 for males and 25 for females), a rate of 6.1 notifications per 100,000 young people, higher than the 5.2 in 1998 (National Centre in HIV Epidemiology and Clinical Research, unpublished data).

Hospitalisations

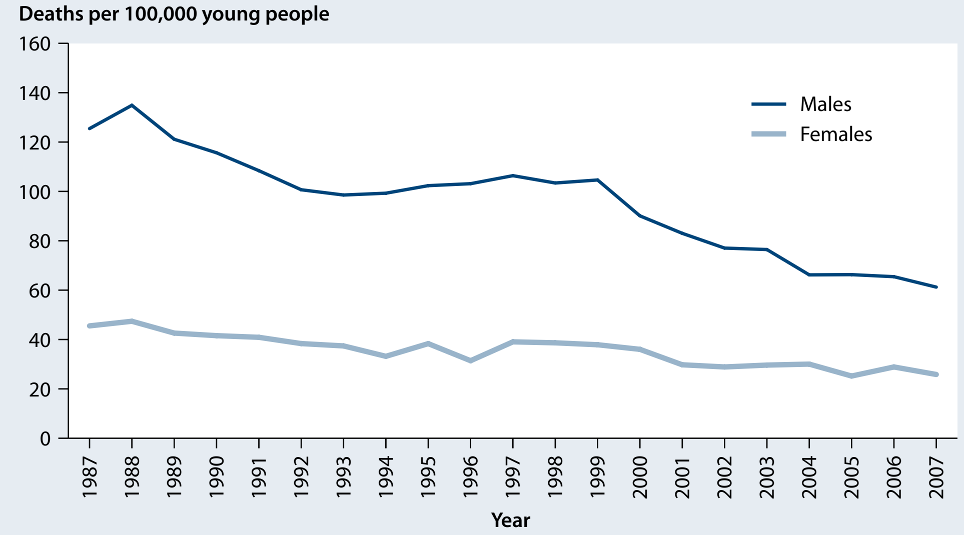
In 2007–08 there were 537,414 hospitalisations for young people, with pregnancy and childbirth the most common cause for hospitalisation (21% of their hospitalisations), followed by digestive conditions (17%), and injury and poisoning (15%) (Table 6.5). The most common causes for hospitalisation for digestive conditions were diseases of the oral cavity, salivary glands and jaw, and diseases of the appendix. Transport accidents, falls and assaults were the most common reasons for injury hospitalisations of young people.

Mortality

In 2007, there were 1,300 deaths among Australians aged 15–24 years—a rate of 44 deaths per 100,000 young people, and representing 1% of total Australian deaths that year. Males accounted for over two-thirds (71%) of these deaths among young people. The male death rate remained consistently higher than the female rate (over twice as high) between 1987 and 2007. However, overall death rates among young people have fallen considerably and the gap in rates between the sexes has been narrowing. Between 1987 and 2007 the overall rate halved (from 86 to 44 deaths per 100,000) and the rate declined faster for males than females (declines of 51% and 43% respectively) (Figure 6.6).

This overall decline in mortality over recent decades can largely be attributed to a halving of the death rate from injury and poisoning. However, in 2007 injury and poisoning remained by far the leading cause of death among young people, accounting for 869 deaths—67% of all their deaths. Furthermore, land transport accidents and intentional self-harm were the leading causes of injury and poisoning deaths among young people (35% and 28% of injury and poisoning deaths respectively), and together accounted for 42% of all deaths in young people. Death rates among males were 3 times as high as among females for land transport accidents (15 and 5 deaths per 100,000 respectively) and intentional self-harm (12 and 4 deaths per 100,000 respectively). Cancers (malignant neoplasms) were the second leading cause of death and accounted for 10% or 127 deaths among young people (a rate of 4 per 100,000 population). A quarter of cancer deaths among young people were due to lymphoid or myeloid leukaemia, with a further 11% due to brain cancer.

In 2003–2007, death rates among Indigenous young people were 2.5 times as high as for non-Indigenous young people (113 and 45 deaths per 100,000 respectively), based on deaths in New South Wales, Queensland, Western Australia, South Australia and the Northern Territory only.



Source: AIHW National Mortality Database.

Figure 6.6: Mortality for young people aged 15–24 years, 1987–2007

Health determinants

The health behaviours of young people—including levels of physical activity, eating habits, substance use and sexual practices—are important determinants of their current and future health status, and these are discussed in this section. There are also many other factors, such as environmental, social, economic and cultural factors, which can affect their overall health and wellbeing, and these are discussed in other parts of this report.

Nutrition, physical activity and body weight

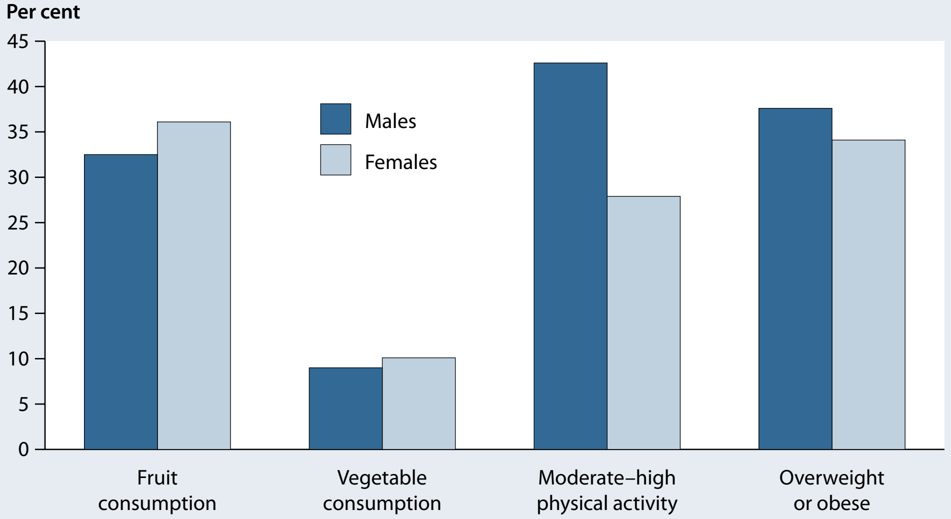
Good nutrition and physical activity have many benefits for the health and wellbeing of young people, and are important in maintaining good health. They are also critical factors in determining a person's body weight.

Nutrition

The National Health and Medical Research Council has developed a set of dietary guidelines to maintain the best health and reduce the risk of chronic disease. For young people aged 15–18 years the guidelines recommend three serves of fruit and four serves of vegetables per day, and, for 19–24 year olds, two serves of fruit and five serves of vegetables per day (DoHA & NHMRC 2005). According to the 2007–08 NHS, 1 in 3 (34%) young people met the recommendations for daily serves of fruit and 1 in 10 (10%) met the recommended number of serves of vegetables (Figure 6.7). Most young people usually consumed some fruit and vegetables each day but at levels below the recommended number of serves (59% of young people did not meet the recommended levels for fruit and correspondingly 89% did not meet them for vegetables). A small proportion of young people did not eat any fruit or vegetables (7% and 1% respectively) (AIHW analysis of the 2007–08 NHS).

Physical activity

According to the 2007–08 NHS, one-third (35%) of young people participated in moderate to high levels of physical activity in the 2 weeks before the survey (43% of males and 28% of females) (Figure 6.7). However, 27% were sedentary (no exercise or very low levels), with females slightly more likely to be sedentary than males (29% and 25% respectively). Adolescents (15–17 year olds) were more active than young adults (40% doing moderate to high levels of physical activity compared with 33% for 18–24 year olds) (AIHW analysis of the 2007–08 NHS).



Sources: ABS 2009b; AIHW analysis of the 2007–08 NHS CURF version 2.

Figure 6.7: Young people aged 15–24 years meeting recommended fruit, vegetable and physical activity guidelines, and who are overweight or obese, 2007–08

Overweight and obesity

Overweight and obesity affects young people's psychological wellbeing and increases the risk of developing chronic conditions and adult obesity. According to measured height and weight data from the 2007–08 NHS, over one-third (36%) of young adults aged 15–24 years were overweight or obese—23% were overweight but not obese and 13% were obese. Young males were more likely to be overweight or obese than young females (38% and 34% respectively) (Figure 6.7). The prevalence of overweight and obesity among 15–24 year olds increased over the last decade—from 29% to 36% for overweight or obese and 8% to 13% for obesity between 1995 and 2007–08 (unpublished data from the 2007–08 NHS).

Tobacco, alcohol and other substance abuse

Youth is a stage in life when many people begin to experiment with substances that can cause immediate and long-term health and social problems. This section briefly discusses the use of tobacco, alcohol and illicit drugs among young Australians, according to results from the National Drug Strategy Household Survey.

Tobacco smoking

In 2007, an estimated 17% of young people aged 15–24 years were current smokers (with 13% smoking daily), while 76% had never smoked. Based on successive National Drug Strategy Household Surveys, the prevalence of current smoking among young people fell from 28% in 2001 to 17% in 2007. Most adult smokers begin smoking during adolescence, and in 2007 the average age of starting was 15.8 years.

Alcohol and illicit drug use

Alcohol use at young ages is associated with more frequent use during late adolescence and an increased risk of later dependence (Brown et al. 2009). In 2007, over one-third of young people (38% of males and 37% of females) had consumed alcohol at least once a month at levels considered to be risky or high risk in the short term; that is, on any one day, seven or more standard drinks for males and five or more standard drinks for females (NHMRC 2001). This represents a slight decrease from 39% in 2001. An estimated 14% of young people (13% of males and 16% of females) drank at risky or high-risk levels for long-term harm in 2007, similar to levels in 2001 (15%).

In 2007, 23% of young people (25% of males and 22% of females) had used an illicit drug in the preceding 12 months. The most common types used were marijuana/cannabis (18% of all young people), ecstasy (9%) and amphetamines, including 'ice' (4%). The corresponding figures for 2001 indicate some decrease in illicit drug use for marijuana/cannabis (29% of young people then) and amphetamines (10% then), while ecstasy use has remained much the same.

Misuse of alcohol and other drugs may result in hospitalisations due to acute intoxication and related injuries, dependence, withdrawal symptoms, psychotic disorders and amnesia. In 2007–08, there were 8,005 hospitalisations among young people for mental and behavioural disorders due to drug and alcohol use (almost 1.5% of all hospitalisations of young people, a rate of 314 and 223 per 100,000 males and females respectively). In addition, there were 192 hospitalisations for accidental overdose of narcotics and hallucinogens (such as cannabis and cocaine), and 110 for accidental poisoning by alcohol.

Sexual and reproductive health

Sexual development is a normal part of adolescence, and sexual and reproductive behaviour during adolescence can have far-reaching consequences in later life. According to the 2008 Survey of Secondary Students and Sexual Health, over three-quarters of students had experienced some form of sexual activity, with 27% of Year 10 students and 56% of Year 12 students having had sexual intercourse. Between 2002 and 2008 there was an increase in the proportion of students who had had sexual intercourse (from 35% to 40%). Nearly all students used some form of contraception at their most recent sexual encounter—two-thirds had used a condom and nearly half of the females were on the contraceptive pill (Smith et al. 2009).

Teenage motherhood, particularly at younger ages, can pose significant long-term risks for both mother and child, including poorer health, educational and economic outcomes (Ambert 2006; Sleebos 2003; WHQW 2008). According to the AIHW National Perinatal Data Collection, in 2006 around 11,900 infants were born to teenage mothers—a rate of 17 live births per 1,000 females aged 15–19 years. Teenage births declined in the decade to 2003 (from 22 live births per 1,000 females aged 15–19 years in the mid-1990s to 17 in 2003), but rates appear to have stabilised from 2003 onwards. In 2006, the teenage birth rate among Indigenous females was 5 times as high as that among non-Indigenous females.

6.4 People aged 25–64 years

The 25–64 years age group—often referred to as 'working-age adults'—make up over half of the total Australian population (54%, or 11.5 million people in June 2008). The 40 years of life included in this age group span a wide range of life events, milestones and transitions. Males and females may establish themselves in the workforce, change career paths, form long-term relationships or have children, and many retire during this period. Yet equally important, 25–64 years is a significant life stage in terms of health. While many long-term health conditions can emerge during this time, there are also opportunities to establish health behaviours that reduce the risk of ill health in later life. Therefore, examining the health and lifestyle of those aged 25–64 years is important, not only for the health of the people concerned and their productivity but also for predicting the future needs of the older population.

This section provides an overview of the health and wellbeing of Australians aged 25–64 years. As males and females have quite different health outcomes and needs at each life stage, this section will also focus on differences by sex and age within this broad age group.

Health and disability

Life expectancy

As for all age groups, the life expectancy of Australians aged 25–64 years is higher than at any time in the past. At age 25, Australian males in 2005–2007 could expect to live until 80.0 years and females until 84.4 years (ABS 2008b). At age 64, males could expect to live until 83.3 years and females until 86.5 years. Although females continue to have a longer life expectancy than males at all ages, this disparity narrows with age—from 4.4 years' difference at age 25 to 3.2 years at age 64.

Self-assessed health status

Most Australians aged 25–64 years consider themselves to be in good health, but the proportions decrease with age (Table 6.6). Estimates from the 2007–08 NHS show that almost two-thirds (64%) of 25–34 years olds rated their health as excellent or very good, and this proportion declined to just under half (49%) in the 55–64 years group. At all ages, higher proportions of females than males rated their health as excellent or very good.

Table 6.6: People aged 25–64 years who assessed their health as excellent or very good, 2007–08 (per cent)

	Age group				
Sex	**25–34**	**35–44**	**45–54**	**55–64**	**Total 25–64**
Males	62.9	59.2	50.9	45.8	55.2
Females	65.1	62.0	59.7	52.2	60.1
Total persons	64.0	60.6	55.3	49.0	57.7

Source: AIHW analysis of the 2007–08 NHS CURF version 2.

Long-term health conditions

Most people aged 25–64 years (85% of males and 89% of females) have at least one long-term health condition, and as people age their likelihood of developing more long-term conditions increases.

According to the 2007–08 NHS, the most common long-term health conditions were vision problems (mainly long- and short-sightedness), back pain, and hayfever and allergic rhinitis (Table 6.7). The frequency of reporting certain conditions varies by age. For example, long-sightedness, arthritis and deafness were rarely reported by those aged 25–34 years but were common in those aged 45 years or over.

Table 6.7: Ten most common long-term health conditions, people aged 25–64 years, 2007–08

Age group	Condition	Per cent[(a)]	Age group	Condition	Per cent[(a)]
25–34	Short-sightedness	22.6	**45–54**	Long-sightedness	49.5
	Hayfever & allergic rhinitis	19.2		Short-sightedness	31.8
	Back pain & disc problems	14.1		Back pain & disc problems	20.8
	Mood (affective) problems	9.8		Arthritis (all types)	18.7
	Chronic sinusitis	9.6		Hayfever & allergic rhinitis	17.7
	Asthma	9.5		Chronic sinusitis	12.6
	Long-sightedness	8.1		Deafness	11.3
	Migraine	7.4		High blood pressure	10.3
	Astigmatism	6.9		Mood (affective) problems	9.7
	Other mental & behavioural problems	6.1		Asthma	8.9
35–44	Short-sightedness	22.7	**55–64**	Long-sightedness	59.4
	Hayfever & allergic rhinitis	20.7		Short-sightedness	37.6
	Back pain & disc problems	17.8		Arthritis (all types)	37.1
	Long-sightedness	15.3		High blood pressure	23.6
	Chronic sinusitis	10.9		Back pain & disc problems	22.9
	Asthma	10.2		Deafness	19.1
	Migraine	9.7		High cholesterol	15.0
	Mood (affective) problems	9.6		Hayfever & allergic rhinitis	13.7
	Arthritis (all types)	9.0		Chronic sinusitis	13.2
	Deafness	6.8		Other diseases of circulatory system	12.1

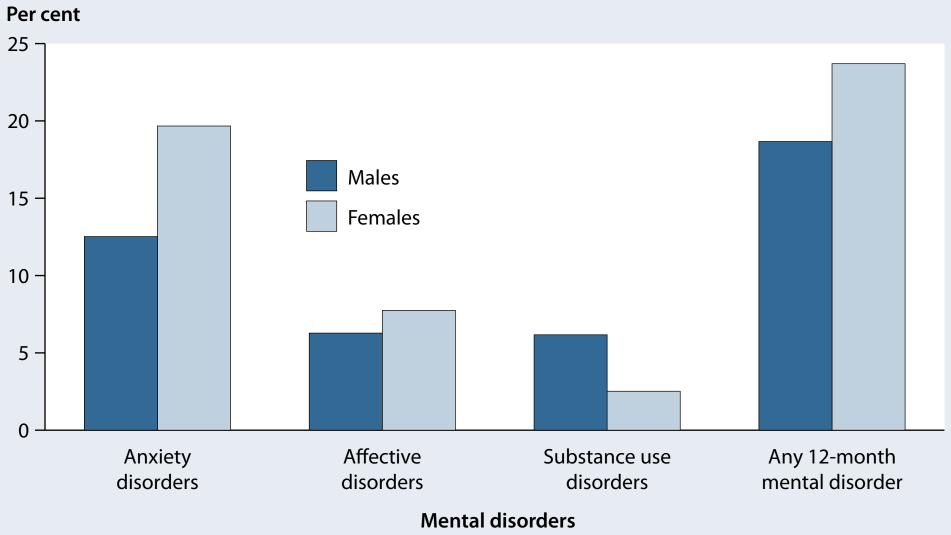
(a) The proportion in each age group who reported that long-term condition.

Note: Long-term conditions are self-reported. More than one condition may be reported.

Source: AIHW analysis of the 2007–08 NHS CURF version 2.

Mental health and wellbeing

Mental illness is widely recognised as a health concern for Australians of virtually all ages, certainly from teenage onwards. Based on the 2007 National Mental Health and Wellbeing Survey, 1 in 5 Australians aged 25–64 years in 2007 (21% or 2.3 million) had experienced an anxiety, affective or substance use disorder (see Box 4.7 in Chapter 4) in the 12 months before the survey (ABS 2008c). Anxiety disorders (such as post-traumatic stress disorder) and affective disorders (such as depression and bipolar affective disorder) were more common among females than males but substance use disorders were more common among males, particularly those aged 25–34 years (Figure 6.8). Males and females in younger age groups generally experienced higher rates of disorder than their older counterparts. Overall, 23% of males and 27% of females aged 25–34 years experienced a mental disorder in the preceding 12 months, compared with 11% of males and 16% of females aged 55–64 years.



Notes

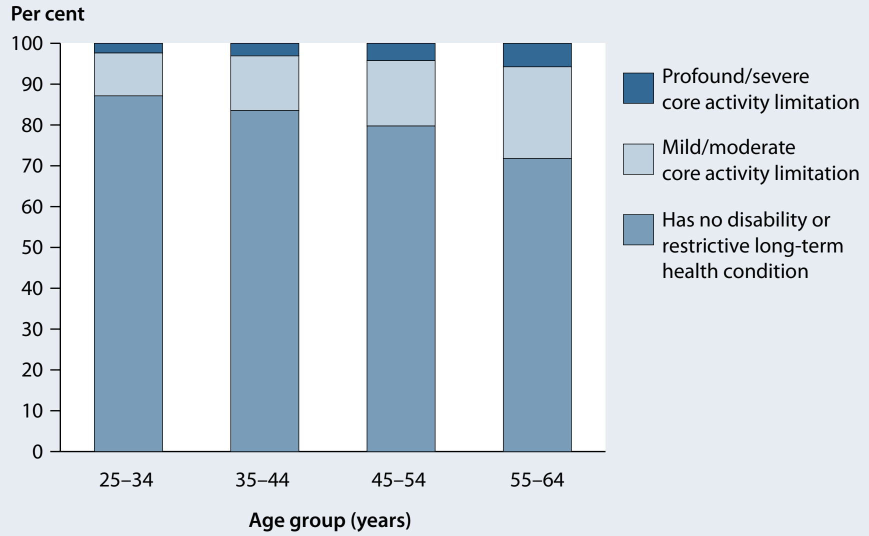
1. Persons who the met criteria for diagnosis of a lifetime mental disorder (with hierarchy) and had symptoms in the 12 months before interview.
2. A person may have had more than one mental disorder, so the components may not add to the total shown at right.

Source: ABS 2008c.

Figure 6.8: Prevalence of 12-month mental disorders by sex, people aged 25–64 years, 2007

Disability

According to the 2007–08 NHS, most males and females aged 25–64 years (81%) do not have a disability or restrictive long-term health condition. However, the proportion of those who do have such restrictions increases with age (Figure 6.9). Around 6% of people aged 55–64 years reported a profound or severe limitation that restricted them in their core activities (that is, self-care, mobility or communication) compared with 2% of 25–34 year olds. A further 22% of 55–64 year olds reported mild or moderate core activity limitation (compared with 10% of 25–34 year olds).



Source: AIHW analysis of the 2007–08 NHS CURF version 2.

Figure 6.9: Activity restrictions by age, people aged 25–64 years, 2007–08

Work-related absenteeism and injury

Around three-quarters (74%) of Australians aged 25–64 years are employed, hence the term 'working-age' (ABS 2007). Having a healthy working population is essential to the Australian economy because illness and injury affect a person's ability to work, leading to productivity losses. Also, the workforce itself can play a role in whether people are healthy or not. According to the 2007–08 NHS, 10% of males and 10% of females aged 25–64 years had a long-term condition as a result of a workplace injury.

According to Safe Work Australia, in 2006–07 over 134,000 workers' compensation claims were accepted for a workplace injury, disease or condition (Safe Work Australia 2009). The great majority of these claims (84%) were for people aged 25–64 years and around two-thirds (67%) were for males in that age group. The most common mechanism for work-related injury and disease among people aged 25–64 years was 'body stressing' through repetitive movement or handling objects (43% of all claims); falls, trips and slips (20%); and being hit by moving objects (13%). Most of these claims were for sprains and strains of joints and adjacent muscles (43%), and the most common bodily locations of injuries or diseases were the back (23%) and hands (11%). The industries with the highest numbers of compensation claims were those of manufacturing, health and community services, and construction.

Use of health services

This section provides an overview of the use of some mainstream health services by people aged 25–64 years—specifically problems managed by GPs and hospitalisations.

Problems managed by general practitioners

For most people, a GP is the first point of contact to discuss a health problem. Estimates from the 2007–08 NHS show that 61% of females and 49% of males aged 25–64 years have check ups with a GP at least once a year. Analysis of the 2008–09 data from the Bettering the Evaluation and Care of Health (BEACH) study of GP activity (see Chapter 7) show that the problem most commonly managed for males and females aged 25–64 years during GP consultations was hypertension (high blood pressure), followed by lipid (chiefly cholesterol) disorders for males and depression for females (Table 6.8).

Table 6.8: Problems most commonly managed at encounters with GPs, people aged 25–64 years, 2008–09

Males		Females	
Problem	Per 100 encounters	Problem	Per 100 encounters
Hypertension	10.2	Hypertension	7.1
Lipid (cholesterol) disorders	5.6	Depression	6.9
Acute upper respiratory infection	4.9	Female genital check-up	5.7
Diabetes	5.0	Acute upper respiratory infection	5.1
Depression	4.8	Lipid (cholesterol) disorders	3.6

Source: AIHW analysis of BEACH data.

Hospitalisations

Within the population aged 25–64 years, rates of hospitalisation vary by sex and age group as different health needs and conditions emerge (Table 6.9). With the exception of the 55–64 year age group, rates of hospitalisation are higher for females than males across the age groups. In the younger age groups this is largely due to pregnancy and childbirth, which feature strongly as causes of hospitalisation for females aged 25–34 years. Whereas hospitalisation rates increase with age for males, they are elevated for females aged 25–34 years and only exceed this level at 55–64 years.

With the exception of 'care involving dialysis', which was the most common cause of hospitalisation for people aged 25–64 years overall, the most common specific causes of hospitalisation varied by sex and age. As Table 6.10 shows, females aged 25–34 years were most commonly hospitalised for obstetric-related reasons (for example, abortion or delivery), while for females aged 55–64 years, the most common causes were rehabilitation procedures and throat and chest pain. Embedded and impacted teeth, and internal derangement of the knee were the most common causes of hospitalisation for males aged 25–34 years, while rehabilitation procedures and throat and chest pain were again some of the most common causes for males aged 55–64 years.

Table 6.9: Hospitalisations[(a)] by age group and sex, people aged 25–64 years, 2007–08

	Age group			
Sex/measure	25–34	35–44	45–54	55–64
Males				
Total hospitalisations	230,600	341,400	474,100	669,000
Number per 1,000 population	156	222	326	565
Females				
Total hospitalisations	557,700	529,500	516,400	597,000
Number per 1,000 population	379	339	349	502

(a) All hospital separations, including same-day separations.

Source: AIHW 2009c.

Table 6.10: Three most common causes of hospitalisations[a] for people aged 25–64 years, 2007–08 (per cent of age group)

	Males			Females		
Age group	**Cause[b] of hospitalisation**	**Number**	**Per cent[c]**	**Cause[b] of hospitalisation**	**Number**	**Per cent[c]**
25–34	Embedded and impacted teeth	6,200	2.7	Perineal laceration during delivery	32,000	5.7
	Internal derangement of knee	5,600	2.4	Medical abortion	20,200	3.6
	Abdominal and pelvic pain	4,100	1.8	Single spontaneous delivery	18,200	3.3
35–44	Pain in throat and chest	9,100	2.7	Procreative management	29,400	5.6
	Internal derangement of knee	7,200	2.1	Abdominal and pelvic pain	12,100	2.3
	Mental and behavioural disorders due to use of alcohol	6,000	1.7	Maternal care for abnormality of pelvic organs	11,700	2.2
45–54	Pain in throat and chest	13,300	2.8	Abdominal and pelvic pain	12,000	2.3
	Internal derangement of knee	7,900	1.7	Excessive, frequent and irregular menstruation	11,800	2.3
	Care involving use of rehabilitation procedures	7,300	1.5	Pain in throat and chest	11,400	2.2
55–64	Care involving use of rehabilitation procedures	14,600	2.2	Care involving use of rehabilitation procedures	17,100	2.9
	Pain in throat and chest	13,700	2.0	Pain in throat and chest	12,800	2.1
	Angina pectoris	11,900	1.8	Adjustment and management of implanted device	10,600	1.8

(a) Most common causes of hospitalisations exclude 'care involving dialysis', 'other medical care' and 'other'. Hospital separations include same-day separations.

(b) Principal diagnosis based on 3-character ICD-10-AM grouping.

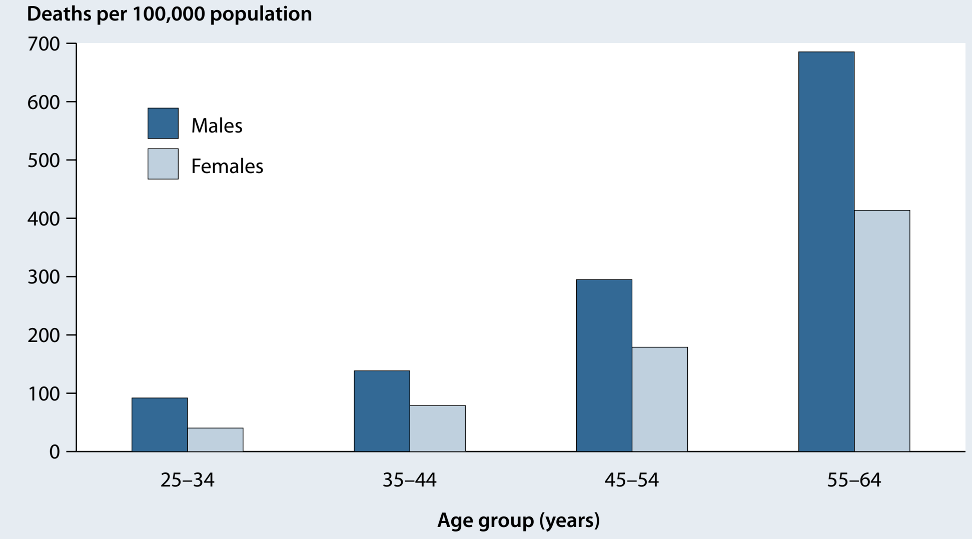
(c) Per cent of all hospital separations (including 'care involving dialysis') for sex and age group.

Source: AIHW 2009c.

Mortality

With life expectancy at age 25 standing at 80.0 years for males and 84.4 years for females in 2007 (ABS 2008b), deaths in the 25–64 year age group are considered premature. Overall, 18% of all deaths that occurred in 2007 were among those aged 25–64 years (around 25,000 deaths).

As with all ages, there are substantially more male than female deaths among 25–64 year olds (Figure 6.10). Male deaths were more than twice as common as female deaths in the younger age group (25–34 years), with 228 male deaths for every 100 female deaths. Although the disparity between males and females decreases with age, at ages 55–64 there were still 166 male deaths for every 100 female deaths.



Source: ABS 2009a.

Figure 6.10: Mortality rates by sex and age group, people aged 25–64 years, 2007

Overall, the leading specific cause of death for males aged 25–64 years in 2007 was coronary heart disease (14% of all deaths). For females of the same age it was breast cancer (12% of all deaths). However, the most common causes of death differ when looking at the specific age groups within this broad age range (Table 6.11). Causes such as intentional self-harm (suicide), land transport accidents and accidental poisonings feature prominently for the younger age groups. As age increases, causes of death are more likely to relate to chronic conditions such as heart disease and cancers of the breast, lung and colon.

Although most 25–64 year olds are employed, they suffer relatively few work-related deaths each year compared with deaths from other causes among this age group. Across all age groups, there were 260 compensated fatality claims related to work in 2006–07, with most claims (71%) being for males aged 25–64 years. The industries with the highest numbers of compensated fatalities were those of transport and storage, construction and manufacturing.

Table 6.11: Leading causes[a][b] of death by sex and age group, 2007

	Males			Females		
Age group (years)	**Cause of death**	**Deaths**	**% of deaths**	**Cause of death**	**Deaths**	**% of deaths**
25–34	Suicide	300	22.3	Suicide	73	12.5
	Land transport accidents	206	15.3	Land transport accidents	45	7.7
	Accidental poisoning	128	9.5	Accidental poisoning	27	4.6
35–44	Suicide	319	15.0	Breast cancer	167	13.6
	Coronary heart disease	204	9.6	Suicide	85	6.9
	Land transport accidents	148	7.0	Lung cancer	47	3.8
45–54	Coronary heart disease	644	15.1	Breast cancer	376	14.3
	Lung cancer	271	6.4	Lung cancer	222	8.5
	Suicide	270	6.3	Coronary heart disease	123	4.7
				Colorectal cancer	123	4.7
55–64	Coronary heart disease	1,296	16.2	Breast cancer	581	12.0
	Lung cancer	858	10.7	Lung cancer	538	11.1
	Colorectal cancer	388	4.9	Coronary heart disease	308	6.4
Total 25–64	Coronary heart disease	2,182	13.9	Breast cancer	1,144	12.4
	Lung cancer	1,187	7.6	Lung cancer	815	8.8
	Suicide	1,069	6.8	Coronary heart disease	480	5.2

(a) Based on commonly accepted ICD-10 groupings.

(b) The category 'Event of undetermined intent' ranks in the leading causes of death for males and females 25–34 and 35–44 years. However, these deaths were excluded from the tabulation as they are subject to a revision process by the ABS upon further information from the coroner.

Source: AIHW National Mortality Database.

Burden of disease

The combined extent of disability and premature death, known as the 'burden of disease', can be estimated using a measure called the disability-adjusted life year or DALY (for more information see Chapter 2). The causes and extent of the burden in Australia for various age groups have been investigated in detail, although the latest analysis applies to 2003.

The conditions which cause the most burden to people aged 25–64 years differ by age and sex (Begg et al. 2007). In 2003, anxiety and depression were the major contributors to disease burden for both males and females aged 25–34 years (12% and 27% of all DALYs for males and females respectively). Suicide and self-inflicted injuries (11%), substance use disorders (11%) and road traffic accidents (7%) also featured prominently for 25–34 year old males, while migraine (6%), schizophrenia (4%) and infertility (4%) were included in the top five for 25–34 year old females.

In contrast, 55–64 year olds faced a greater burden from chronic diseases and cancer. Coronary heart disease was the largest single contributor for males in this age group (14% of DALYs), while breast cancer (11%) caused the greatest burden for females. Vision changes and hearing loss, Type 2 diabetes and lung cancer were also included in the top five conditions causing disease burden for both sexes aged 55–64 years.

Health determinants

For 25–64 year olds, the main risk and protective factors for health are mostly the same as for other age groups examined in this chapter—for example, see Section 6.3.

When risk factors such as smoking, risky alcohol consumption, inadequate physical activity and others were analysed using the 2007–08 NHS, most people aged 25–64 years (an estimated 99% of males and 97% of females) had at least one risk factor, with a large proportion having at least three (59% of males and 41% of females).

As shown in Table 6.12, males aged 25–64 years were more likely than females to report a number of key risk behaviours, including smoking and consuming alcohol at a risky or high-risk level. Self-reported high cholesterol was also higher among males although the proportion of males and females reporting high blood pressure was generally similar.

Diet and exercise remain important determinants of health in later life. The vast majority of males (94%) and females (90%) in the survey who were aged 25–64 years did not consume the recommended daily intake of vegetables. While fruit consumption was more adequate, 57% of males and 44% of females did not consume the recommended two serves per day. Two-thirds (66%) of both males and females participated in some form of exercise in the 2-week period before the survey interview, although around one-third (34%) were still considered sedentary. Estimates from the 2007–08 NHS based on measured body weight and height show that 71% of 25–64 year old males and 56% of females were overweight or obese.

Table 6.12: Selected health risk factors, people aged 25–64 years, 2007–08 (per cent)

Risk factors	Males	Females	Total
Daily smokers	23.8	19.3	21.6
Risky or high-risk alcohol consumption[(a)]	16.3	11.5	13.9
Sedentary exercise level[(b)]	34.4	34.4	34.4
Overweight or obese[(c)]	70.8	56.1	63.6
Insufficient fruit intake[(d)]	56.8	44.4	50.5
Insufficient vegetable intake[(e)]	93.5	89.7	91.6
High blood pressure	9.3	9.0	9.2
High blood cholesterol	7.3	5.5	6.4

(a) In a 1-week period.

(b) People undertaking no exercise or a very low level of exercise in the 2 weeks prior to the survey.

(c) Body mass index greater than or equal to 25, calculated from measured height and weight.

(d) An insufficient fruit intake is considered to be one or less serves of fruit per day.

(e) An insufficient vegetable intake is considered to be four or less serves of vegetables per day.

Source: AIHW analysis of the 2007–08 NHS CURF version 2.

6.5 Older people

Good health not only helps older Australians to enjoy a good quality of life and to participate fully in the community, but also helps to reduce their demands for health and aged care services. This is important as Australia's population ages over coming decades. For this reason, improving older people's health is a national research priority in Australia (DIISR 2009). One area of special interest is the adoption of a healthy lifestyle at older ages because its benefits include preventing disease and functional decline, and promoting a longer life and a better quality of life (WHO 2002).

Current data show that older Australians today have a longer life expectancy and are generally healthier than previous generations in a range of aspects. This section provides information about older Australians for the following areas: their life expectancy, self-assessed health status, common health conditions and diseases, health risks and leading causes of death. ‘Older Australians’ here refers to those aged 65 years and over—about 2.8 million people, 13% of the Australian population in 2008 (AIHW 2009b: Table 3.1).

Health status

Life expectancy still improving

Life expectancy in Australia has been increasing almost continually throughout the last century and into this century, including for those who have already achieved a good age (AIHW 2008). At age 65 years in 2005–2007, Australian males could expect to live another 18.5 years to 83.5 years, and females another 21.6 years to 86.6 years. Even at age 85, males and females could expect to live a further 6.0 and 7.1 years respectively (ABS 2008b).

Although this is a welcome trend from several viewpoints, the continuing growth of the older population does have important implications for the patterns of health, disease and disability in the community, as well as for various health and aged care services.

Self-assessed health status still high for older Australians

Most older people in private households consider themselves to be in excellent, very good or good health (68% in 2007–08, according to the NHS), although the proportion of older females reporting only fair or poor health increases with age. For example, in the 2007–08 NHS, around one-quarter of females (24%) aged 65–74 years rated their health as only fair or poor, but by age 85 years and over this had increased to over one-third (38%). For older males, those aged 75–84 years were the most likely to rate their health as fair or poor (43%). Older females (37%) were more likely than older males (34%) to rate their health as excellent or very good (AIHW analysis of the 2007–08 NHS).

However, self-reported health assessment data are not available for people in residential aged care and this excludes a significant proportion of people who are more likely to have poor health. For example, at 30 June 2009 three-quarters of the 157,494 people who had had an appraisal of their care needs in permanent residential aged care were classed as high care, indicating that they have generally poorer levels of health (unpublished data from the DoHA Aged and Community Care Management Information System (ACCMIS) database).

Health and disability

As would be expected, although older Australians are living longer than ever before and increasingly rating their health favourably, many of them encounter health problems that affect how they feel and function. Moreover, a proportion will have several health problems at once along with some depression, frailty, difficulty in understanding things and related social issues. This can present great challenges to their health care. The following sections examine the health conditions and diseases that have the greatest effects on older Australians.

Disability and health conditions more common at older ages

Although disability is not an inevitable part of the experience of ageing, it does become more common at older ages. As the population grows and life expectancy increases, there will be more people in Australia at older ages and therefore more older people with disability. Based on data from the 2003 Survey of Disability, Ageing and Carers (SDAC), it is estimated that over half of all people aged 65 years and over in that year experienced some type of disability that restricted everyday activities. 'Physical or multiple and diverse disability' was the most common type of main disabling condition at older ages, affecting 45% of older people (AIHW 2007a). This type of disability stems from impairments that may have diverse effects within and among individuals, including effects on physical activity such as mobility.

Almost a quarter of older people (23%) had a severe or profound disability in 2003, meaning that they sometimes or always needed help with self-care, mobility or communication. This included over half (58%) of people aged 85 years and over—females in this 85-plus age group reported much higher rates than males in the group (65% compared with 44%) (ABS 2004).

From the 2003 SDAC, dementia, although not the most common health condition among older people, was the condition most associated with high levels of disability (98% of those with dementia had a severe or profound disability). Next was paralysis (89%), speech-related conditions (87%), Parkinson disease (79%) and schizophrenia (76%). Conversely, for older people with a profound or severe disability the most common conditions were arthritis (50%), hearing disorders (43%) and hypertension (38%) (AIHW 2006).

In 2003, the average number of health conditions for people aged 65 years and over was 2.84, but those with a profound disability had an average of 4.85. This shows that the greater the number of health conditions a person has, the greater the risk of severe disability. Older people with depression reported the highest average number of health conditions (5.5 conditions) (AIHW 2007b).

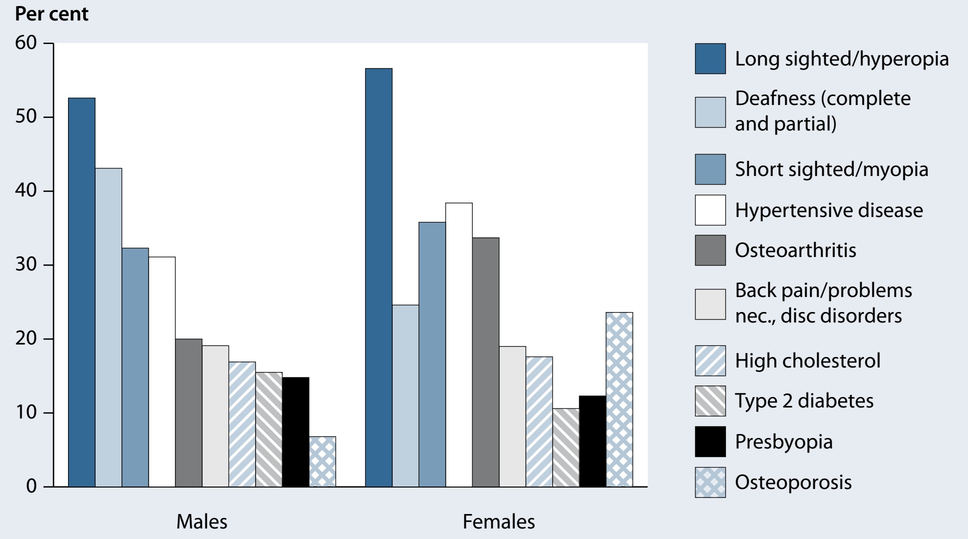
Related information is available in *Australia's welfare* (AIHW 2007a) and *Older Australia at a glance* (AIHW 2007b).

Long-term health conditions

The health conditions most likely to occur in older people are some degree of sight or hearing loss, arthritis or other musculoskeletal problems, and elevated blood pressure or cholesterol levels (Figure 6.11).

Long-term conditions among older people in the community

According to the 2007–08 NHS, the long-term health condition most commonly affecting people aged 65 and over was long-sightedness (53% of males and 57% of females), followed by deafness for older males (43%) and hypertensive disease (high blood pressure or related conditions) for older females (38%). Around a third of older males and females in the NHS reported they were short-sighted (32% and 36% respectively), the third most common condition for both (Figure 6.11). For people aged 85 years and over, deafness was the most common long-term health condition reported (57% of males and 52% of females) (AIHW analysis of the 2007–08 NHS).



nec. Not elsewhere classified.

(a) People may have reported more than one health condition.

Source: AIHW analysis of the 2007–08 NHS CURF version 2.

Figure 6.11: Most commonly reported individual long-term health conditions, people living in the community aged 65 years and over, 2007–08

Long-term conditions among older people in residential aged care

As at 30 June 2009, circulatory disease, such as heart disease and hypertension, was the most common condition (excluding dementias and other mental illness) among older permanent residents living in aged care facilities, regardless of age or sex. Circulatory disease was reported in over a quarter (27%) of them (DoHA ACCMIS database) (Table 6.13).

Musculoskeletal conditions, such as arthritis, was the next most common condition reported for both sexes (18%), more commonly for older female residents (20%) than for males (11%). Endocrine diseases such as diabetes and thyroid problems was the third most commonly reported condition for both female and male older residents (8% and 9% respectively) (unpublished data from the DoHA ACCMIS database).

Information on dementia and other mental illnesses among permanent aged care residents is available in Chapter 4.

Table 6.13: Main health conditions[(a)] for permanent aged-care residents aged 65 years and over[(b)] (excluding dementias and other mental illness), 30 June 2009, per cent

	Age group (years)			Total 65 and over
Disease category	**65–74**	**75–84**	**85 and over**	
Circulatory system	23.9	27.0	27.6	27.1
Musculoskeletal & connective tissue	10.6	15.8	19.5	17.5
Endocrine, nutritional and metabolic disorders	12.2	10.3	6.8	8.4
Nervous system[(c)]	11.0	6.7	3.8	5.4
Eye and adnexa	2.8	4.1	6.8	5.6
Genitourinary system	4.7	5.0	5.0	5.0
Respiratory system	5.2	4.6	3.4	3.9
Digestive system	4.1	3.6	3.5	3.6
Injury/poisoning/external	3.2	2.5	3.0	2.9
Neoplasms(tumours/cancers)	3.1	3.0	2.9	3.0
Other	19.2	17.4	17.7	17.8
Total persons (per cent)	**100.0**	**100.0**	**100.0**	**100.0**
Total persons (number)	**13,801**	**49,893**	**87,348**	**151,042**

(a) Up to three health conditions may be recorded. The main health condition is the first recorded health condition.

(b) With an Aged Care Funding Instrument Classification (ACFI) at 30 June 2009.

(c) Includes Parkinson disease.

Note: The ACFI health condition codes, which are the same as the Aged Care Assessment Program (ACAP) codes, map to equivalent codes in the International Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (1998) (ICD–10–AM).

Source: Unpublished data from the DoHA ACCMIS database.

Mental health

Mental health became one of Australia's national priority areas for health because of its effect on the Australian population and the possible reduction in disease burden that could occur through prevention and treatment. Based on self-reports in the 2007–08 NHS, mental and behavioural problems were the ninth most common group of long-term health conditions for older people, affecting an estimated 249,000 people aged 65 years and over. Mood (affective) disorders, such as depression, were the most common type of mental health condition reported by older people. In addition, about 8% of the males and 11% of the females reported high or very high levels of psychological distress. An estimated 4% of males and females aged 65 years and over in the survey took at least one medication for a mental health condition in the preceding 2 weeks, with about 3% using antidepressants and 1% using sleeping tablets or capsules (Table 6.14).

Table 6.14: Psychological distress levels and selected actions taken for mental and behavioural problems, people aged 65 years and over, 2007-08

	Males	Females	Males	Females
	Number ('000)		Per cent	
Current psychological distress level				
Low	951.4	975.6	78.7	70.1
Moderate	161.0	250.4	13.3	18.0
High/very high	97.0	158.7	8.0	11.4
Taken medication used for mental wellbeing more than once a week	42.2	57.5	3.5	4.1
Used medication for mental health in the last 2 weeks(a)	47.3	59.7	3.9	4.3
Used antidepressants	29.9	45.3	2.5	3.3
Used sleeping tablets or capsules	7.7	16.1	0.6	1.2
Total aged 65 years and over	**1,209.4**	**1,391.8**	**100.0**	**100.0**

(a) Persons may have reported more than one type of medication.

Source: AIHW analysis of the 2007–08 NHS CURF version 2.

Risk of hospitalisation due to falls increases at older ages

Falls commonly happen to older people and they often result in fractures or other serious injuries, with considerable cost to the individual and the health system. For 2003–04, the total cost of fall-related acute episodes of hospital care for older people was estimated at $566.0 million (Bradley & Harrison 2007).

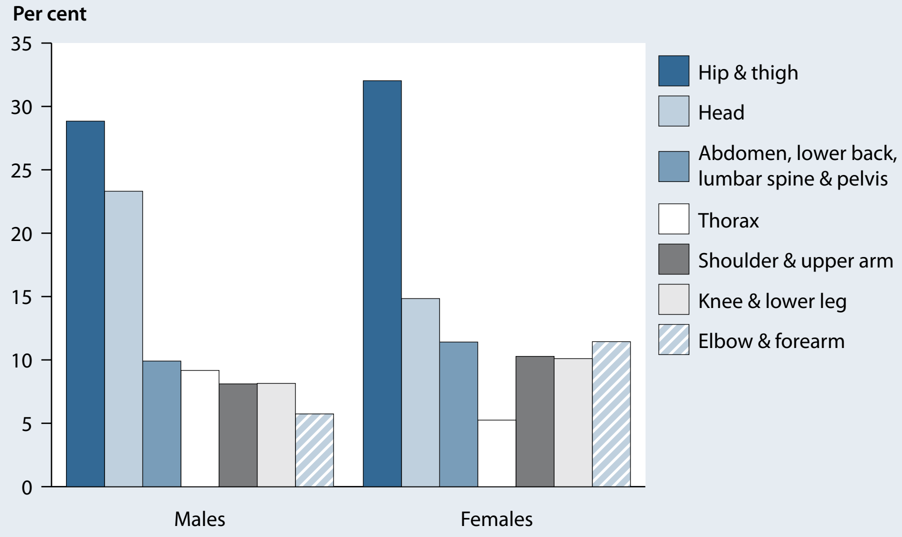
During 2005–06, there were an estimated 66,784 hospitalised injury cases for older Australians due to falls. According to Bradley and Pointer (2008), this represented a rise of 10% since 2003–04 (a 16% increase for older males and an 8% increase for older females). Among older people, over two-thirds (71%) of the hospitalised fall injury cases in 2005–06 were for females. Part of this sex imbalance is because females live longer than males, so older females strongly outnumber older males. Another reason is that older females are more likely to be hospitalised for fall-related injuries than males of the same age. It should also be noted that osteoporosis is a major risk factor for fractures resulting from falls: its prevalence increases with age, and at any age it is considerably more common among females than males.

Besides being more common for females, fall injury rates increase significantly with age. In 2005–06, there were 4.1 fall injury cases per 1,000 persons aged 75 years and over, almost double the rate of 2.4 per 1,000 population for the 65-and-over population. By age 95 years and over the rate had increased to 12.5 per 1,000 persons in this age group (Bradley & Pointer 2008).

Half of all fall injury cases for people aged 65 years and older occurred in the home, most commonly from slipping, tripping or stumbling on the same level, and another fifth (22%) occurred in residential aged care facilities. Older people who lived in aged care facilities were found to have a rate of falls 5 times as high as that for people of the same age who lived in the community and fell in their home (Bradley & Pointer 2008).

The most common fall injuries for both older males and females were injuries to the hip and thigh—almost a third of all fall cases (31%)—and injuries to the head (17%).

However, higher proportions of older males experienced injuries to the head (23%) and to the thorax (9%) than females (15% and 5% respectively), whereas older females had higher proportions of injuries to the elbow and forearm (11%) than older males (6%) (Figure 6.12).



Source: Bradley & Pointer 2008.

Figure 6.12: Top seven injury types for fall injury cases, persons aged 65 years and over, 2005–06

Mortality

Leading causes of death

Among older Australians in 2007, the top 10 leading causes of death were responsible for almost 65,000 deaths, or around 59% of all deaths for older males and females (Table 6.15).

Coronary heart disease and cerebrovascular diseases (notably stroke) were the leading two causes of death among both older males and females. These diseases accounted for 26% of all deaths among older males and 29% among older females in 2007. Heart failure also featured prominently (the fifth leading cause of death for older females and the tenth for older males).

'Dementia and Alzheimer disease' was the third most common cause of death for older females (8.5%) and the sixth for older males (4.5%). These diseases are strongly age-related, and because there are greater numbers of females at the oldest ages, females are more likely than males to develop and subsequently die from them.

Lung cancer was the third most common cause of death for older males and the fourth for older females. Colorectal cancer was also prominent for both sexes, and prostate cancer and breast cancer were two prominent sex-specific causes of death.

Chronic obstructive pulmonary disease, which includes emphysema, was also a significant cause of death for older males and females in 2007, as was diabetes.

The top eight causes of death show important differences for each of the age groups 65–74 years, 75–84 years, and 85 years and over. For example, the most common causes of death for 65–74 year olds were coronary heart disease and cancer of the lung. At 75–84 years, deaths from cerebrovascular disease become relatively more prominent, and cancer of the male genital organs (virtually all being prostate cancer) appears in the top eight causes of death for the first time. For those aged 85 years and over, influenza and pneumonia become more important, and kidney failure appears among the top eight causes (AIHW National Mortality Database).

Table 6.15: Leading causes of death in Australians aged 65 years and over, 2007

Males	Deaths	Per cent of total	Females	Deaths	Per cent of total
Coronary heart disease	9,931	18.7	Coronary heart disease	10,129	17.8
Cerebrovascular disease	4,059	7.7	Cerebrovascular disease	6,625	11.6
Lung cancer	3,525	6.7	Dementia and Alzheimer disease	4,862	8.5
Chronic obstructive pulmonary disease	2,721	5.1	Lung cancer	2,095	3.7
Prostate cancer	2,713	5.1	Heart failure[(a)]	2,006	3.5
Dementia and Alzheimer disease	2,380	4.5	Chronic obstructive pulmonary disease	1,953	3.4
Colorectal cancer	1,635	3.1	Diabetes	1,702	3.0
Diabetes	1,597	3.0	Breast cancer	1,536	2.7
Unknown primary site cancers	1,419	2.7	Colorectal cancer	1,448	2.5
Heart failure[(a)]	1,214	2.3	Influenza and pneumonia	1,380	2.4
Other causes	21,778	41.1	Other causes	23,152	40.7
Total (10 leading causes)	**31,194**	**58.9**	**Total (10 leading causes)**	**33,736**	**59.3**
All causes	**52,972**	**100.0**	**All causes**	**56,888**	**100.0**

(a) Includes heart complications and ill-defined heart diseases.

Source: AIHW National Mortality Database.

Health determinants

Good health is clearly important for people of all ages but it can be especially important for older people if they are to remain independent and play a part in family and community life. As for the other age groups examined in this chapter, healthy diets, regular and adequate physical activity and not smoking are important factors in promoting and maintaining good health for older Australians.

According to the 2007–08 NHS, around a third of males (37%) and females (33%) aged 65 years and over had inadequate fruit consumption, and over two-thirds ate less than the recommended daily vegetable intake (72% and 70% respectively) (Table 6.16). Inadequate vegetable consumption was higher among people aged 85 years and over (78%) than those aged 65–74 years (71%).

The proportion of older people who were sedentary increased with age from 4 in 10 people aged 65–74 years to almost 7 in 10 for those aged 85 years and over (Table 6.16). At each age, older females were more likely to be sedentary than older males. This pattern was reversed for overweight and obesity, with older males being more likely to be overweight or obese than older females. The prevalence of overweight and obesity among older Australians declined with age, from three-quarters of 65–74 year olds to just under half of people aged 85 years and over, and this pattern was observed for both males and females. These results are based on actual measurements of height and weight and, although higher, are not directly comparable to those of the 2004–05 NHS, which relied on self-reports (ABS 2006).

The likelihood of being a smoker at older ages dropped from 1 in 10 for those aged 65 to 74 years to 1 in 100 for those aged 85 years or more (Table 6.16). The proportion of older people with risky or high-risk alcohol consumption also declined with age, from 12% of 65–74 year olds to 3% of those aged 85 years and over.

Table 6.16: Selected risk factors for persons aged 65 years and over, 2007–08 (per cent)

	Age group (years)			Total 65 and over
Selected risk factors	**65–74**	**75–84**	**85 and over**	
Males				
Inadequate daily fruit intake[(a)]	37.5	37.4	30.9	37.0
Inadequate daily vegetable intake[(b)]	73.1	68.4	81.8	72.0
Sedentary[(c)]	37.5	51.7	66.8	44.4
Overweight or obese[(d)(e)]	78.9	76.7	58.9	77.0
Current smokers[(f)]	10.5	6.0	0.9	8.3
Risky or high-risk alcohol consumption[(g)]	11.5	5.6	3.5	8.9
Females				
Inadequate daily fruit intake[(a)]	32.5	32.5	35.4	32.8
Inadequate daily vegetable intake[(b)]	68.7	70.2	75.7	70.0
Sedentary[(c)]	41.4	57.3	67.8	50.0
Overweight or obese[(d)(e)]	71.2	60.1	42.2	64.7
Current smokers[(f)]	9.1	5.7	1.5	7.0
Risky or high-risk alcohol consumption[(g)]	11.9	6.8	2.7	9.1
Persons				
Inadequate daily fruit intake[(a)]	34.9	34.8	33.9	34.8
Inadequate daily vegetable intake[(b)]	70.9	69.4	77.8	70.9
Sedentary[(c)]	39.5	54.7	67.5	47.4
Overweight or obese[(d)(e)]	75.0	67.9	48.4	70.5
Current smokers[(f)]	9.8	5.8	1.3	7.6
Risky or high-risk alcohol consumption[(g)]	11.7	6.2	2.9	9.0

(a) One or no serves per day. Dietary guidelines recommend at least two serves of fruit per day.

(b) Three or fewer serves per day. Dietary guidelines recommend at least five serves of vegetable per day.

(c) Physical activity for sport, recreation or exercise only; does not include those who exercised for transport or work.

(d) Measured body mass index greater than or equal to 25.

(e) Estimated as a proportion of those for whom height and weight were measured.

(f) Daily, weekly or less than weekly current smoker.

(g) In a 1-week period according to NHMRC Guidelines 2001.

Source: AIHW analysis of the 2007–08 NHS CURF version 2.

References

ABS (Australian Bureau of Statistics) 2004. The health of older people, Australia, 2001. ABS cat. no. 4827.0.55.001. Canberra: ABS.

ABS 2006. Health of older people in Australia: A snapshot, 2004-05. ABS cat. no. 4833.0. 55.001. Canberra: ABS.

ABS 2007. 2006 Census tables: labour force status by age and sex, Australia. ABS cat. no. 2068.0. Canberra: ABS.

ABS 2008a. Births Australia, 2007. ABS cat. no. 3301.0. Canberra: ABS.

ABS 2008b. Deaths, Australia, 2007. ABS cat. no. 3302.0. Canberra: ABS.

ABS 2008c. National survey of mental health and wellbeing: summary of results, 2007. ABS cat. no. 4326.0. Canberra: ABS.

ABS 2009a. Causes of death, Australia, 2007. ABS cat. no. 3303.0. Canberra: ABS.

ABS 2009b. National Health Survey: summary of results, 2007–2008. ABS cat. no. 4364.0. Canberra: ABS.

AIHW (Australian Institute of Health and Welfare) 2006. Australia's health 2006. Cat. no. AUS 73. Canberra: AIHW.

AIHW 2007a. Australia's welfare 2007. Cat. no. AUS 93. Canberra: AIHW.

AIHW 2007b. Older Australia at a glance: 4th edition. Cat. no. AGE 52. Canberra: AIHW.

AIHW 2007c. Young Australians: their health and wellbeing 2007. Cat. no. PHE 87. Canberra: AIHW.

AIHW 2008. Australia's health 2008. Cat. no. AUS 99. Canberra: AIHW.

AIHW 2009a. A picture of Australia's children 2009. Cat. no. PHE 112. Canberra: AIHW.

AIHW 2009b. Australia's welfare 2009. Australia's welfare series no. 9. Cat. no. AUS 117. Canberra: AIHW.

AIHW 2009c. Australian hospital statistics 2007–08. Cat. no. HSE 71. Canberra: AIHW.

AIHW 2009d. Insulin-treated diabetes in Australia 2000–2007. Diabetes Series no. 11. Cat. no. CVD 45. Canberra: AIHW.

Abeywardana S, Karim M, Grayson N & Sullivan EA 2007. Congenital anomalies in Australia 1998–2001. Congenital anomalies series no 2. Cat no. PER 37. Sydney: AIHW National Perinatal Statistics Unit.

Abeywardana S & Sullivan EA 2008a. Congenital anomalies in Australia 2002–2003. Birth anomalies series no. 3. Cat. no. PER 41. Sydney: AIHW National Perinatal Statistics Unit.

Abeywardana S & Sullivan EA 2008b. Neural tube defects in Australia: an epidemiological report. Cat no. PER 45. Sydney: AIHW National Perinatal Statistics Unit.

Ambert AM 2006. One parent families: characteristics, causes, consequences and issues. Ontario: The Vanier Institute of the Family.

Begg S, Vos T, Barker B, Stevenson C, Stanley L & Lopez A 2007. The burden of disease and injury in Australia, 2003. Cat. no. PHE 82. Canberra: AIHW.

Biddle SJ, Gorely T & Stensel DJ 2004. Health-enhancing physical activity and sedentary behaviour in children and adolescents. Journal of Sports Sciences 22(8):679–701.

Bradley C & Harrison JE 2007. Hospitalisations due to falls in older people, Australia, 2003–04. Injury research and statistics series no. 32. Cat. no. INJCAT 96. Adelaide: AIHW.

Bradley C & Pointer S 2008. Hospitalisations due to falls by older people, Australia 2005–06. Injury research and statistics series no. 50. Cat. no. INJCAT 122. Adelaide: AIHW.

Brown SA, McGue M, Maggs J, Schulenberg J, Hingson R, Swartzwelder S et al. 2009. Underage alcohol use: summary of developmental processes and mechanisms: ages 16–20. Alcohol Research and Health 32(1):41–52.

De Wals P, Tairou F, Van Allen MI et al. 2007. Reduction in neural-tube defects after folic acid fortification in Canada. New England Journal of Medicine 357:135–42.

DIISR (Department of Innovation, Industry, Science and Research) 2009. National research priorities fact sheet. Canberra: DIISR. Viewed 21 January 2010, <http://www.innovation.gov.au/Section/AboutDIISR/FactSheets/Pages/NationalResearchPrioritiesFactSheet.aspx>.

DoHA (Department of Health and Ageing) 2005. National Sexually Transmissible Infections Strategy 2005–2008. Canberra: DoHA.

DoHA 2009. NNDSS (National Notifiable Diseases Surveillance System). Canberra: DoHA. Viewed 29 November 2009, <http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-nndss-nndssintro.htm>.

DoHA & NHMRC (National Health and Medical Research Council) 2003. Food for health: dietary guidelines for children and adolescents in Australia. Canberra: NHMRC. Viewed 25 March 2010, <http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/n30_pamphlet.pdf >.

DoHA & NHMRC 2005. Food for health: dietary guidelines for Australians. Viewed 25 March 2010, <http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/n31.pdf >.

Honein MA, Paulozzi LJ, Mathews TJ et al. 2001. Impact of folic acid fortification of the US food supply on the occurrence of neural tube defects. The Journal of the American Medical Association 285(23):2981–6.

Laws PJ & Sullivan EA 2009. Australia's mothers and babies 2007. Perinatal statistics series no. 23. Cat. no. PER 48. Sydney: AIHW National Perinatal Statistics Unit.

Lewis G (ed) 2007. The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving mothers' lives: reviewing maternal deaths to make motherhood safer 2003–2005. The seventh report on confidential enquiries into maternal deaths in the United Kingdom. London: CEMACH.

Lister S, McIntyre PB, Burgess MAB & O'Brien ED 1999. Immunisation coverage in Australian children: a systematic review 1990–1998. Communicable Diseases Intelligence 23(6): 145–70.

NHMRC (National Health and Medical Research Council) 2001. Australian alcohol guidelines: health risks and benefits. Canberra: NHMRC.

Safe Work Australia 2009. National online statistics interactive (NOSI) system. Canberra: Safework Australia.Viewed 22 March 2010, <http://nosi.ascc.gov.au>.

Sleebos JE 2003. Low fertility rates in OECD countries: facts and policy responses. OECD Social, Employment and Migration Working Papers 15. Paris: Directorate for Employment, Labour and Social Affairs, OECD.

Smith A, Agius P, Mitchell A, Barrett C & Pitts M 2009. Secondary students and sexual health 2008. Monograph series no. 70. Melbourne: Australian Research Centre in Sex, Health & Society, La Trobe University.

Sullivan EA, Hall B & King JF 2008. Maternal deaths in Australia 2003–2005. Maternal deaths series no. 3. Cat. no. PER 32. Sydney: AIHW National Perinatal Statistics Unit.

WHO (World Health Organization) 1992. International statistical classification of diseases and related health problems, 10th revision. Geneva: WHO.

WHO 2002. Active ageing: a policy framework. Geneva: WHO. Viewed 10 May 2010, <http://whqlibdoc.who.int/hq/2002/WHO_NMH_NPH_02.8.pdf >.

WHQW (Women's Health Queensland Wide) 2008. Teenage pregnancy. Brisbane: WHQW. Viewed 10 May 2010, <http://www.womhealth.org.au/studentfactsheets/teenagepregnancy.htm>.

7

Health services

KEY POINTS

- In 2007–08, just over 2% of total health expenditure was for preventive services or health promotion.
- Between 1998–99 and 2008–09, there was an increase in general practitioners' management of some chronic diseases, including hypertension, diabetes and depression.
- Ambulances attended 2.9 million incidents in 2008–09, of which 39% were emergencies.
- The number of hospital admissions rose by 37% in the decade to 2007–08.
- Over half of the hospital admissions (56%) in 2007–08 were same-day admissions, compared with 48% in 1998–99.
- In 2008–09, about 1 in 9 of all prescriptions under the Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme were for a mental health-related medication.

This chapter presents an overview of Australia’s health services, which are grouped into five broad categories: public health services; primary care and community health services; hospitals; specialised health services; and goods, such as medicines (see Figure 7.1). The chapter also discusses the safety and quality of health services, an important component of all health service delivery. Figure 7.1 lists examples of the types of services in each category, all of which are described in turn in this chapter.

It should be noted that these categories cannot fully convey how health services are organised in Australia, especially the complex and changing patterns of health service delivery or the similarly complex paths that some patients follow through the health sector. In addition, some types of service can belong to more than one category. For example, dental services are placed here in the primary care and community health care category, but could also be included in the specialised health services category.

For an explanation of how dates and time spans are represented see the ‘Methods and conventions’ section.

Public health services	Primary care and community health care services	Hospitals	Specialised health services	Goods
Health promotion and education	General practice activity	Admitted patient care	Specialist medical practitioners	Pharmaceuticals
Cancer screening	Dental	Emergency department care	Specialised mental health	
Immunisation	Private sector allied health	Outpatient care	Reproductive health	
	Community health		Alcohol and other drug treatment	
	Complementary/ alternative health		Hearing	
	Ambulance and Royal Flying Doctor Service		Palliative care	
	Primary health care for Aboriginal and Torres Strait Islanders		Australian Defence Force	

Figure 7.1: Health service categories

7.1 Public health services

What is public health?

A widely used definition of ‘public health’ in Australia is:

> the organised response by society to protect and promote health, and to prevent illness, injury and disability. The starting point for identifying public health issues, problems and priorities, and for designing and implementing interventions, is the population as a whole, or population sub-groups (NPHP 1997).

The term ‘public health’ is often used interchangeably with ‘population health’ and ‘preventive health’.

In essence, public health interventions focus on maintaining the wellbeing of populations rather than only individuals, and are aimed at protecting or promoting health or preventing illness. Public health services deal with the factors and behaviours that cause illness and other health problems, rather than the illness itself. The Australian Institute of Health and Welfare (AIHW) has estimated that governments spent around $2.2 billion on public health activities in Australia in 2007–08, representing 2.3% of total health expenditure (AIHW 2009a). This was an increase over the 1.9% from previous years, largely due to a substantial increase in spending on immunisation such as the National Human Papillomavirus vaccination program.

Public health activities can take the form of screening, programs, campaigns or events. They draw on different strategies including health education, lifestyle advice, infection control, risk factor monitoring and tax loadings to discourage unhealthy lifestyle choices. They also apply in many settings, such as in schools, homes and workplaces, and through the media and general practitioner (GP) consultations, and relate to a broad spectrum of health issues. They are variously carried out by state, territory and local governments, the Australian Government, and other agencies such as cancer councils and the National Heart Foundation of Australia.

Cancer screening

Population screening involves the systematic use of a test to help identify individuals within a target population who have a particular disease or abnormality that was previously unrecognised. The screening test itself is not diagnostic. Rather, screening aims to identify people who are more likely to have, or be at high risk of, the health problem and require further investigation from diagnostic tests.

Screening for cancer allows disease to be detected and treated earlier, often leading to improved outcomes. It may also allow abnormalities to be treated to prevent cancer from occurring; however, some people will receive false results and may undergo unnecessary procedures. Population screening programs need to balance these benefits and side effects.

In Australia there are national population screening programs for breast, cervical and bowel cancers. Their goals are to reduce illness and death from these cancers through early detection of cancer and pre-cancerous abnormalities and effective follow-up treatment. These programs are BreastScreen Australia (using mammography for screening), the National Cervical Screening Program (using Pap tests) and the National Bowel Cancer Screening Program (using faecal occult blood tests). They provide screening services that are free to individuals in the target populations (for breast and bowel screening) or are covered by a Medicare rebate (for cervical screening). One measure of the effectiveness of population screening programs is the proportion of people in the target population that participates in the program.

BreastScreen Australia

BreastScreen Australia was established in 1991 (see Box 7.1). The program is aimed primarily at females aged 50–69 years, but also screens those aged 40–49 years and 70 years or over.

Of the females who participated in BreastScreen Australia in 2007–2008, 77.6% were aged 50–69 years, 13.9% were aged 40–49 years and 8.6% were aged 70 years or over. This reflects the focus of BreastScreen Australia on actively recruiting the target age group. Over time the proportion of participants who were in the target age group has increased, with a corresponding decrease in the proportion of females screened aged 40–49 years and 70 years and over.

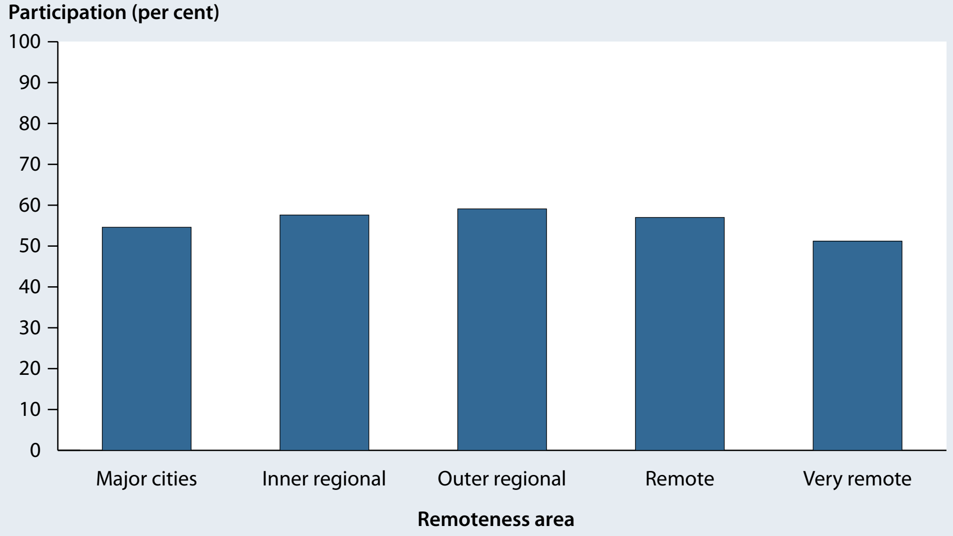
Box 7.1: BreastScreen Australia

BreastScreen Australia was established in 1991 as the National Program for the Early Detection of Breast Cancer, and is a joint program of the Australian and state and territory governments. The main objective of BreastScreen Australia is to reduce illness and death from breast cancer. Females aged 50–69 years are the primary target group, as evidence indicates that these are the years of higher risk and most benefit from screening. Females aged 40–49 years and 70 years and over are also eligible to attend.

BreastScreen Australia provides free mammographic screening and assessment for females in the target age group every 2 years. Females have their screening mammography performed at a screening unit (which may be fixed, relocatable or mobile), and if possible signs of breast cancer are identified they are recalled for further investigation by a multidisciplinary team at an assessment centre. Most of those recalled for assessment are found not to have breast cancer.

The proportion of females in the target age group of 50–69 years who were screened through BreastScreen Australia in a 2-year period rose from 51.4% in 1996–1997 (the first period for which national data are available) to 57.1% in 2001–2002, with subsequent rates fluctuating around 56%. Participation in 2007–2008 was 54.9%.

In 2007–2008, participation in BreastScreen Australia varied by geographical region of residence. inner regional, outer regional and remote locations showed significantly higher levels of participation than major cities (about 1.1 times major cities) whereas participation was significantly lower in very remote locations (0.94 times Major cities) (Figure 7.2).



Note: Geographical regions were assigned using the participant's residential postcode according to the Australian Standard Geographical Classification for 2006.

Source: AIHW analysis of BreastScreen Australia data.

Figure 7.2: Participation by females aged 50–69 in BreastScreen Australia, by geographical region, 2007–2008

National Cervical Screening Program

Organised cervical screening in Australia began in 1991 under the National Cervical Screening Program, and is aimed at females aged 20–69 years (see Box 7.2). Participation in the National Cervical Screening Program has remained steady at around 61% for most years since reporting began in 1996–1997. The proportion of the target population participating in the 2-year period 2007–2008 was 61.2%. Participation was highest in females aged 55–59 years (69.7%) and lowest in those aged 20–24 years (47.4%) (Figure 7.3). This reflects the trend seen between 1996–1997 to 2007–2008 of declining participation in females aged less than 40 years, most prominent in the 25–29 year age group, and increasing participation in females aged 55 years and over.

In 2007–2008, participation in the National Cervical Screening Program varied by geographical region of residence, although in a different pattern from breast screening. While participation was similar (around 61%) in major cities, inner regional and outer regional locations, it was significantly lower in remote and very remote locations (54.6% and 59.0% respectively) (Figure 7.4).

Box 7.2: National Cervical Screening Program

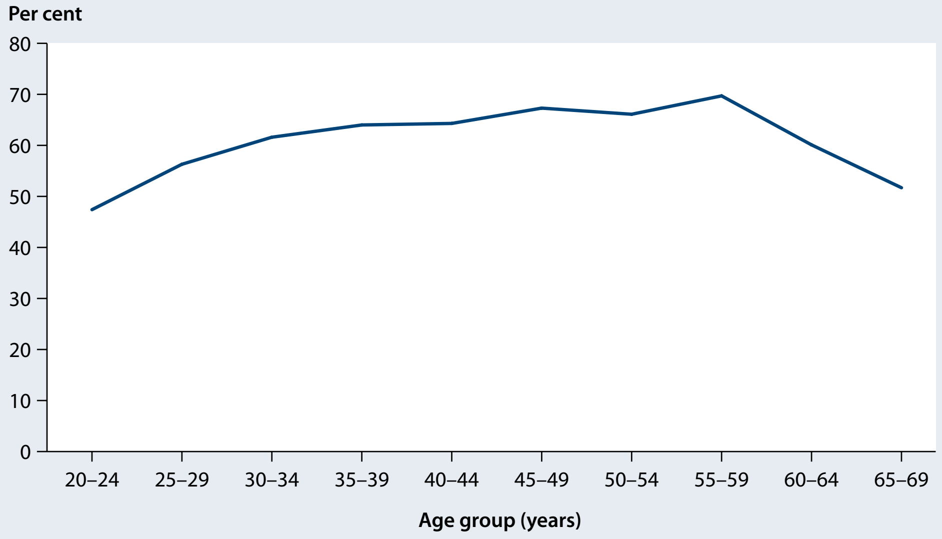
The National Cervical Screening Program was established in 1991 and is a joint program of the Australian and state and territory governments. The program is aimed at females aged 20–69 years. Its objective is to reduce both the incidence of and death from cervical cancer by identifying treatable pre-cancerous lesions as well as cervical cancer. Cervical screening uses the Pap test, which involves examining a sample of cells taken from the uterine cervix under a microscope to look for abnormalities. Referral for diagnostic follow-up will occur if abnormal or cancerous cells are detected. Early detection of pre-cancerous abnormalities allows treatment to prevent possible progression to cervical cancer, while early detection of cervical cancer improves treatment options and outcomes.

Unlike breast cancer screening, cervical screening in Australia does not operate through dedicated services. Instead it is provided as part of mainstream health services, with the great majority of Pap tests performed by general practitioners. Females may claim Medicare rebates for their Pap tests and any subsequent diagnostic follow-up services, including pathology and colposcopy.

National policy for the National Cervical Screening Program currently recommends:

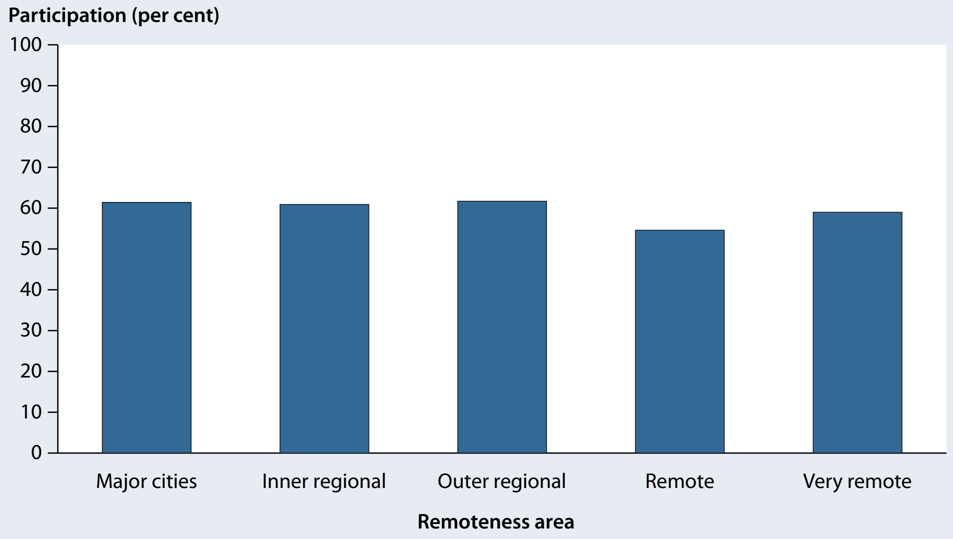
- females who have been sexually active should begin Pap tests between the ages of 18 and 20 years, or 1 or 2 years after first having sexual intercourse, whichever is later
- routine screening with Pap tests should occur every 2 years for females without symptoms or with a history that suggests cervical problems or abnormalities
- Pap tests may cease at the age of 70 years for females who have had two normal results within the last 5 years. Females over 70 years who have never had a Pap test, or who request one, should be screened.

This policy applies to females who have received the vaccine introduced in 2007 against human papillomavirus as well as to unvaccinated females.



Source: AIHW analysis of state and territory cervical cytology register data.

Figure 7.3: Participation by females aged 20–69 in the National Cervical Screening Program, by age, 2007–2008



Note: Geographical regions were assigned using the participant's residential postcode according to the Australian Standard Geographical Classification for 2006.

Source: AIHW analysis of state and territory cervical cytology register data.

Figure 7.4: Participation by females aged 20–69 in the National Cervical Screening Program, by geographical region, 2007–2008

National Bowel Cancer Screening Program

The National Bowel Cancer Screening Program began in August 2006, with screening being offered to both males and females aged 55 and 65 years. In July 2008 the program was extended to people aged 50 years (see Box 7.3). After adjusting for the lag time between receiving an invitation to screen and participating in the program, the proportion of people participating in 2008 was estimated to be 39.3%. This was lower than previous years because of the inclusion of the 50 year old invitees late in 2008.

Box 7.3: National Bowel Cancer Screening Program

The major goals of the National Bowel Cancer Screening Program are to reduce both the incidence of and death from bowel cancer by detecting abnormalities of the colon and rectum early. Early detection of both pre- and non-cancerous abnormalities can prompt medical intervention to avert possible progression to bowel cancer. Where bowel cancer has already developed, detection at an early stage makes treatment much more effective.

The program is being phased in gradually to help ensure that health services, such as colonoscopy and treatment services, are able to meet any increased demand. The first phase of the National Bowel Cancer Screening Program began in August 2006 and invited people aged 55 or 65 years to participate. In July 2008 the program was extended to include people aged 50 years.

Eligible people are individually invited to participate in the program through Medicare Australia. Invitation packs include a faecal occult blood test (FOBT) kit that allows a person's faeces to be tested for blood that is not normally visible to the naked eye but may be a sign of cancer. Participants are asked to post their completed FOBT to the program's pathology laboratory for analysis, using the postal kits provided. The results of this analysis are then sent to the participant, the participant's nominated general practitioner (GP) and the National Bowel Cancer Screening Register. Participants with a positive result, meaning that they have blood in their faeces, are advised to consult their GP to discuss further testing. In most cases this will be colonoscopy, a procedure in which the inside of the large bowel (the colon) is viewed through a long flexible tube inserted through the anus.

The program is coordinated at the national level by the Australian Government Department of Health and Ageing, in partnership with state and territory governments. The National Bowel Cancer Screening Register is maintained by Medicare Australia, and its major functions are to:

- invite eligible people to participate in the screening program
- ensure follow-up of people with positive FOBT results
- provide monitoring data to aid reporting and management.

A change in the FOBT kit in December 2008 was found to yield unreliable results and led to suspension of the program in May 2009. A replacement FOBT kit was subsequently listed by the Therapeutic Goods Administration on the Australian Register of Therapeutic Goods, and the program resumed in November 2009.

Participation rates increased with age, ranging in 2008 from 31.7% for 50 year olds and 38.9% for 55 year olds to 47.7% for 65 year olds. Females were more likely to participate than males (42.6% and 36.0% respectively) (Table 7.1).

In 2008, participation in the program also varied by geographical region of residence. Inner regional and outer regional locations showed significantly higher levels of participation than major cities (1.1 and 1.03 times major cities respectively), while participation was significantly lower in very remote locations (0.7 times major cities) (Figure 7.5) (AIHW 2009b).

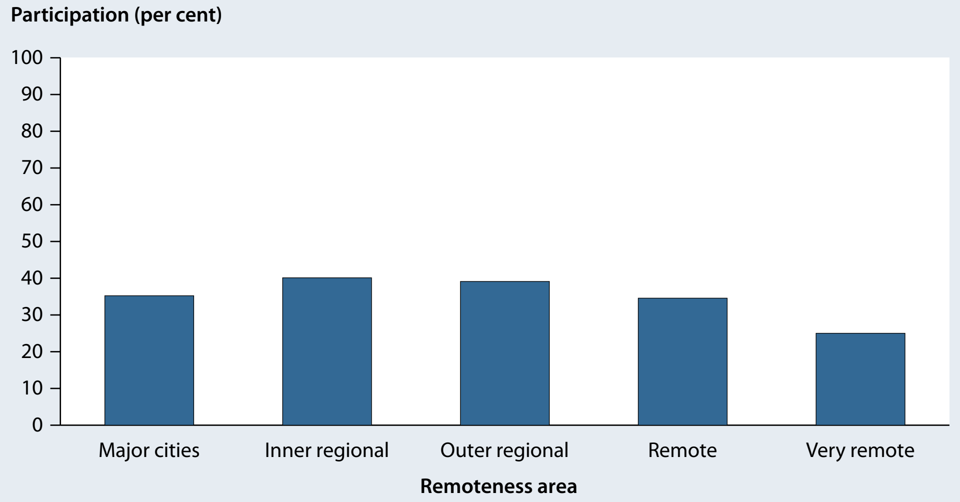
Table 7.1: Estimated participation in the National Bowel Cancer Screening Program, 2008

	Invitations	Participants	Estimated participation (per cent)
Males	344,199	115,021	36.0
Females	341,716	136,131	42.6
Persons	685,915	251,152	39.3

Notes

1. Participants in the program are defined as members of the eligible population who have been sent an invitation to screen and who returned a completed faecal occult blood test (FOBT) kit.
2. Participation rates are the estimated Kaplan-Meier participation rate of people who returned a completed FOBT kit as a proportion of the total number of the eligible population who were invited to be screened in 2008. This excludes people who suspended or opted off the program.
3. People aged 50 years were invited to be screened from 1 July 2008.

Source: AIHW analysis of National Bowel Cancer Screening Register data as at 31 January 2009.



Notes

1. Participants in the program are defined as members of the eligible population who have been sent an invitation to screen and who returned a completed faecal occult blood test (FOBT) kit.
2. Geographical regions were assigned using the participant's residential postcode according to the Australian Standard Geographical Classification for 2006.
3. Participation rates equal the number of people who returned a completed FOBT kit as a proportion of the total number of the eligible population who were invited to be screened in 2008. This excludes people who suspended or opted off the program.
4. People aged 50 years were invited to be screened from 1 July 2008.

Source: AIHW analysis of National Bowel Cancer Screening Register data as at 31 January 2009.

Figure 7.5: Participation in the National Bowel Cancer Screening Program, by geographical region, 2008

Immunisation services

This section provides information on administration of childhood and adult vaccinations, as well as information on the Immunise Australia Program (see Box 7.5). Information on immunisation coverage is presented in Chapter 3.

Box 7.5: Immunise Australia Program

The Immunise Australia Program aims to increase national immunisation rates by funding free immunisation, administering the Australian Childhood Immunisation Register and communicating information to the general public about immunisation. The National Health and Medical Research Council—with expert advice from the Australian Technical Advisory Group on Immunisation—recommends a range of vaccinations for all children, older persons and others (including Indigenous Australians) who are medically at higher risk from vaccine-preventable diseases. It does this by issuing the National Immunisation Program Schedule. For the diseases listed on the schedule, free vaccines are funded by the Australian Government and administered mainly by general practitioners or nurses. States and territories can choose the vaccines on the schedule that best suit the health needs of their jurisdiction.

Childhood vaccinations

The National Immunisation Program Schedule currently covers children's vaccinations for diphtheria, tetanus, pertussis (whooping cough), polio, measles, mumps, rubella, *Haemophilus influenzae* type b, meningococcal type C disease, varicella (chickenpox), pneumococcal disease, hepatitis B, rotavirus and, for females aged 12–13 years, human papillomavirus. Aboriginal and Torres Strait Islander children living in high-risk areas are also immunised for hepatitis A.

In 2008–09, over 4 million vaccinations were administered to children nationally (Table 7.2). Across the six states and the Australian Capital Territory, the great majority of these (74%) were done in general practice. In the Northern Territory, however, most vaccinations (64%) were administered through community health centres. In Victoria about two-fifths were administered by local government councils, while in the Australian Capital Territory about two-fifths were administered through community health centres.

Table 7.2: Childhood vaccinations by type of provider, state and territory, 2008–09

Provider type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust[(a)]
					Per cent				
General practice	86.8	56.0	83.9	68.7	72.0	91.5	55.9	10.2	74.0
Local government council	4.2	42.5	6.1	3.4	20.3	8.0	—	—	14.8
Community health centre/ nurse	7.5	0.3	6.3	17.9	6.3	0.0	43.4	63.5	7.9
Hospital	0.9	1.0	2.8	1.6	0.6	0.4	0.7	8.1	1.5
State/territory health department	—	—	—	7.9	0.1	—	—	0.4	0.9
Aboriginal health service or worker	0.6	0.2	0.7	0.4	0.6	—	—	17.8	0.8
Other	—	0.1	0.2	0.1	—	—	—	—	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total vaccinations ('000)	**1,322**	**1,038**	**922**	**489**	**294**	**90**	**66**	**69**	**4,291**

(a) Includes Cocos/Keeling Island, Christmas Island, Norfolk Island and unknown; therefore rows do not add up to the total 'Australia' column.

Source: Medicare Australia unpublished data.

Adult vaccinations

Influenza and pneumococcal vaccines are available free to all Australians aged 65 years or over, to Indigenous Australians aged 50 years or over, and to medically at-risk Indigenous Australians aged 15–49 years.

For those in the main target group who were vaccinated in 2006, over 98% received their influenza vaccination from a GP. However, for those aged under 65 years who were vaccinated, about 80% received it from a GP and 15% received it at their place of work (AIHW 2008).

7.2 Primary care and community health services

Primary care and community health services are usually the first health service visited by a patient with a health concern. These services include care from GPs, private dentists, pharmacists, physiotherapists and various other practitioners. They play an important role in monitoring an individual's health and managing many health conditions; and many practitioners establish an ongoing relationship with their patient. This section discusses a range of primary care services, as listed in Figure 7.1.

General practitioner and other non-specialist services

Medicare provides funding for general practitioner services, medical specialist services and other services (such as optometry and practice nurse services). The information in this section uses both Medicare data (see boxes 7.5 and 7.6) and data from the Bettering the Evaluation and Care of Health (BEACH) survey of general practice activity (see Box 7.7).

Medicare data provide an overview of the use of GP and other non-medical specialist services funded through Medicare, including services provided outside hospitals as well as non-medical specialist services for private patients in public and private hospitals. Medicare data on specialist medical services is presented in Section 7.4, later in this chapter.

Medicare provided benefits for 131.6 million non-specialist medical services during 2008–09, representing an increase of 5.9% over the 124.3 million services the previous year. Some of this increase in numbers can be attributed to population growth but it also represents an overall 4.3% increase in the number of GP and non-specialist items per 100,000 population (Medicare 2009). In 2008–09, an average 6.10 non-specialist services per Australian were provided under Medicare.

Non-referred medical attendances (that is, GP services, emergency attendances after hours, other prolonged attendances, group therapy, and acupuncture) accounted for 86% of these services with the remaining services being *Optometry, Practice nurse* and *Other allied health items* (Table 7.3). Between 2006–07 and 2008–09 the largest increases were recorded for the allied health group.

In 2007–08, an average 5.85 non-specialist services per Australian were provided. The largest areas of increase from 2007–08 to 2008–09 occurred in *Non-referred medical attendances* (from 5.16 to 5.24) and in *Other allied health* (from 0.18 to 0.32). The introduction of new service items—that is, new services eligible for Medicare funding—accounted for some of this increase.

Box 7.5: Medicare and Medicare benefits

Australia's universal health insurance scheme, Medicare, came into operation on 1 February 1984. As with the Pharmaceutical Benefits Scheme (see Box 7.12), it aims to make health care affordable for all Australians. Administered by Medicare Australia, the scheme provides for free or subsidised treatment by medical practitioners, participating optometrists, services delivered by a practice nurse on behalf of a general practitioner (GP), certain diagnostic and therapeutic procedures and, for certain services, eligible dentists and allied health practitioners.

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 majority of Australian taxpayers contribute indirectly to the cost of Medicare through a Medicare levy, which is presently 1.5% of taxable income. Individuals and families on higher incomes may have to pay a 1% surcharge in addition to the Medicare levy if they do not have private hospital insurance.

Medicare has established a schedule of fees for medical services that private practitioners can charge for their various services. The payments—known as 'benefits'—that Medicare contributes for those services are based on those fees (see below). 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. However, if they bulk-bill Medicare Australia for any service rather than issuing a patient with an account, Medicare then pays the benefit amount and additional charges cannot be raised for the service and the patient pays nothing for it.

For private patients who are admitted to hospitals or day-hospital facilities, the Medicare benefit is 75% of the schedule fee. 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, up to a maximum of $69.10 per service item (from 1 November 2009), indexed annually. Patients are also responsible for payments of amounts charged above the schedule fee.

Further measures take into account situations where, despite normal Medicare benefits, the costs over time for a patient or family may still become a burden. First, for out-of-hospital services the maximum amount of gap payable by a family group or an individual in any one calendar year is $388.80 (from 1 January 2010), indexed annually. Thereafter, patients are reimbursed 100% of the schedule fee unless the service was billed at less than the schedule fee. Second, under the extended safety net, Medicare will meet 80% of the out-of-pocket costs (that is, the difference between the fees charged by the doctor and the Medicare benefits paid) for out-of-hospital medical services, once an annual threshold is reached ($562.90 for families in receipt of Family Tax Benefit Part A and for concession card holders, or $1,126.00 for all other individuals and families). In addition, for medical expenditure in certain categories (including Medicare payable items), a 20% rebate on net medical expenses over $1,500 can be claimed through the income tax system.

Another component of Medicare—sometimes termed 'hospital Medicare'—provides free public hospital care for all Australian residents, either as an admitted patient, outpatient or emergency department patient. Doctors appointed by the hospitals provide medical care for such 'public' patients at no cost to the patient. Patients who choose to be treated in private hospitals, or as private patients in public hospitals, are liable for hospital accommodation and other charges, and for a portion of the medical fees charged by private practitioners.

Box 7.6: Medicare statistics

Medicare data provide information on all health services subsidised through the Medical Benefits Schedule (MBS). The MBS 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. Consequently, it is not possible to directly compare different types of services based on the number of Medicare items. Also, for this reason the terms 'items' or 'items of service' are generally used when referring to Medicare services.

The count of items is subject to changes in bundling and unbundling of services, so the count is not always 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 nurses providing services on behalf of a GP
- mental health services provided by registered psychologists, clinical psychologists, occupational therapists and social workers
- allied health practitioner services for people with complex conditions who are being managed by a medical practitioner under an Enhanced Primary Care multidisciplinary care plan.

Benefits paid

In 2008–09, a total of $5,670 million was paid in Medicare benefits for non-specialist services, accounting for 40% of total Medicare benefits paid. The vast majority of these were paid for the 113 million *Non-referred medical attendances* (82% of non-specialist benefits or $4,624 million). A further $281.5 million (5%) was paid for 6.1 million *Optometry* items and $702.4 million (12%) for 6.9 million *Other allied health* items (Table 7.3). Between 2006–07 and 2008–09 the number of services processed for GP and other non-specialist services increased, in particular for *Other allied health* items, reflecting the introduction of new mental health items noted in Box 7.6.

Table 7.3: Medicare services processed for GP and other non-specialist services, 2006–07 to 2008–09

	Services per person				Items in 2008–09		
	Number						
Broad type of service	**2006 –07**	**2007 –08**	**2008 –09**	**Average annual change (%)**	**Number ('000)**	**Benefits paid ($ million)**	**Proportion of total benefits (%)**
Non-referred medical attendances[(a)]	4.9	5.2	5.2	3.0	113,045	4,623.9	81.6
Optometry	0.3	0.3	0.3	4.4	6,138	281.5	5.0
Other allied health	0.1	0.2	0.3	108.1	6,934	702.4	12.4
Practice nurse	0.2	0.2	0.3	20.4	5,468	62.0	1.1
Total non-specialist items[(b)]	5.5	5.9	6.1	5.8	131,585	5,669.8	100.0

(a) Includes GP attendances, emergency attendances, attendances after hours, other prolonged attendances, group therapy and acupuncture.

(b) Excludes dental services covered by Medicare.

Source: Medicare Australia 2009.

General practice activity

An insight into GP clinical activity and practice patterns since 1998 can be derived from data from the BEACH study, a continuous survey of general practice activity in Australia (see Box 7.7). The following pages provide an overview of results from the eleventh year of the BEACH study, and describes some changes in practice patterns from 1998–99 to 2008–09. This section also includes some data relating to the Medicare Benefits Schedule (MBS) and data from the Department of Health and Ageing data on general practice services for particular population groups and for specific health problems. For each BEACH year of reporting, data are based on the 12-month period April to March.

Box 7.7: The BEACH study of general practice activity

The Bettering the Evaluation and Care of Health (BEACH) study is run by the Australian General Practice Statistics and Classification Centre (a collaborating unit of the Australian Institute of Health and Welfare) and the Family Medicine Research Centre, University of Sydney. BEACH began in April 1998 and each year about 1,000 general practitioners (GPs) participate from a random sample of GPs who claimed at least 375 general practice Medicare items of service in the previous 3 months. These GPs provide details of about 100,000 GP–patient encounters, which represent more than 100 million such encounters across the country each year. No information identifying patients is collected.

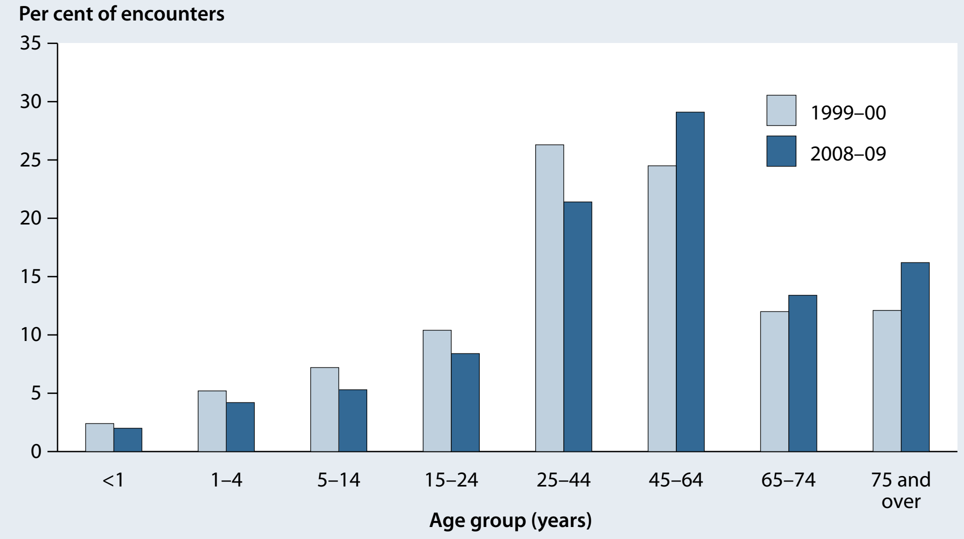
The figure of 375 general practice Medicare items of service in 3 months ensures that most part-time GPs are included in the study, while excluding those who are not in private practice but may claim for a few consultations a year. Each participating GP completes details for 100 consecutive patient encounters on structured paper encounter forms and provides information about themselves and their practice. Questions about selected patient health risk factors and health conditions are asked of subsamples of patients.

From April 2008 to March 2009 inclusive, 1,011 GPs provided details for 101,100 patient encounters. After statistically adjusting for the fact that young GPs were under-represented, there were 96,688 encounters on which the following 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.

Who accounts for most encounters with general practitioners?

In 2008–09, patients aged 45 years and over accounted for the majority (59%) of GP encounters—patients aged less than 25 years accounted for 20% of encounters, 25–44 years for 21%, 45–64 years for 29% and patients aged 65 years and over for 30%. The age profile of patients seen at encounters with GPs is changing. In the ten years between 1999–00 and 2008–09, there was an increase in the proportion of encounters with patients aged 45–64 years (from 24.5% to 29.1% of total encounters recorded) and 75 years and over (12.1% to 16.2%). There was a corresponding decrease in the proportion of younger patients. Specifically, encounters with patients aged under 1 year fell (from 2.4% to 2.0% of all encounters), as did those with patients aged 1–4 years (5.2% to 4.2%) and 5–14 years (7.2% to 5.3%). There was also a statistically significant decrease in the proportion of patients aged 25–44 years (from 26.3% to 21.4%) (Figure 7.6). Females accounted for 57.5% of all GP encounters in 2008–09.



Source: Britt & Miller 2009.

Figure 7.6: Age distribution of patients at GP encounters, 1999–00 and 2008–09

Why do people see a general practitioner?

For every 100 GP–patient encounters, patients presented with an average of 157 reasons for their encounters. These are the patients' reasons for seeing the doctor, as stated or implied by the patient to the GP.

A request for a partial or full check-up was the most common reason for encounter (15.2 per 100 encounters), followed by the need for medication or repeat prescriptions (12.6 per 100) and attendance to receive test results (7.8 per 100). The fifth most common reason was a need for immunisation or vaccination (Table 7.4). Frequent symptoms included cough, throat complaints, back complaints, rash, fever and abdominal pain.

Since 1998, the frequency of patient presentations to GPs to get test results has doubled, and requests for prescriptions have risen 40%. Patient reasons for encounters associated with symptoms such as abdominal pain, headache and ear pain fell by 20–27% over these years.

Table 7.4: GP consultations: 20 most frequent patient reasons for encounter, 2008–09

Patient reason for encounter	Per cent of total reasons	Per 100 encounters
Check-up	9.7	15.2
Prescription	8.0	12.6
Test results	5.0	7.8
Cough	4.3	6.8
Immunisation and vaccination	3.4	5.3
Throat complaint	2.0	3.2
Back complaint	2.0	3.1
Rash	1.7	2.6
Upper respiratory tract infection	1.5	2.3
Hypertension and high blood pressure	1.4	2.1
Administrative procedure, not otherwise stated	1.3	2.1
Depression	1.3	2.1
Fever	1.2	1.9
Abdominal pain	1.1	1.7
Headache	1.0	1.6
Skin complaint	0.9	1.5
Weakness or tiredness	0.9	1.5
Ear pain	0.9	1.4
Shoulder complaint	0.9	1.4
Knee complaint	0.8	1.3

Source: Britt et al. 2009.

What problems do general practitioners manage?

GPs report the problems managed at each encounter. Sometimes the problems are described in terms such as 'check-up', or in terms of a symptom or complaint if they remain undiagnosed at the end of the consultation. GPs managed an average 1.5 problems at each patient encounter in 2008–09. The number of problems managed increased with age, from 119 problems per 100 encounters among babies (under 1 year) to 176 with the elderly (75 years and older).

In 2008–09, problems related to the respiratory system, the cardiovascular system, the musculoskeletal system and the skin together accounted for about 50% of all problems managed. The 20 problems most frequently managed accounted for 44% of all problems managed. The most common problem was hypertension (high blood pressure) followed by check-up, upper respiratory tract infection, immunisation/vaccination, depression, diabetes, lipid disorders (high cholesterol) and arthritis (Table 7.5).

Over one-third of the problems managed were chronic in nature. At least one chronic problem was managed at 42% of all encounters and chronic problems were managed at an average rate of 55 per 100 encounters.

The chronic problems managed most often by GPs were hypertension, depressive disorder, diabetes, lipid (cholesterol-related) disorders, chronic arthritis, oesophageal disease and asthma. Together these seven accounted for more than half of chronic problems managed. However, they accounted for only 20% of the total problems managed.

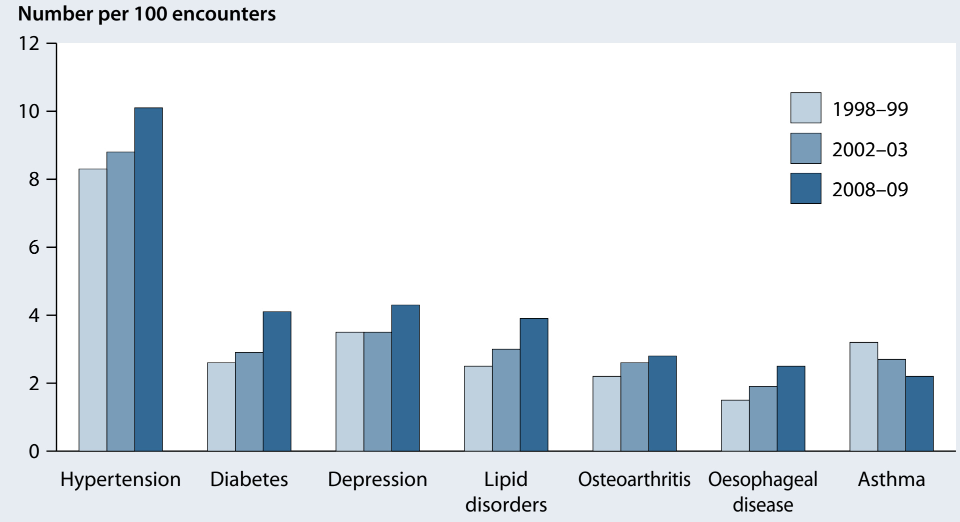
Table 7.5: GP consultations: 20 problems most often managed, 2008–09

Problem managed	Per cent of total problems	Per 100 encounters
Hypertension	6.5	10.1
Check-up	4.3	6.7
Upper respiratory tract infection	4.0	6.1
Immunisation and vaccination	3.7	5.7
Depression	2.8	4.3
Diabetes	2.6	4.1
Lipid disorders	2.5	3.9
Arthritis	2.5	3.8
Back complaint	1.8	2.7
Acute bronchitis and bronchiolitis	1.7	2.6
Oesophageal disease	1.6	2.5
Asthma	1.4	2.2
Prescription	1.4	2.1
Anxiety	1.2	1.9
Contact dermatitis	1.2	1.9
Urinary tract infection	1.1	1.7
Sleep disturbance	1.0	1.6
Test results	1.0	1.5
Sprain and strain	0.9	1.4
Gastroenteritis	0.9	1.4

Source: Britt et al. 2009.

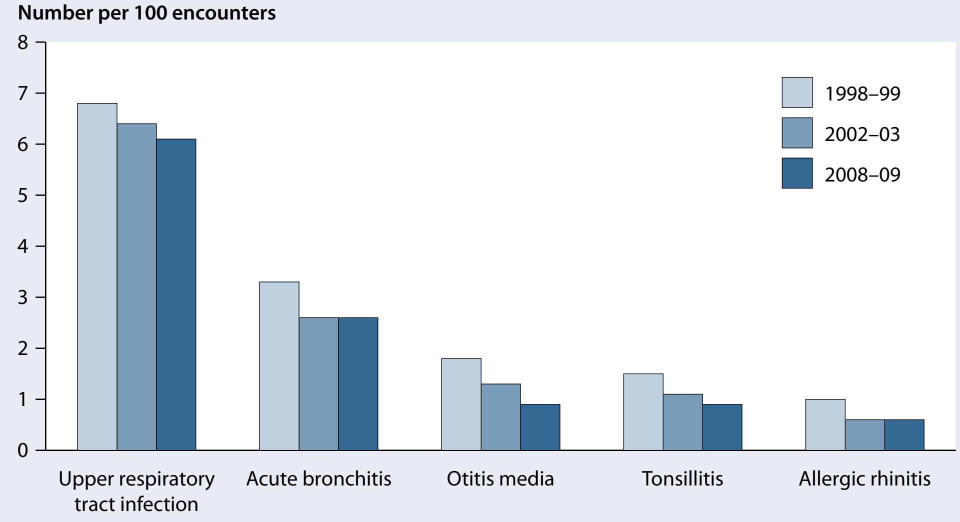
Between 1998–99 and 2008–09, there were statistically significant increases in the management rate of certain chronic problems including: hypertension, diabetes, depression, lipid disorders and oesophageal disease; and there was a marginal increase in the management rate of osteoarthritis (Figure 7.7). Over the same period there was a statistically significant decrease in the management rate of asthma.

Some acute problems are being managed less often than they were previously, including upper respiratory tract infections, acute bronchitis, otitis media, tonsillitis and allergic rhinitis (Figure 7.8).



Source: Britt & Miller 2009.

Figure 7.7: Changes in GP management rate of selected individual problems



Source: Britt & Miller 2009.

Figure 7.8: Changes in GP management rate of selected acute problems

How do general practitioners manage problems?

GPs have a variety of techniques to manage patients' health problems. One is the provision of medications, either by prescription, by recommendation for over-the-counter purchase, or by direct supply of some vaccines and product samples. Other techniques are to carry out or order tests and investigations, undertake procedures, refer the patient to other services, and provide advice and counselling. At the 96,688 encounters recorded in the 2008–09 BEACH sample, GPs undertook 219,525 management activities in total—227 per 100 encounters and 147 per 100 problems managed. For 14% of problems managed, no specific management actions were recorded.

The most common form of management was provision of medications (prescribed, GP-supplied, or advised). For an 'average' 100 GP–patient encounters, GPs provided 86 prescriptions, carried out 34 clinical treatments, undertook 17 procedures, made 9 referrals to specialists and 4 to allied health services, and placed 46 pathology test orders and 10 imaging test orders (Table 7.6).

Table 7.6: GP consultations: management activities, 2008–09

Management type	Number per 100 encounters	Number per 100 problems
Medications	106.3	68.7
Prescribed	86.4	55.9
GP-supplied	11.0	7.1
Advised for over-the-counter purchase	8.9	5.7
Other treatments	50.7	32.8
Clinical (advice or counselling)	34.0	22.0
Procedures	16.7	10.8
Referrals	13.7	8.9
Specialist	9.0	5.8
Allied health	3.9	2.5
Hospital	0.3	0.2
Emergency department	0.2	0.1
Other medical services	0.1	0.0
Other referral	0.3	0.2
Pathology	45.6	29.5
Imaging	9.8	6.3
Other investigations	1.0	0.6
Total management activities	**227.1**	**146.8**

Source: Britt et al. 2009.

There were 106 medications recorded per 100 encounters, or 69 per 100 problems managed. The great majority of these (81.3%) were prescribed. Medications were prescribed at a rate of 86 per 100 encounters or 56 per 100 problems managed. At least one medication was prescribed for 45% of problems managed.

Over the latest eleven years there was a statistically significant decrease in the rate of prescribed medications, from 94 per 100 encounters in 1998–99 to 86 per 100 in 2008–09.

The use of advice or counselling in managing problems increased from 31 per 100 encounters in 1998–99 to 39 per 100 in 2004–05 but then declined to 29 per 100 in 2005–06. It increased again to 34.0 per 100 in 2008–09. The reasons for the fluctuations in these rates are unclear but may be related to the changing role of practice nurses in general practice.

GPs are undertaking more procedures, with numbers increasing from 12 per 100 encounters in 1998–99 to 17 in 2008–09. They are also referring their patients more often (from 11 per 100 encounters in 1998–99 to 14 in 2008–09). There have been statistically significant increases in referrals to specialists (from 7 to 9 per 100 encounters), and to allied health professionals (from 3 to 4 per 100 encounters).

Since 2000–01, the rate of pathology test ordering has increased by over 50%, from 30 test orders per 100 encounters to 46 in 2007–08. There was also a smaller but statistically significant increase in the rate of imaging tests ordered, from 8 per 100 encounters in 2000–01 to 10 in 2008–09.

In 1999–2000, Medicare Enhanced Primary Care items were introduced for GPs as incentives to use more health assessments, care plans and case conferencing, provide more preventive care, and improve coordination of care for older patients and those with chronic conditions and complex care needs. Health assessments were not commonly recorded by GPs during 2008–09, comprising only 0.3% of all Medicare items recorded at BEACH encounters.

Use of antibiotics to treat upper respiratory tract infections

This section presents information on the management of upper respiratory tract infections (URTIs) by GPs. In 2008–09, URTI was the third most frequently managed problem in Australian general practice, managed 6.1 times per 100 encounters (compared with 7.2 per 100 encounters for 1999–2000) (Britt & Miller (eds) 2009).

URTI was the second most common problem for which antibiotics were prescribed or supplied in 2007–08 (14.4% of such problems), followed by acute bronchitis/bronchiolitis (14.5%) (unpublished BEACH data). However, URTIs without complications are most often caused by viruses, and the use of antibiotics is not recommended as they are ineffective in treating viral infections. Overuse of antibiotics increases antibiotic resistance in the general population, so a decline in their prescribing rate for URTI may be an indication of more appropriate management of viral infections.

The rate in prescription or supply of antibiotics for URTI declined from 38.7 per 100 URTI problems in 2000–01 to 34.6 per 100 in 2006–07, but increased in 2008–09 to 39.1.

Antibiotics prescribed for URTIs broadly fall into four categories: cephalosporins, narrow spectrum antibiotics (penicillin), broad spectrum antibiotics and ‘other’ (includes tetracyclines and macrolides). The increase in the rate between 2006–07 and 2008–09 reflected small, but not statistically significant, increases in each of the groups except the narrow spectrum penicillins.

How are general practitioners’ services funded?

Most GP services are funded through Medicare. Small proportions are funded by the Department of Veterans’ Affairs (DVA), and by additional fees to the patient (out-of-pocket), by workers’ compensation, employers, states and territories (hospitals or other state agencies), the Australian Defence Force, and privately by individuals who do not qualify for Medicare, such as visitors from overseas. A small proportion of GP services are also delivered without charge.

For 96,688 GP–patient encounters in 2008–09, Table 7.7 shows the breakdown of encounter type (by payment source), counting a single Medicare item number per GP–patient encounter. Direct encounters (where the patient was seen by the GP) accounted for 98.6% of all encounters, with about 95% of all direct encounters claimable either through Medicare or the DVA. Direct encounters where the GP indicated that no charge was made accounted for 0.5% of encounters and indirect encounters (where the patient was not seen by the GP) accounted for 1.4%. Encounters payable through workers' compensation accounted for 2.2% of all encounters.

Table 7.7: BEACH GP encounter type by payment source, 2008–09

Type of encounter	Number	Per cent of all encounters
Direct encounters	89,185	98.6
Medicare/DVA items of service	86,118	95.2
Workers' compensation	1,950	2.2
Other paid (hospital, state, etc.)	707	0.8
No charge	424	0.5
Indirect encounters	1,303	1.4
Practice nurse only items (indirect encounters)	9	0.0
Other indirect encounters	1,294	1.3
Practice nurse only items (unspecified)	3	0.0

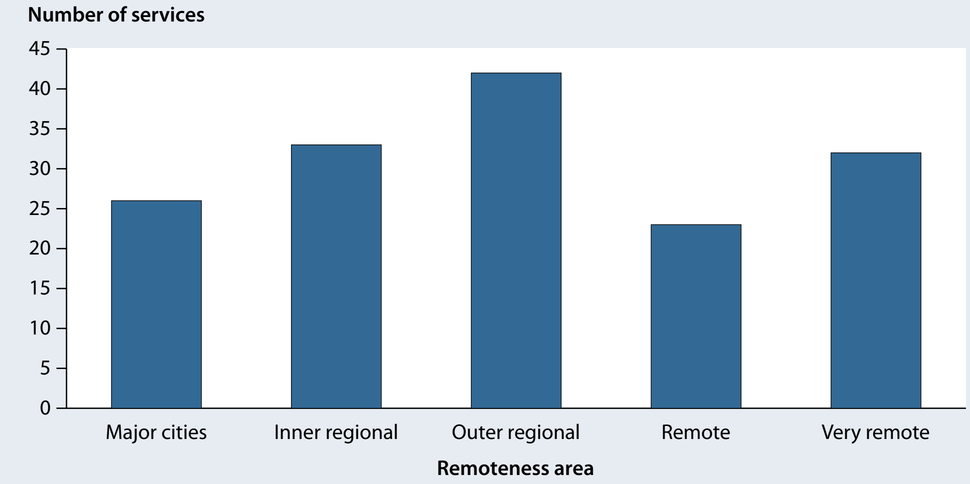
Note: Does not include 6,197 encounters for which payment source was not specified.

Source: Britt et al. 2009.

Primary health-care services for Aboriginal and Torres Strait Islander people

While Aboriginal and Torres Strait Islander people can access a wide range of primary care services, mainstream services such as hospitals and general practices are not always accessible to, or the most appropriate provider for, Indigenous Australians. In fact, *Australia's health 2008* concluded that Indigenous Australians tend to use mainstream services differently from the rest of the Australian population (AIHW 2008). Because of this, and the relatively poor health status of Aboriginal and Torres Strait Islander people generally, the Australian Government and state and territory governments provide funds for specific health-care services to meet their needs.

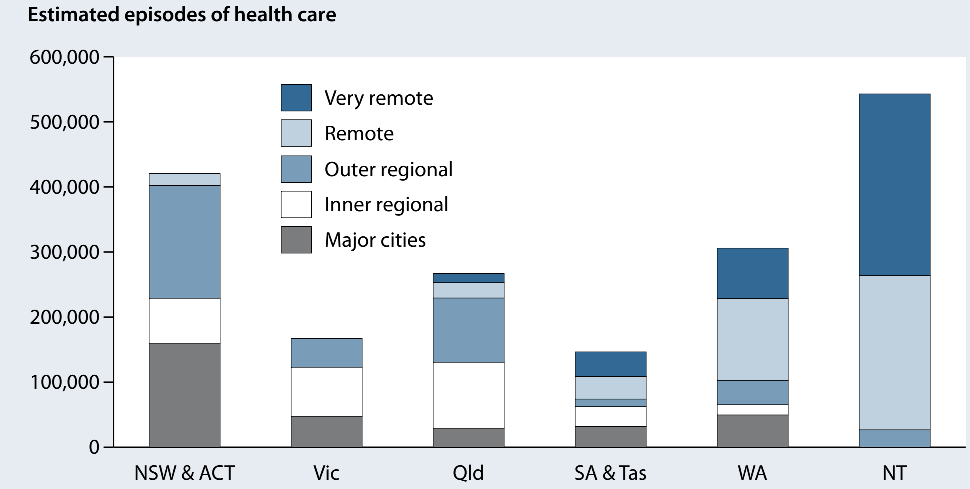
The state and territory governments provide funding primarily through hospitals, community clinics and Aboriginal Community Controlled Health Services. The Australian Government, through the Office for Aboriginal and Torres Strait Islander Health, provides funding for a range of Indigenous-specific primary health-care and substance misuse services, which are largely delivered in community-based settings. In 2007–08, the Office for Aboriginal and Torres Strait Islander Health funded 156 organisations to provide or facilitate access to primary health care for Aboriginal and Torres Strait Islander people. Overall, 55 of these organisations (35%) were in remote or very remote locations (Figure 7.9).



Source: Department of Health and Ageing, Service Activity Reporting, unpublished data.

Figure 7.9: Geographical distribution of Australian Government-funded Aboriginal Community Controlled Health Organisations, 2007–08

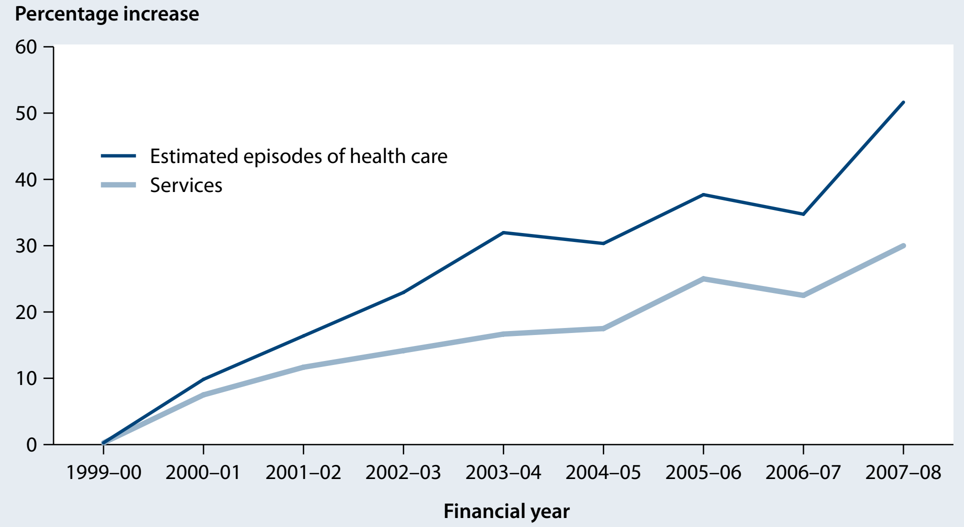
In 2007–08, about 87% of the estimated episodes of health care in 2007–08 were provided to Aboriginal and Torres Strait Islander clients through these Australian Government-funded services. The number of episodes of health care provided across each state and territory varies considerably by remoteness area. In 2007–08, the majority of episodes of health care reported for Western Australia and the Northern Territory were provided in Remote and very remote areas, while for other jurisdictions the majority of episodes of health care were provided in major cities, inner regional and outer regional areas (Figure 7.10). This reflects the geographical distribution of the Indigenous population in these jurisdictions.



Source: Department of Health and Ageing, Service Activity Reporting, unpublished data.

Figure 7.10: Australian Government-funded Aboriginal Community Controlled Health Organisations, by geographical region, 2007–08

There has been a steady rise in the number of Aboriginal and Torres Strait Islander primary health-care services that have been set up, and in the total estimated episodes of health care they have provided in recent years. Over the period 1999–00 to 2007–08, there has been a 30% rise in the number of services (from 120 to 156) and a 52% rise in the total estimated episodes of health care provided to Indigenous and non-Indigenous clients (from 1.2 million to 1.9 million) (Figure 7.11).



Note: Includes data from all services which reported in any year over the given period 1999–00 to 2007–08.

Source: Department of Health and Ageing, Service Activity Reporting unpublished data.

Figure 7.11: Australian Government-funded Community Controlled Health Organisations, 1999–00 to 2007–08: percentage increases since 1999–00

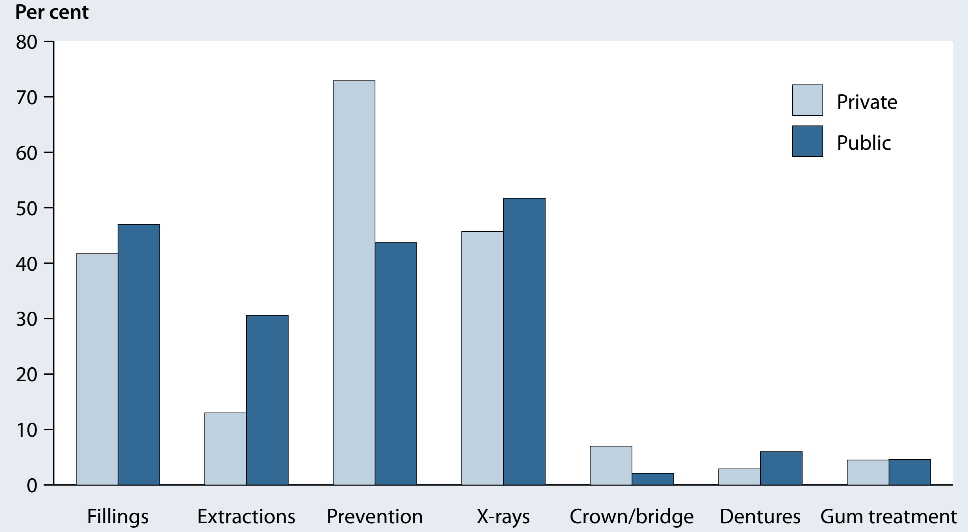
Dental services

Most dental care in Australia is provided in the private sector. In the 2004–06 National Survey of Adult Oral Health, only 13.5% of respondents were public dental patients. Those who attend for public dental care are generally health care card holders and socioeconomically disadvantaged.

The Survey of Adult Oral Health provided information on dental services received by 14,123 Australians aged 15 years and over (Slade et al. 2007). Respondents supplied information on their dental treatment in the categories of fillings, extractions, oral prophylaxis (preventive treatment), X-rays, crowns and bridges dentures and gum treatment within the last year, as well as whether they received private or public dental care (Brennan et al. 2008).

The survey showed marked differences in the treatments received by private and public patients. Private patients received more preventive treatment than public patients (72.9% compared with 43.7%) and crown and bridge services (7.0% compared with 2.1%) (Figure 7.12). Overall, public dental patients received more fillings, extractions and X-rays than private patients.

The different patterns of service between public and private dental patients may partly reflect resource constraints in the public sector, and the higher rates of extractions may reflect a greater reliance on emergency, rather than preventive, care.



Note: Dentate persons (that is, those with teeth) aged 15 years or over who made a dental visit within the last year.

Source: National Survey of Adult Oral Health 2004–06.

Figure 7.12: Percentage of people receiving services by service type and place of dental visit, 2004–06

Other health professionals

In addition to medical practitioners and dentists, many other professionals provide a range of health services. This section provides an overview of consultations with a number of these health professionals, including pharmacists, nurses, allied health workers, complementary therapists and other workers (ABS 2006). Results from the 2007–08 National Health Survey showed that 46% of Australians consulted one of these other health professionals in the 12 months before the survey interview (Table 7.8). Females were more likely to do this (51%) than males (42%), and the most common health professionals consulted were opticians or optometrists, chemists, and physiotherapists or hydrotherapists. Not surprisingly, people aged 65 years or over were more likely to consult a health professional (51%) than people aged 15–24 years (39%). Consultations with medical imaging workers are not included in this analysis.

Table 7.8: Persons consulting other health professionals, 2007–08[(a)] (per cent)

	Age group (years)				Total		
Selected health professional	**15–24**	**25–44**	**45–64**	**65 and over**	**Males**	**Females**	**Persons**
Accredited counsellor	1.1	2.6	1.5	0.6	1.4	2.3	1.9
Acupuncturist	*1.3	3.3	3.2	1.9	2.0	3.3	2.7
Chemist (for advice only)	7.8	15.2	11.9	11.0	9.8	16.2	13.0
Chiropodist or podiatrist	2.5	2.7	4.8	14.0	3.1	7.0	5.1
Chiropractor	7.2	11.1	9.7	4.9	8.9	9.1	9.0
Dietitian or nutritionist	3.2	3.9	4.7	6.3	4.0	4.4	4.2
Naturopath	2.1	4.7	3.8	1.6	1.9	5.1	3.5
Nurse	2.6	3.6	2.6	4.9	3.2	3.8	3.5
Occupational therapist	**	0.7	1.1	1.3	1.0	0.9	1.0
Optician or optometrist	10.2	10.7	17.3	26.6	12.8	16.8	14.8
Osteopath	1.1	2.3	2.0	*1.5	1.6	2.2	1.9
Physiotherapist or hydrotherapist	7.3	10.0	9.6	9.2	9.2	10.0	9.6
Psychologist	2.0	4.4	2.6	0.9	2.6	3.5	3.0
Social worker or welfare worker	0.9	1.6	1.1	2.4	1.2	2.0	1.6
Other	2.9	3.5	3.0	3.7	3.1	3.4	3.3
Total[(b)]	**38.9**	**47.4**	**46.3**	**51.2**	**41.7**	**50.5**	**46.2**

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

** Figure omitted as relative standard error greater than 50%.

(a) Consultations in the 12 months before the interview. Excludes consultations in/at hospitals or day clinics.

(b) Totals will not necessarily be the sum of rows, as some persons reported consultations with more than one type of professional.

Source: ABS National Health Survey 2007–08.

Several of the health professionals listed in Table 7.8 are eligible to participate in the Medicare Allied Health Initiative. Under this initiative, Medicare benefits are paid for up to five services to eligible patients managed by a GP under an Enhanced Primary Care plan. For example, in 2008–09, about 89,800 chiropractic and 45,500 osteopathic services were provided under these arrangements, with total Medicare benefits of around $4.3 million and $2.2 million, respectively (Medicare Australia 2009).

Most private health ancillary (or ‘extras’) insurance organisations offer rebates for allied and complementary health services that their members receive. In the quarter ending September 2009, 2.2 million benefits were paid for physiotherapy, 2.2 million for chiropractic services, 1.8 million for optical services, 693,000 for natural therapy services, 557,000 for chiropodist and podiatrist services, 412,000 for acupuncture and acupressure services, and 62,000 for psychologist and group therapy services (PHIAC 2009). For data on the number of benefits paid for other health professional services, see PHIAC 2009.

Community health services

Government-funded community health services in each state and territory provide a diverse range of services not described elsewhere in this chapter. They are either provided directly by governments (including local governments) or funded by governments and managed by local health services or community organisations (SCRGSP 2010). Community health services are delivered in a variety of settings, including purpose-built community health centres, local council buildings, schools and clients’ homes.

Statistical information on these services is not as highly developed as for other services (such as hospitals) and there is no nationally agreed basis for describing their nature or for measuring the number of services provided. Therefore, a comprehensive national picture of community health services is not available. However, some information on the nature of the services follows (SCRGSP 2010).

In 2009–10, the Australian Government funded community health services that included:

- the Rural Primary Health Services program, which was implemented on 1 January 2010 and is a consolidation of four primary and allied health programs. The program funds a range of primary and allied health-care services and activities for rural and remote communities
- a discrete preventive health component of the Rural Primary Health Services program, which provides services to remote and very remote communities.

States and territories provide a variety of community health services, including:

- maternal and child community 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
- women's health services that provide services and health promotion programs for females across a range of health-related areas
- men's health programs, including mainly promotional and educational programs
- community rehabilitation programs, including case management, prosthetic services and equipment schemes, and home modification.

Ambulance services

Ambulance services are provided directly by state and territory governments, except in Western Australia and the Northern Territory, which contract St John Ambulance Australia to provide the services.

The role of ambulance services generally includes providing emergency pre-hospital patient care and transport in response to sudden illness and injury, retrieving emergency patients, transporting patients between hospitals, conducting road accident rescues and coordinating patient services in multicasualty 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 2008–09, ambulance service organisations attended 2.9 million incidents nationally (excluding Northern Territory), of which most were emergency incidents (39%), followed by non-emergency incidents (35%), and urgent incidents (26%) (SCRGSP 2010).

The numbers of incidents, responses and patients are interrelated: multiple responses/vehicles may be sent to a single incident, and there may be more than one patient per incident. There may also be responses to incidents that do not involve patients because no one at the scene requires treatment. For every 100,000 Australians in 2008–09, there were about 15,800 responses and 12,600 patients.

Royal Flying Doctor Service

The Royal Flying Doctor Service (RFDS) uses aircraft and other transport, as well as communication technology, to improve the health and wellbeing of regional and remote Australians. It provides primary and community health-care clinics at remote sites (for routine health checks and advice, immunisation, child health care, and dental, eye and ear care), telehealth consultations by radio, telephone or video conference, pharmaceutical supplies at remote sites and emergency air transport services (both to and between hospitals).

During the past decade there has been a steady increase in the services that the RFDS provides (Table 7.9). In 2008–09, there were 274,200 patient contacts with the RFDS. The service conducted 14,000 health-care clinics, 85,000 telehealth services and nearly 37,000 aerial medical evacuations.

Table 7.9: Services provided by the Royal Flying Doctor Service, 1998–2008 (selected years)

	1998–99	1999–00	2001–02	2003–04	2005–06	2008–09
Patient contacts	181,621	183,587	196,996	210,423	237,143	274,237
Aerial medical evacuations	21,604	22,191	25,977	31,231	34,203	36,832
Number of aircraft	40	45	40	45	50	53
Distance flown (million km)	13.3	14.6	16.6	19.5	20.4	23.9
RFDS bases	19	20	22	23	22	21

Sources: RFDS 2009; previous editions of RFDS annual report.

7.3 Hospitals

Hospitals accounted for more than one-third of recurrent health expenditure ($39 billion) in Australia in 2007–08 (AIHW 2009c). The hospital sector comprises more than 1,310 public and private hospitals around Australia. The public hospital system employs the equivalent of more than 240,000 full–time staff, with about 45% of these being nurses and 10% being doctors.

Most hospital resources are consumed in providing care to admitted patients (inpatients). However, hospitals also provide high numbers of non-admitted services, such as those provided by emergency departments and outpatient clinics (Box 7.8). On a typical day in 2007–08, almost 22,000 people were admitted to Australian hospitals, and about 134,000 non-admitted services were provided.

The National Health Performance Framework includes six areas in which to assess how well the health system is performing. For several of these areas there are indicators that relate to the performance of the acute care or hospital component of the health system. They include:

- the cost per casemix-adjusted separation, as an indicator of sustainability and efficiency
- average length of stay per separation, as an indicator of sustainability and efficiency
- waiting times for elective surgery, as an indicator of access
- emergency department waiting times, as an indicator of access
- hospital separations (see Box 7.8) with an adverse event, as an indicator of safety
- falls resulting in patient harm in hospitals (as an indicator of safety).

This section contains data on all of these indicators except hospital separations with an adverse event (Section 7.6) and falls resulting in patient harm in hospitals (see Chapter 9).

Box 7.8: Terms and data sources relating to the use of hospitals

Admitted patients

An 'admitted patient' is a patient who undergoes a hospital's formal admission process. Statistics on admitted patients are compiled when patients complete an 'episode of care' and are therefore considered to have 'separated' from that episode. 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 be a total hospital stay (from admission to discharge, transfer or death), or a portion of a hospital stay beginning or ending in a change of type of care (such as from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care by being discharged, dying, transferring to another hospital or changing their type of care.

For each separation, patients are assigned a principal diagnosis, which describes the chief reason for the patient's episode of care. The principal diagnosis recorded for each separation 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, and therapeutic or diagnostic. In 2007–08, diagnoses and procedures were reported using the fifth edition of the ICD-10-AM/ACHI classification (see Box 7.9). 'Casemix' is the range and type of patients (the mix of cases) treated by a hospital or other health service.

National Hospital Morbidity Database

The state and territory health authorities compile information on patients admitted to hospitals and supply it to the AIWH for collation into the National Hospital Morbidity Database. This database is an electronic record for each separation 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 separations and, for most years, about 95% of private hospital separations.

As indicators of ill health in the population, hospital separations data have limitations. First, people who are attended to by the hospital but not admitted are not counted in the separations data. Also, the counting unit is the episode of care (the separation), 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, hospital separations data are also affected by variations in admission practices, and in the availability of, and access to, hospital and non-hospital services.

(continued)

Box 7.8 (continued): Terms and data sources relating to the use of hospitals

Non-admitted patients

Hospitals provide services to many patients without admitting them (although in the case of emergency department care, many patients may go on to be admitted). These patients receive care through emergency departments, outpatient clinics and a range of other specialised services. Summary information on these services is collated nationally for public hospitals by the AIHW and for private hospitals by the Australian Bureau of Statistics.

An 'occasion of service' for a non-admitted patient is defined as any examination, consultation, treatment or other service provided to a patient in each functional unit of a health service establishment, each time the service is provided. National data are categorised into broad clinic- or service-based groupings.

Definitions used for non-admitted patient hospital care are not completely uniform among the states and territories, and have varied over time. Existing national systems for counting and classifying this care are being revised with the aim of improving consistency and comparability.

Hospitals and bed numbers

Nationally, the number of public acute care hospitals increased from 738 in 1997–98 to 742 in 2007–08. Over the same period, the number of private hospitals, other than free-standing day hospital facilities, decreased from 317 to 280 (Table 7.10). The number of private free-standing day hospital facilities reporting admitted patient data, however, increased from 175 in 1997–98 to 272 in 2007–08. These facilities provide investigation and treatment services for admitted patients on a day-only basis.

The number of public psychiatric hospitals has remained relatively stable in recent years, with a small decline from 22 in 1997–98 to 20 in 2007–08. These hospitals mainly treat and care for admitted patients with psychiatric, mental or behavioural disorders. Their role declined in the early to mid-1990s because of reforms under the National Mental Health Strategy that led to more services being provided in acute care hospitals and community settings.

Bed numbers

The concept of an available bed has become less important in recent years due to increasing same-day hospitalisations and the provision of 'hospital in the home' care. Bed numbers in hospitals can also be affected by the range and types (casemix) of patients admitted to those hospitals.

In 2007–08, there were 84,235 available beds in Australia, with 56,467 (67% of the total) beds in public acute and public psychiatric hospitals (Table 7.10). Between 1997–98 and 2007–08, there was a an overall 5.2% increase in available beds across the public and private sectors, but this amounted to a 7.9% reduction in available beds per 1,000 population. The latter change was not evenly distributed across the two sectors, with private sector beds per 1,000 population remaining stable during this period and the public sector rate decreasing by around 11%.

Table 7.10: Hospitals and available beds, 1997–98 to 2007–08 (selected years)

	1997–98	1999–00	2001–02	2003–04	2005–06	2007–08
Hospitals						
Public acute	738	726	724	741	736	742
Public psychiatric	22	22	22	20	19	20
Total public	*760*	*748*	*746*	*761*	*755*	*762*
Private free-standing day hospital facilities	175	190	246	234	256	272
Private other[(a)]	317	312	314	291	291	280
Total private	*492*	*502*	*560*	*525*	*547*	*552*
Total public and private	**1,252**	**1,250**	**1,306**	**1,286**	**1,302**	**1,314**
Available beds[(b)]						
Public acute	52,801	50,188	49,004	51,038	52,236	54,137
Public psychiatric	2,935	2,759	2,457	2,560	2,366	2,330
Total public	*55,736*	*52,947*	*51,461*	*53,599*	*54,601*	*56,467*
Private free-standing day hospital facilities	1,348	1,581	1,851	1,947	2,114	2,151
Private other[(a)]	23,019	23,665	25,556	24,642	24,113	25,617
Total private	*24,367*	*25,246*	*27,407*	*26,589*	*26,227*	*27,768*
Total public and private	**80,103**	**78,193**	**78,868**	**80,188**	**80,828**	**84,235**
Available beds per 1,000 population[(b)]						
Public acute	2.8	2.6	2.5	2.6	2.5	2.5
Public psychiatric	0.2	0.1	0.1	0.1	0.1	0.1
Total public	*3.0*	*2.8*	*2.6*	*2.7*	*2.7*	*2.7*
Private free-standing day hospital facilities	0.1	0.1	0.1	0.1	0.1	0.1
Private other[(a)]	1.2	1.2	1.3	1.2	1.2	1.2
Total private	*1.3*	*1.3*	*1.4*	*1.3*	*1.3*	*1.3*
Total	**4.3**	**4.1**	**4.0**	**4.0**	**3.9**	**4.0**

(a) Includes private acute and private psychiatric hospitals.

(b) Average available beds through the course of the year where possible, otherwise available beds at 30 June.

Sources: AIHW 2009c and earlier editions of *Australian hospital statistics.*

Admitted patient care

In 2007–08, there were 7.9 million separations in Australian hospitals, of which 4.7 million (60%) were in public hospitals and 3.1 million (40%) were in private hospitals. Over the past decade, hospitals have become increasingly busy, even allowing for increases in the population, and this has especially been the case for private hospitals.

Between 1998–99 and 2007–08, the number of separations increased overall by 37.3%—by 23.1% in public acute hospitals and by 66.9% in private hospitals. Separation rates (which adjust for increases in the population) increased by 5.2% for public acute hospitals and by 39.6% for private hospitals.

Between 1998–99 and 2007–08, the number of patient days in public acute hospitals increased by 13.5% and in private hospitals by 29.1%. Over the same period, patient days per 1,000 population decreased by 5.8% for public acute hospitals and increased by 5.4% for private hospitals.

Length of stay in hospital

Although some categories of patients (such as those requiring rehabilitation, some specialised mental health services or palliative care) can have relatively long stays in hospital, most patients are admitted for acute care services and require a relatively short stay. There is an increasing trend towards day surgery, with one reason being improvements in medical technology such as keyhole surgery. Improved drug treatments and efforts to increase hospital productivity have also tended to result in shorter lengths of stay. Some treatments that have previously been undertaken during short-stay admissions are not included in these data because they are now being delivered without the person being formally admitted to the hospital.

In 2007–08, over 4.4 million separations were for same-day care: 2.4 million from public acute hospitals, around 1,800 from public psychiatric hospitals and 2.1 million from private hospitals. The proportion of separations that are same-day increased from 47.9% of separations in 1998–99 to 56.2% in 2007–08 (AIHW 2009c).

With public psychiatric hospitals excluded, the average length of stay was 3.2 days in 2007–08 (3.6 days in public acute hospitals and 2.5 in private hospitals). Excluding same-day separations, however, the average length of stay was 6.2 days in public acute hospitals and 5.4 in private hospitals.

The difference in average length of stay between public and private hospitals at least partly reflects the different casemixes in the two hospital sectors. For example, there were differences in the socioeconomic status of the patients' residential areas, in the proportion of separations for which procedures were reported, and in the average number of procedures reported per separation.

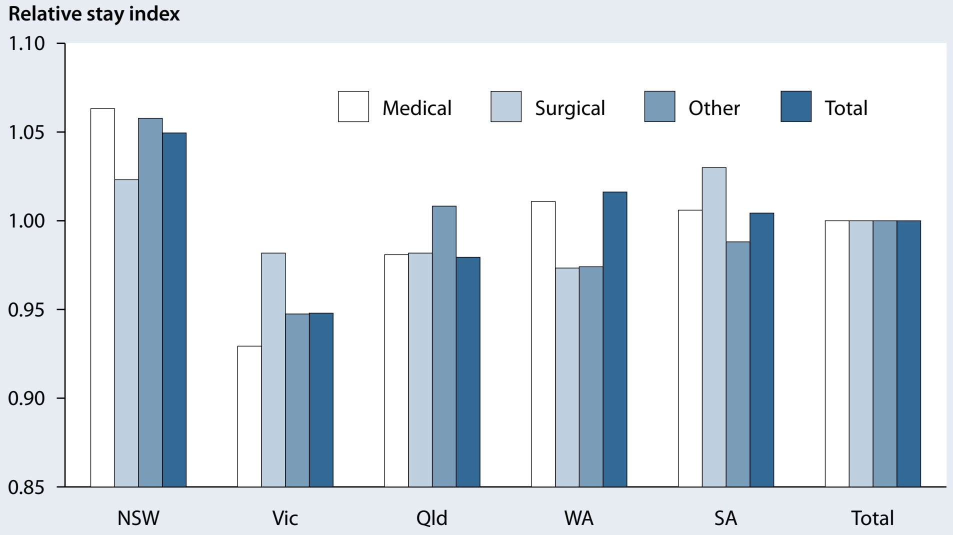
The average length of stay for all hospitals declined from 3.4 days in 2003–04 to 3.3 in 2007–08. This partly reflects the steady upward trend in the proportion of separations that were day-only. If those same-day separations are excluded, the average length of stay still fell over the period, from 6.3 days to 6.2.

The average length of hospital stay per separation is considered to be a measure of the efficiency of acute care hospitals. However, because hospitals and jurisdictions vary in terms of their casemix, it is appropriate to adjust length-of-stay measures to account for casemix.

The relative stay index (RSI) compares the actual length of stay in a hospital with the 'expected' length of stay. If the RSI is more than 1.00, the average stay is longer than expected and if it is less than 1.00 it is shorter than expected. The RSIs presented here are calculated using the direct standardisation method. This method uses Australian Refined Diagnosis Related Groups (AR-DRGs) (Box 7.9) to adjust the casemix of the jurisdiction or hospital sector to the national casemix (which then has a value of 1.00, by definition), allowing values to be directly comparable.

There were variations between jurisdictions (Figure 7.13) and between the public and private sectors in the RSI for 2007–08. For public hospitals the RSI was 0.99 in 2007–08 (shorter stay than expected) and for private hospitals it was 1.03 (longer stay than expected). In the public sector, the Northern Territory (1.15) had the highest RSI, followed by New South Wales (1.05) and South Australia (1.01).

For surgical separations, the RSI was 1.04 for public hospitals and 0.95 for private hospitals. For medical separations, the RSI was 0.96 for public hospitals and 1.14 for private hospitals.



Notes

1. Relative stay index is based on separations for which the care type was reported as Acute, or as Newborn with qualified patient days, or was Not reported, using AR-DRG 5.1.
2. Data presented are for combined public and private hospitals except for Tasmania, the Australian Capital Territory and the Northern Territory. This is because a Relative Stay Index is not published for private hospitals in these jurisdictions.

Source: AIHW National Hospital Morbidity Database.

Figure 7.13: Relative stay index, by type of separation, by state and territory, 2007–08

What are people being admitted for?

The conditions that hospitals treat are of interest to consumers, health service managers, planners, funders and researchers. These conditions, the procedures that patients undergo in hospital and the consequent casemix of hospitals are recorded in the National Hospital Morbidity Database using the classification systems described in Box 7.9. The consistent picture is that a large proportion of hospital separations are due to a relatively small number of conditions and treatments. These conditions and treatments include renal (kidney) dialysis (for which patients typically have around 150 separations a year), chemotherapy (also involving multiple stays for each patient), gastrointestinal endoscopies (viewing the inside of the stomach, bowel and so on), replacement of the eye's lens (usually because of cataracts) and childbirth (including caesarean sections). The reasons for which people are being admitted are presented below in three ways—as the diagnosis view, the procedures view and the AR-DRG view. A later section focuses on elective surgery as the reason for about 22% of hospital admissions.

Box 7.9: Classification of diagnoses and procedures for admitted patients

Diagnoses and procedures

Hospital patient records contain information about a patient's diagnosis and about procedures performed during the hospital stay. To allow efficient storage and analysis of this information, detailed classification and coding systems are used to describe and record diagnoses and procedures.

In 2007–08, diagnoses and external causes of injury were recorded using the fifth edition of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) (NCCH 2006). It comprises classifications of diseases and external causes of injuries and poisoning, based on the World Health Organization's version of ICD-10. Procedures were recorded using the Australian Classification of Health Interventions (ACHI) (NCCH 2006).

These classifications can be a source of information on the diseases and conditions treated in hospitals and the operations performed, either at very detailed levels or combined into broad groupings.

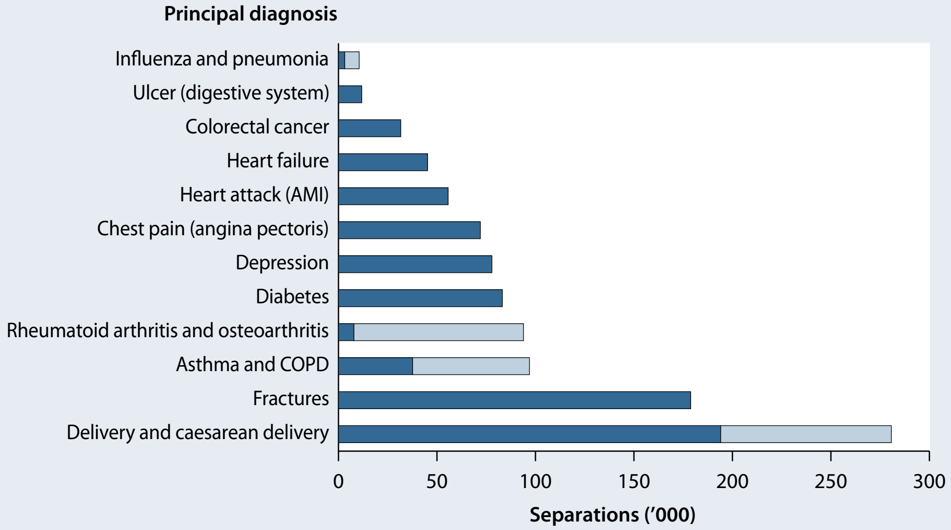
Diagnosis Related Groups

Australian Refined Diagnosis Related Groups (AR-DRGs) is a classification system used mainly for acute care admitted patient episodes. 'Acute' care applies to more than just emergency care and acute illnesses; it includes care and treatment for chronic conditions. The term distinguishes this type of care from other types, such as rehabilitation or palliative care. The AR-DRG classification provides a means of summarising the number and type of acute admitted patients treated in a hospital (that is, its casemix) and relating this to the resources expected to be used in their treatment. This classification groups episodes with similar clinical conditions and similar use of hospital resources, using information in the hospital separation record such as diagnoses, procedures and age of the patient. Each AR-DRG is associated with information on the average length of stay and estimated average cost for patients in the group in the public and private sectors. This classification therefore has use in measuring the outputs and performance of hospitals, and in planning and funding hospital service provision.

The diagnosis view of admitted patient care activity

Nearly 37% of all separations in Australian hospitals in 2007–08 had a principal diagnosis in six of the broad ICD–10–AM chapter groups (see boxes 7.8 and 7.9). These were *Diseases of the digestive system; Neoplasms; Diseases of the circulatory system; Pregnancy, childbirth and the puerperium; Injury, poisoning and certain other consequences of external causes;* and *Factors influencing health status and contact with health services* (including dialysis, chemotherapy and rehabilitation) (tables S16 and S17 🖱).

At a more detailed level, in 2007–08 there were around 99,000 separations with a principal diagnosis of *Asthma and chronic obstructive pulmonary disease*, 94,000 for *Rheumatoid arthritis and osteoarthritis*, and 45,000 for *Heart failure* (Figure 7.14). Also of high volume was childbirth—there were 87,000 separations for *Childbirth by caesarean section* and 194,000 for *Other delivery*.



COPD Chronic obstructive pulmonary disease.

Notes

1. For bars with two values, the darker shading refers to the second part of the label.
2. Separations for which the care type was reported as Newborn with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.

Source: National Hospital Morbidity Database.

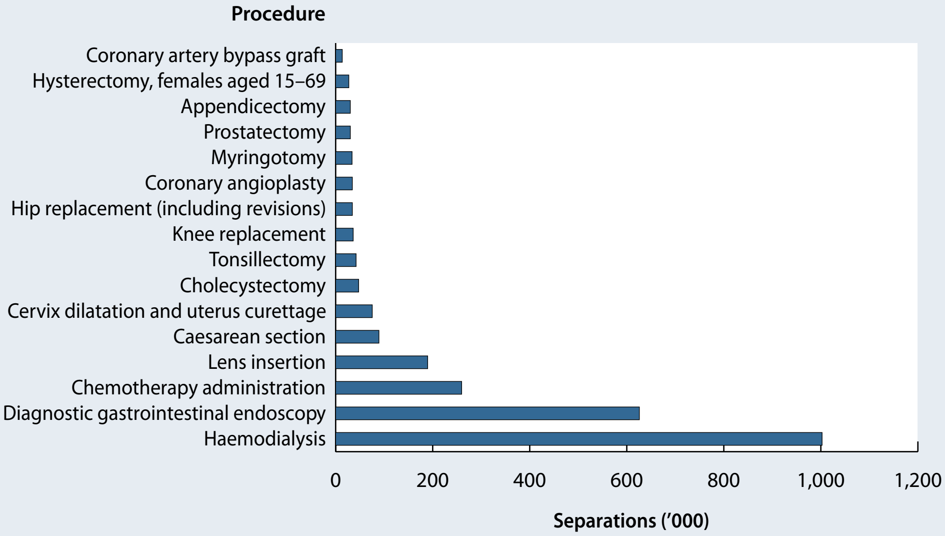
Figure 7.14: Separations for selected principal diagnoses, public and private hospitals combined, 2007–08

The procedures view of admitted patient care activity

Procedures are clinical interventions that are surgical in nature, carry a procedural or anaesthetic risk, require specialised training, and/or require special facilities or equipment available only in an acute care setting. Procedures are a very common part of hospital treatment, especially so for private hospitals. A procedure was reported for 82.6% of separations from Australian hospitals in 2007–08 (AIHW 2009c). Of these, 55.1% were from public hospitals, although public hospitals accounted for 60.3% of separations overall. Similarly, although 69.6% of overall patient days were in public hospitals, only 67.0% of patient days associated with procedures were in public hospitals. This reflects the higher proportion of separations in private hospitals (93.4%) that had a procedure, compared with public hospitals (75.5%).

At the broad ICD-10-AM chapter level, if miscellaneous diagnostic and therapeutic procedures are not included, *Procedures on the urinary system* accounted for the largest proportion of public hospital separations for which a procedure was reported (952,000 separations) (Table S18 🖱). *Haemodialysis* accounted for 87.8% (836,000) of those urinary system separations. The most commonly reported procedure group for the private sector was *Procedures on the digestive system* (673,000) (Table S19 🖱), with 87.9% of these being for *Fibreoptic colonoscopy*, *Panendoscopy with excision* and *Fibreoptic colonoscopy with excision*.

Other commonly reported procedures across both sectors were *Diagnostic gastrointestinal endoscopy* (626,000 separations), *Chemotherapy administration* (260,000) and *Lens insertion* (190,000) (Figure 7.15).



Source: National Hospital Morbidity Database.

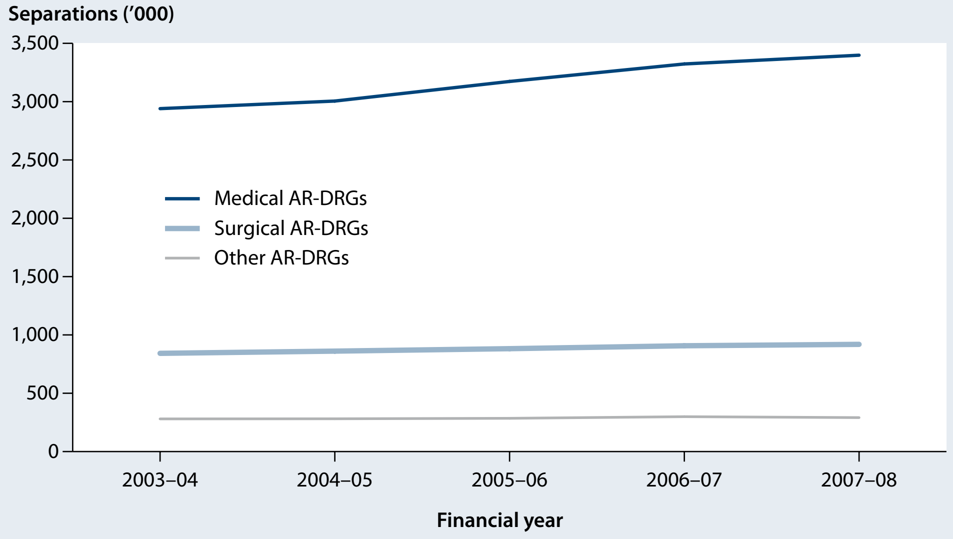
Figure 7.15: Separations for selected procedures, public and private acute hospitals combined, 2007–08

The AR-DRG view of hospital activity

The AR-DRG classification takes into account diagnoses, procedures, length of stay and other patient factors to create groups of similar conditions and/or similar expected resource use (see Box 7.9). It provides a composite view of hospitalisations and is useful for describing the overall nature of the care received in hospital. AR-DRGs can be classified as surgical, medical and other.

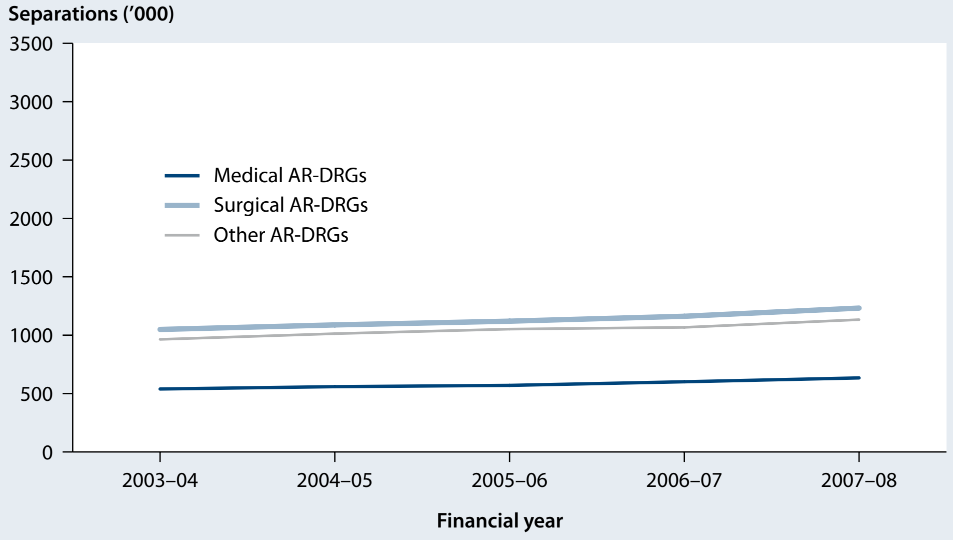
In 2007–08, 73.7% of acute hospital separations in the public sector were for medical AR-DRGs (3.4 million), compared with 37.8% in the private sector (1.1 million). In contrast, there was a larger proportion of separations for surgical AR-DRGs in the private sector (41.1%) than in the public sector (19.9%). A small proportion of separations were for other AR-DRGs, 6.4% in the public sector and 21.1% in the private sector.

In public hospitals, separations with medical AR-DRGs increased by 15.6% between 2003–04 and 2007–08, those with surgical AR-DRGs increased by 9.2% and other AR-DRGs increased by 3.9% (Figure 7.16). In private hospitals, the distribution remained similar, with all three AR-DRG groups increasing by around 18% (Figure 7.17). In 2007–08 the number of surgical separations from private hospitals (1.2 million) exceeded those from public hospitals (0.9 million) (AIHW 2009c).



Source: National Hospital Morbidity Database.

Figure 7.16: Separations for surgical, medical and other AR-DRGs, public acute hospitals, 2003–04 to 2007–08



Source: National Hospital Morbidity Database.

Figure 7.17: Separations for surgical, medical and other AR-DRGs, private hospitals, 2003–04 to 2007–08

The AR-DRGs with the highest numbers of separations in 2007–08 featured several for which same-day separations dominated (Table 7.11). Renal dialysis and chemotherapy dominated for both public and private hospitals, but for public hospitals dialysis was by far the more common (817,000 public sector separations). In private hospitals, chemotherapy (176,000 separations) was a little more common than dialysis (164,000). *Vaginal delivery* (without complications) was the most common AR-DRG that was usually not a same-day hospitalisation.

Table 7.11: Top 12 AR-DRGs version 5.1 with the highest number of separations from public and private hospitals, 2007–08

AR-DRG		Separations	Same-day separations (per cent)	Patient days	ALOS (days)
L61Z	Admit for renal dialysis	981,830	99.8	982,278	1.0
R63Z	Chemotherapy	298,158	99.9	298,330	1.0
G44C	Other colonoscopy, same day	222,619	100.0	222,619	1.0
C16B	Lens procedures, same day	173,085	100.0	173,085	1.0
O60B	Vaginal delivery without catastrophic or severe complications or comorbidities	141,633	2.3	444,622	3.1
G45B	Other gastroscopy for non-major digestive disease, same day	131,918	100.0	131,918	1.0
Z64B	Other factors influencing health status, same day	122,424	100.0	122,424	1.0
D40Z	Dental extractions and restorations	118,516	96.5	120,643	1.0
G46C	Complex gastroscopy, same day	113,044	100.0	113,044	1.0
F74Z	Chest pain	100,682	39.7	150,440	1.5
U60Z	Mental health treatment, same day, without electroconvulsive treatment	96,752	100.0	96,752	1.0
Z40Z	Follow-up with endoscopy	92,247	96.9	93,737	1.0

ALOS Average length of stay.

Note: Includes separations for which the care type was reported as Acute, or as Newborn with qualified patient days, or was not reported.

Source: AIHW National Hospital Morbidity Database.

Elective surgery

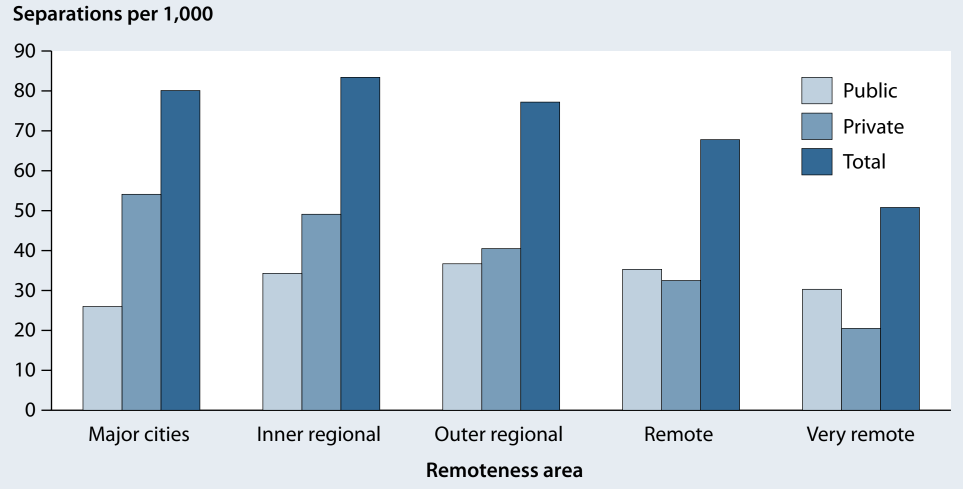
In 2007–08, elective surgery accounted for about 22% of hospital separations: 13% of public hospital separations (619,000) and 36% of private hospital separations (1.1 million). The information on separations per 1,000 population is from the National Hospital Morbidity Database, in which separations were classified as elective surgery if they had an elective urgency of admission and a surgical procedure, using AR-DRGs, version 5.1 (DoHA 2004).

Separations per 1,000 population

There were 52 elective surgery separations per 1,000 persons in private hospitals and 29 elective surgery separations per 1,000 in public hospitals.

Separation rates varied by remoteness area of the usual residence of the patient. The rate of private hospital elective surgery was highest for those living in major cities (54 per 1,000) and decreased to 21 per 1,000 for very remote areas (Figure 7.18), reflecting the lower availability of private hospital services in the more remote areas of Australia. In contrast, the rate of public hospital elective surgery was lowest for those living in major cities (26 per 1,000) and highest for those living in outer regional areas (37 per 1,000).

There was also some variation in both private and public hospital elective surgery rates by socioeconomic status. Overall elective surgery rates were highest for patients from the most advantaged areas (86 per 1,000 persons) and tended to decrease with increasing disadvantage to 76 per 1,000 persons from the most disadvantaged areas.



Note: Rates are age-standardised to the ABS estimated resident population at 30 June 2001.

Source: National Hospital Morbidity Database.

Figure 7.18: Elective surgery separations per 1,000 persons, by remoteness area of usual residence, 2007–08

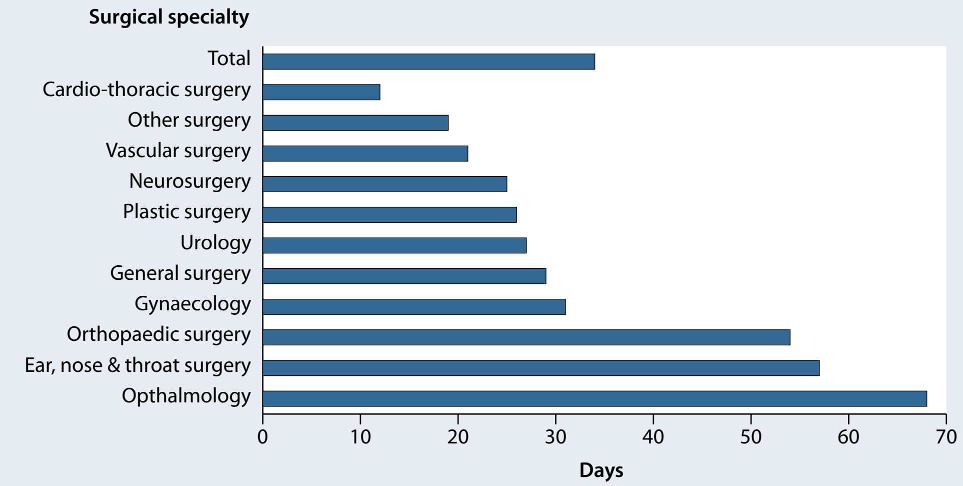
The rate of private hospital elective surgery was highest for the most advantaged areas (69 per 1,000 persons) and decreased to 38 per 1,000 persons for the most disadvantaged areas. The rate of public elective surgery was lowest for the most advantaged areas (17 per 1,000) and highest for the most disadvantaged areas (38 per 1,000).

The overall rate of elective surgery for Indigenous Australians was 48 per 1,000, about 61% of the rate for other Australians (78 per 1,000). Over 85% of these elective surgery separations for Indigenous Australians (13,000) were for public elective surgery. The rate of public elective surgery for Indigenous Australians (38 per 1,000) was about 37% higher than for other Australians (28 per 1,000).

Elective surgery waiting times

Waiting times for elective surgery are indicators of access to public hospital services. They are an indicator of the provision of timely care according to need. The information on waiting times is sourced from the National Elective Surgery Waiting Times Data Collection. For that collection, elective surgery comprises elective care where the procedures required by patients are listed in the surgical operations section of the Medicare Benefits Schedule, with the exclusion of specific procedures frequently done by non-surgical clinicians (HDSC 2006).

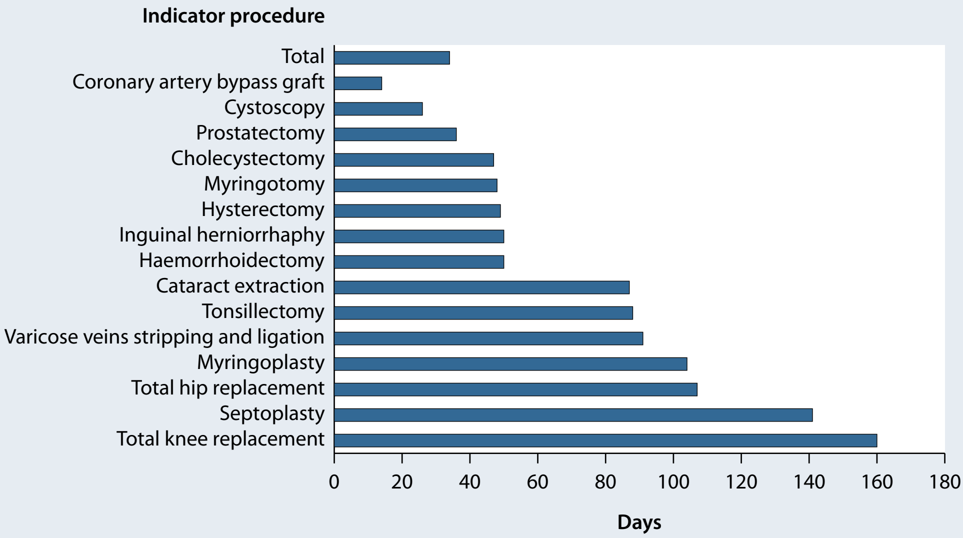
Overall, the median waiting time for elective surgery has increased over time, from 28 days in 2003–04 to 34 days in 2007–08 (AIHW 2009c). *Ophthalmology, Ear, nose and* *throat surgery* and *Orthopaedic surgery* were the surgical specialties with the longest median waiting times in 2007–08 (68, 57 and 54 days respectively). Most other surgical specialties had median waiting times of less than 30 days; and *Cardio-thoracic surgery* had the shortest median waiting time (12 days) (Figure 7.19).



Source: National Elective Surgery Waiting Times Data Collection.

Figure 7.19: Median waiting times, by surgical specialty, 2007–08

Another view of the waiting times is through ‘indicator procedures’. These are 15 high-volume procedures sometimes associated with long waits (Figure 7.20). In 2007–08, Total knee replacement was the indicator procedure with the longest median waiting time at 160 days, and Coronary artery bypass graft had the lowest median waiting time at 14 days.

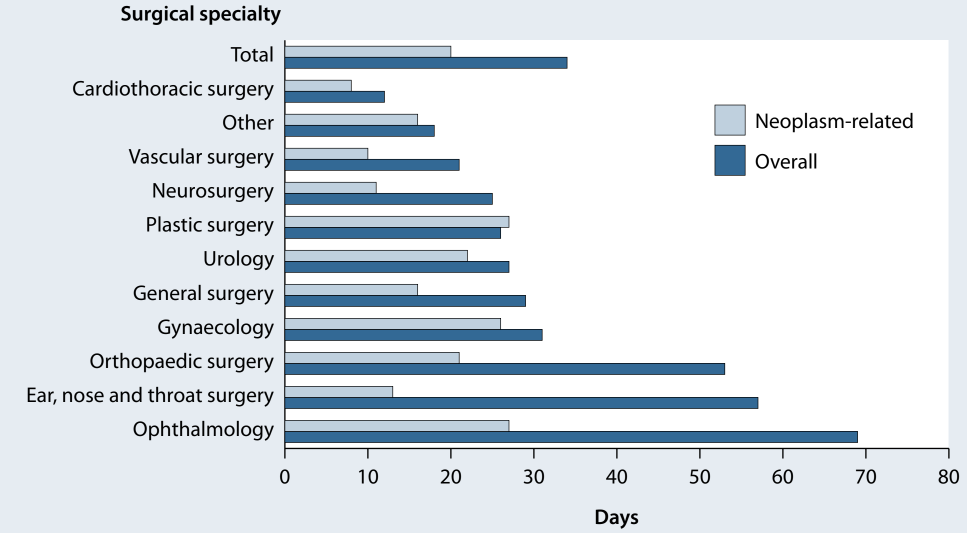


Source: National Elective Surgery Waiting Times Data Collection.

Figure 7.20: Median waiting times, by indicator procedure, 2007–08

Waiting times for elective surgery for cancer and benign tumours

Overall, the median waiting time for patients with cancer and benign tumour-related principal diagnoses was 20 days, 14 days shorter than the median waiting time for patients with other conditions (34 days) (Figure 7.21). The largest variation in median waiting times by surgical specialty was for *Ear, nose and throat surgery*, for which patients with a neoplasm waited 13 days, compared with 57 days overall. The only specialty with a longer median waiting time for cancer and benign tumour than for other diagnoses was *Plastic surgery*.



Source: National Elective Surgery Waiting Times Data Collection and National Hospital Morbidity Database.

Figure 7.21: Median waiting times, overall and for neoplasm-related principal diagnoses, by surgical specialty, 2007–08

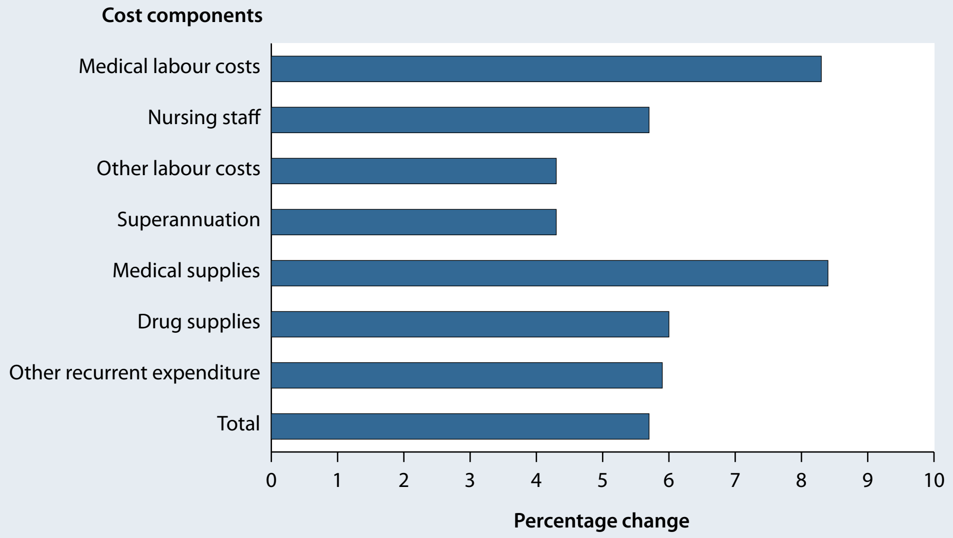
Costs of public hospital admitted care

The cost per casemix-adjusted separation is an indicator of the efficiency of public acute care hospitals. It is a measure of the average recurrent expenditure for admitted patients, adjusted for the relative complexity of the patients' conditions and the resources expected to be used (Box 7.9).

Nationally, the average cost per casemix-adjusted separation was $4,215 (Table S20 🖱), varying from $3,887 for South Australia to $4,619 for the Northern Territory, and from $4,125 for *Large hospitals* to $4,743 for *Small acute hospitals*.

In 2007–08, nursing staff costs accounted for 26% of the cost per casemix-adjusted separation, medical labour 21%, other labour costs 19%, medical supplies 9%, drug supplies 5%, superannuation 5% and other recurrent expenditure 14%.

Between 2002–03 and 2007–08, the average cost per casemix-adjusted separation rose on average by 5.7% annually (in current prices—not adjusted for inflation) (Figure 7.22). The rate of cost increase was not equal across all components. For example, the average annual cost increases in medical supplies (8.4%) and medical labour (8.3%) were higher than the average overall cost increase, and growth in the categories of superannuation (4.3%) and other labour costs (4.3%) was lower than the average overall cost increase.



Note: Medical labour comprises salaried staff, visiting medical officers and estimated medical costs for private patients.
Source: AIHW 2009c and earlier editions of *Australian hospital statistics*.

Figure 7.22: Increases in components of average cost per casemix-adjusted separation, average annual change between 2002–03 and 2007–08

Accident and emergency services

In 2007–08, there were 7.1 million accident and emergency occasions of service provided in public hospitals. Private hospitals reported 454,000 accident and emergency occasions of service in 2006–07 (ABS 2008). Of the public hospital emergency department presentations in 2007–08, 28% resulted in a hospital admission (AIHW 2009c).

Geographical variation in the use of accident and emergency services

The ratio of services provided in an area to the number of residents is an approximation of population use, although services provided in one area may be used by people residing in others.

There is a progressive increase in rates of emergency department usage as remoteness increases. Nationally, for public hospitals the ratio varied from 271 occasions of service per 1,000 people in major cities to 466 per 1,000 in inner and outer regional areas and 908 in remote and very remote areas in 2007–08 (Table 7.12). This variation may reflect several factors, including the availability of other health care services, patterns of disease and injury, and the generally poorer health of Aboriginal and Torres Strait Islander people, who have higher population concentrations in remote areas. Rates for the Northern Territory were markedly higher than for other jurisdictions.

Table 7.12: Accident and emergency occasions of service in public acute hospitals(a), 2007–08

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	Services per 1,000 population resident in area(b)								
Major cities	282	265	231	267	330	. .	295	. .	271
Inner regional	531	380	464	397	279	244	. .	. .	436
Outer regional	550	450	581	680	430	368	. .	488	530
Total regional	*536*	*394*	*512*	*517*	*353*	*286*	. .	*488*	*466*
Remote	957	n.a.	922	992	574	527	. .	1,065	893
Very remote	2,359	. .	1,020	1,273	904	620	. .	406	937
Total remote	*1,133*	*n.a.*	*958*	*1,089*	*649*	*550*	. .	*724*	*908*
Total	**355**	**297**	**360**	**378**	**347**	**291**	**295**	**595**	**343**

. . Not applicable.

n.a. Not available.

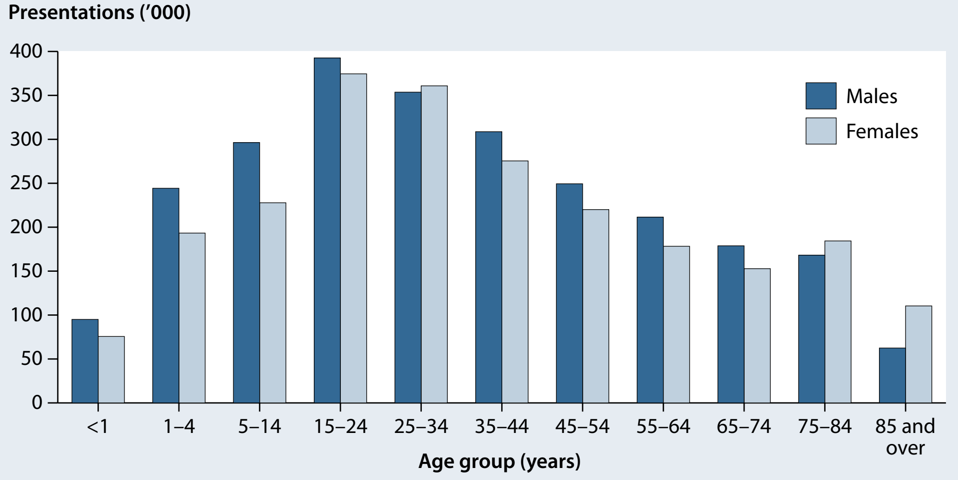
(a) Remoteness area of hospital was based on the ABS 2001 remoteness area classification.

(b) The ratio of services provided in the area to the number of residents in the area only approximates population use because services provided in an area may be provided to persons residing in other remoteness area categories or states. Number per 1,000 population was based on the 30 June 2006 population.

Source: AIHW 2009c.

Age and sex distribution

For 2007–08, data on age and sex were available for over 5.5 million emergency department presentations in public hospitals (about 78% of all emergency department presentations). Most of these data were for hospitals classified as *Principal referral and Specialist women's and children's hospitals* and *Large hospitals* (AIHW 2009c). Males accounted for 52% of all emergency department presentations, and there were more males than females for all age groups except for those aged 25–34 years and 75 years and over (Figure 7.23). The use of emergency departments was highest in the 15–24 and 25–34 year age groups, and was different from the use of admitted patient care, which rises with age.



Source: AIHW 2009c.

Figure 7.23: Emergency department presentations, by sex and age of patient, 2007–08

Emergency department waiting times

Emergency department waiting times data are reported by some public acute hospitals selected according to their hospital peer group. The majority of these hospitals are *Principal referral and Specialist women's and children's hospitals* and *Large hospitals*.

Emergency department waiting times in public hospitals are indicators of access to public acute hospital services. This information is summarised as the proportions of patients who are treated within an appropriate time (for the urgency of their condition).

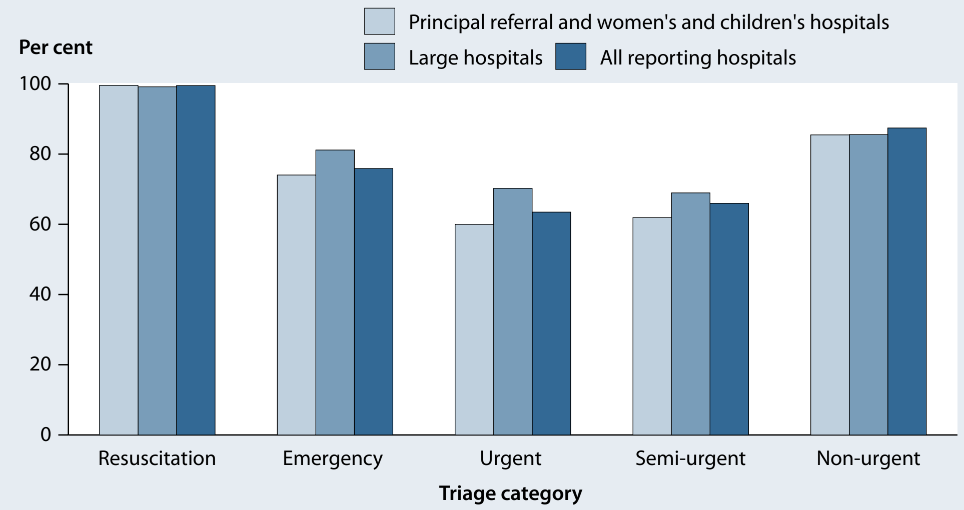
The urgency of the patient's need for medical and nursing care is indicated by a triage category. When patients present to the emergency department a triage nurse assesses their overall condition and assigns them to one of five categories that indicate how soon they should receive care. The categories are:

- Resuscitation: immediate (within seconds)
- Emergency: within 10 minutes
- Urgent: within 30 minutes
- Semi-urgent: within 60 minutes
- Non-urgent: within 120 minutes.

Between 2003–04 and 2007–08, information on emergency department waiting times was available for between 73% and 78% of all public hospital emergency department visits. In 2007–08, this information was available for about 78% of all public hospital emergency department presentations, including almost 100% of emergency department presentations in *Principal referral and Specialist women's and children's hospitals* and *Large hospitals* (AIHW 2009c). Over the 5-year period, the proportion of patients assigned to each triage category remained fairly stable, with about 1% of patients assigned to the triage category of resuscitation, 8% as emergency, and about 78% as either urgent or semi-urgent (AIHW 2009c).

Overall, the proportion of patients seen on time also remained stable at around 69%. Almost all resuscitation cases and over three-quarters of emergency cases received treatment within the recommended time.

In 2007–08, there was some variation among hospital peer groups in the proportion of patients receiving care on time (Figure 7.24). Overall, 65% of patients in the *Principal referral and Specialist women's and children's hospitals* and 73% of patients in the *Large hospitals* were treated in an appropriate time for their condition.



Note: 'All reporting hospitals' includes data that were provided for hospitals in peer groups other than *Principal referral and Specialist women's and children's hospitals* and *Large hospitals*.

Source: National Non-admitted Patient Emergency Department Care Database.

Figure 7.24: Emergency department presentations seen on time, 2007–08 (per cent)

Outpatient services

In 2007–08, there were 16.4 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 24.9 million other services provided to non-admitted patients of public hospitals, including pathology (8.1 million), pharmacy (4.7 million), radiology and organ imaging (3.4 million), and community health services (2.8 million).

Private hospitals also provide non-admitted patient services, with a different mix of services from public hospitals. In 2006–07, there were over 1.7 million non-admitted patient services provided in private hospitals, including 454,000 accident and emergency services.

It should be noted that states and territories vary in how they collect data on non-admitted services, and in admission practices for some services (such as chemotherapy). This variation may affect the comparability of data on this type of hospital activity.

7.4 Specialised health services

Medicare-subsidised specialist services

Medicare data provide an overview of the use of medical specialist services funded through Medicare (see Box 7.5 for information on Medicare and Medicare benefits). These services include those provided by specialists both out of hospital and in private practice, as well as medical services for private patients in public and private hospitals.

During 2008–09, an average of 7.1 specialist services per Australian were provided under Medicare. These services included 4.6 *Pathology* items per person (including administrative items associated with the collection of specimens), 1.1 *Specialist attendances* and 0.8 *Diagnostic imaging* items (Table 7.13).

The number of Medicare services processed increased over the 3 years from 2006–07 to 2008–09 across all types of specialist services. *Radiotherapy and therapeutic nuclear medicine* had the largest average annual increase over the period (18.9%). *Pathology* had the next largest average annual increase over the period (5.6%) followed by *Anaesthetics* (4.9%).

In 2008–09, a total of $7,462 million was paid in Medicare benefits for specialist services (Table 7.13), accounting for 52% of total Medicare benefits paid ($14,322 million). The items contributing to these benefits and the expenditure on these are also shown below.

Table 7.13: Medicare services processed for specialist services, 2006–07 to 2008–09

	Services per person				Items in 2008–09		
	Number						
Broad type of service	**2006 –07**	**2007 –08**	**2008 –09**	**Average annual change (%)**	**Number ('000)**	**Per cent of total (%)**	**Benefits paid ($ million)**
Pathology	4.2	4.5	4.7	5.6	100,445	65.0	1,972.1
Specialist attendances	1.0	1.0	1.1	1.8	23,125	15.0	1,536.8
Diagnostic imaging	0.7	0.8	0.8	3.7	17,331	11.2	1,952.5
Operations	0.3	0.4	0.4	3.1	7,929	5.1	1,210.0
Anaesthetics	0.1	0.1	0.1	4.9	2,451	1.6	306.6
Obstetrics	0.1	0.1	0.1	1.0	1,577	1.0	238.4
Radiotherapy and therapeutic nuclear medicine	0.0	0.0	0.1	18.9	1,272	0.8	191.7
Assistance at operations	0.0	0.0	0.0	4.2	396	0.3	54.3
Total specialist items[(a)]	**6.5**	**6.9**	**7.2**	**4.7**	**154,526**	**100.0**	**7,462.5**

(a) Excludes specialist dental services.

Source: Medicare Australia 2009.

Specialised mental health services

Mental health is a matter of national importance. The 2007 National Survey of Mental Health and Wellbeing found that almost 1 in 2 Australians (46%) had a mental illness at some stage in their lives and 1 in 5 (3.2 million) Australians had experienced a mental disorder in the 12 months before the survey. The survey results are discussed in more detail in Section 4.5.

Australia's National Mental Health Policy (DoHA 2009) and the accompanying plan 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 supports to help them to recover and participate fully.

Total recurrent expenditure on specialised mental health services by Australian states and territories exceeded $3.3 billion during 2007–08 (over 3% of all recurrent spending on health that year). The largest proportion of recurrent expenditure on these specialised services was spent on providing public hospital services for admitted patients ($1.5 billion), followed closely by community mental health services ($1.2 billion).

A variety of public and private health-care providers operate mental health services. GPs offer non-specialised services whereas specialised services are provided by psychiatrists, psychologists, community-based mental health services, psychiatric hospitals, psychiatric units within general acute hospitals and residential care facilities. The various services are described below.

Ambulatory mental health care

Ambulatory services for mental health are those that do not involve overnight admission to a hospital or residential mental health facility. They can be provided by GPs, community mental health services, hospital outpatient services, emergency departments and even hospital admitted day services.

According to estimates from the 2008–09 BEACH survey of general practice activity, 11.7% of all GP encounters involved the management of a mental health-related problem. This proportion rose from 10.4% in 2006–07 (Table 7.14). Depression and anxiety were the most commonly managed problems, accounting for half of all mental health-related problems managed and 4% of all health problems managed (AIHW 2010a).

Table 7.14: Ambulatory mental health services, 2004–05 to 2008–09

Mental health services	2004–05	2005–06	2006–07	2007–08	2008–09[(a)]
Estimated proportion of total GP encounters that are mental health-related (per cent)	10.8	10.5	10.4	10.8	11.7
Medicare-subsidised mental–health related services	2,091,274	2,137,299	3,271,157	5,159,294	6,206,833
GP/other medical practitioner services	60,216	73,087	615,722	1,237,049	1,600,063
Psychiatrist services	2,007,218	2,015,941	1,986,533	1,949,702	1,967,222
Psychologist services	23,092	45,541	646,253	1,877,834	2,489,799
Other allied mental health services	748	2,730	22,649	94,709	149,749
Mental health-related occasions of service in emergency departments in public hospitals	138,729	149,566	178,595	162,721	n.a.
Ambulatory-equivalent mental health-related hospital separations	116,787	117,924	120,602	121,651	n.a.
With specialised psychiatric care	92,369	93,202	92,304	88,348	n.a.
Public hospitals	12,285	8,994	6,484	5,127	n.a.
Private hospitals	80,084	84,208	85,820	83,221	n.a.
Without specialised psychiatric care	24,418	24,722	28,298	33,303	n.a.
Public hospitals	14,248	15,379	17,795	18,527	n.a.
Private hospitals	10,170	9,343	10,503	14,776	n.a.
Community mental health care service contacts	5,108,524	5,665,408	5,966,277	6,374,267	n.a.

n.a. Not available.

(a) 2008–09 hospital data were not available at time of drafting.

Source: AIHW 2010a.

Almost two-thirds of mental health-related problems were managed through a medication being prescribed, recommended or supplied (66.2 per 100 mental health-related problems managed). Antidepressants (26.4 per 100 mental health-related problems managed) and anxiolytics (anti-anxiety medications—12.7 per 100) were most commonly prescribed. The second most common form of management was the GP providing counselling or advice (47.6 per 100). A referral was given at a rate of 13.0 per 100 mental health-related problems managed. The most common referrals given were to psychologists (6.1 per 100 mental health-related problems managed) and to psychiatrists (1.8 per 100) (AIHW 2010a).

Medicare-subsidised services

During 2008–09, 6.2 million Medicare-subsidised mental health-specific services were provided. This included 2.0 million services provided by psychiatrists, 2.5 million services provided by psychologists, 1.6 million provided by GPs and the remainder provided by other allied health professionals. There was an average annual decrease in Medicare-subsidised mental health services provided by psychiatrists from 2004–05 to 2008–09 of 1% per year. However, the total number of Medicare-subsidised mental health services by all providers, not just psychiatrists, increased markedly at an average annual rate of 31% per year over the same period. This was due to the addition of items to the Medicare Benefits Schedule in 2002 and 2006 for services provided by psychologists, other allied health professionals and GPs (AIHW 2010a).

Emergency department occasions of service

Public hospital emergency departments had 162,700 occasions of service specifically related to mental health during 2007–08 (Table 7.14). Four diagnosis categories accounted for the majority (85%) of mental health-related occasions of service. These were *Neurotic, stress-related and somatoform disorders* (28%), *Mental and behavioural disorders due to psychoactive substance use* (24%), *Mood (affective) disorders* (18%) and *Schizophrenia, schizotypal and delusional disorders* (15%) (AIHW 2010a).

Ambulatory-equivalent hospital separations

In 2007–08, there were about 121,700 ambulatory-equivalent mental health-related hospital separations (essentially, same-day hospitalisations that involved only ambulatory-type procedures) (Table 7.14). Of these, 19% were in public hospitals and 81% in private hospitals. Nearly three-quarters (73%) of these separations involved specialised psychiatric care. *Depressive episode* was the most common principal diagnosis, accounting for 17.8% in 2007–08 (AIHW 2010a).

Community and hospital outpatient services

There were 6.4 million mental health service contacts provided in government-operated community mental health services and hospital outpatient services in 2007–08. A greater percentage of service contacts was for males (54%) than females (45%). The most common principal diagnosis reported was *Schizophrenia, schizotypal and delusional disorders* (37%) (Table S23 🖱).

Admitted patient mental health care

During 2007–08, there were 212,890 mental health-related separations (excluding those that were ambulatory-equivalent) (Table S24 🖱). The average length of stay was 14.3 days and most (80%) were in public hospitals. There was an average annual increase of 5% in specialised psychiatric care separations in private hospitals over the period of 2003–04 to 2007–08, but there were declines in public psychiatric hospital separations, both with and without specialised psychiatric care. Overall, the total number of separations increased by 2% per annum.

In 2007–08, the principal diagnosis of *Schizophrenia* accounted for the largest number of separations involving specialised psychiatric care (21,358, or 17.2%) (Table 7.15). In such cases, it was the most commonly reported diagnosis for both public acute and psychiatric hospitals. *Depressive episode* was the second most common diagnosis overall and the most commonly reported diagnosis for private hospitals

Table 7.15: Admitted patient separations(a) with specialised psychiatric care, by principal diagnosis in ICD-10-AM groupings and hospital type, 2007–08

Principal diagnosis	Public acute hospitals	Public psychiatric hospitals	Private hospitals	Total	Total (per cent)
Schizophrenia	17,250	2,834	1,274	21,358	17.2
Depressive episode	11,051	1,121	7,220	19,392	15.6
Bipolar affective disorders	7,628	1,157	3,810	12,595	10.1
Reaction to severe stress and adjustment disorders	8,501	1,098	2,811	12,410	10.0
Recurrent depressive disorders	2,997	554	6,300	9,851	7.9
Schizoaffective disorders	5,354	949	1,344	7,647	6.2
Mental and behavioural disorders due to use of alcohol	2,128	690	2,565	5,383	4.3
Mental and behavioural disorders due to other psychoactive substance use	3,155	779	1,004	4,938	4.0
Specific personality disorders	3,834	614	522	4,970	4.0
Other anxiety disorders(b)	1,089	99	1,442	2,630	2.1
Other specified mental health-related principal diagnosis(c)	10,100	2,005	2,846	14,951	12.0
Other(d)	5,832	823	1,467	8,122	6.5
Total	**78,919**	**12,723**	**32,605**	**124,247**	**100.0**

(a) Excludes separations for which care type was reported as Newborn with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement*, and ambulatory-equivalent mental health-related separations.

(b) Includes separations for which the principal diagnosis was any other anxiety-related principal diagnosis.

(c) Includes separations for which the principal diagnosis was any other mental health-related principal diagnosis.

(d) Includes all other principal diagnoses.

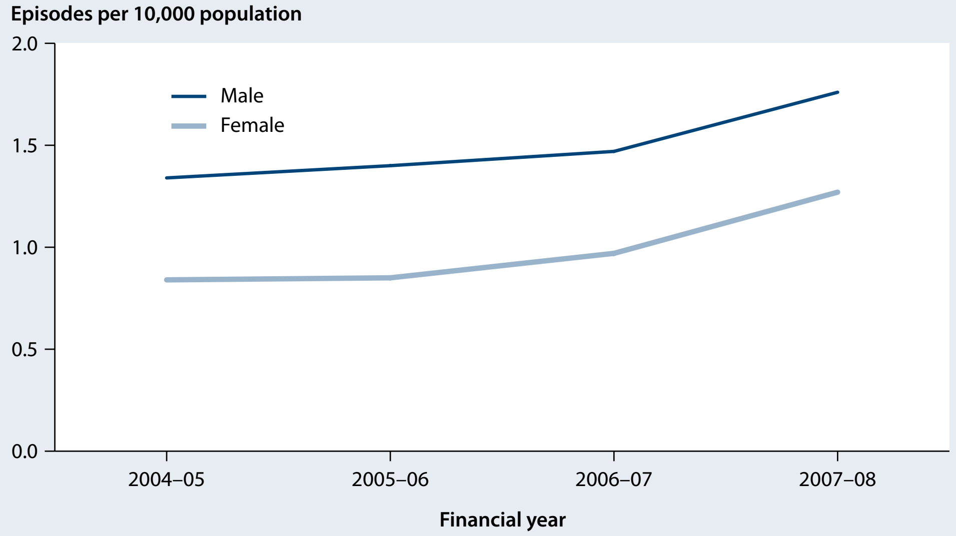
Source: AIHW 2010a.

The principal diagnosis of *Mental and behavioural disorders due to use of alcohol* accounted for the largest number of separations without specialised psychiatric care (18,304 or 21%). Among these cases, it was the most commonly reported diagnosis for both public acute and private hospitals (AIHW 2010a).

There were marked gender differences in the number of separations for the most commonly reported diagnoses involving specialist psychiatric care. For the most commonly reported diagnosis of *Schizophrenia*, the number of separations for males was more than twice that for females. *Mental and behavioural disorders due to other psychoactive substances* also displayed a similar pattern with around double the number of separations for males than females. Separations for females were substantially higher, however, for the principal diagnoses of *Recurrent depressive disorders* and *Specific personality disorders* (AIHW 2010a).

Residential mental health care

Residential mental health care is focused on providing rehabilitation, treatment or extended care for live-in patients in a domestic-like environment. In 2007–08, there were 3,222 episodes of residential mental health care. This equated to 1.5 episodes per 10,000 population, a substantial increase over the rate in previous years, as Figure 7.25 shows. Male patients accounted for a greater proportion (57%) of episodes of residential mental health care than females. The most commonly reported principal diagnosis overall was *Schizophrenia*, reported for 44% of the episodes, followed by *Schizoaffective disorders* (10%), *Bipolar affective disorders* (7%) and *Depressive episode* (6%) (AIHW 2010a).



Source: National Residential Mental Health Care Database.

Figure 7.25: Episodes of residential mental health care per 10,000 population, 2004–05 to 2007–08

Mental health prescriptions

There were 21.4 million prescriptions for mental health-related medications subsidised by the Pharmaceutical Benefits Scheme (PBS) and the Repatriation Pharmaceutical Benefits Scheme (RPBS) in 2008–09 (Table S25 🖱). This represented 11% of the 196.2 million PBS- and RPBS-subsidised prescriptions for all medications in that year, and was equivalent to 990 mental health-related prescriptions per 1,000 population. In interpreting this information, note that a person may have had several subsidised mental health-related prescriptions during the period covered.

The Australian Government spent $743 million on PBS and RPBS benefits for mental health-related medications in 2008–09, accounting for 10% of total PBS and RPBS expenditure (AIHW 2010a) and equating to about $34 per Australian.

Of these mental health-related prescriptions, 85% were provided by GPs, 9% by psychiatrists and 5% by non-psychiatrist specialists. Most of the prescriptions were for antidepressants (57%, or 12.3 million), followed by anxiolytics (15%), hypnotics and sedatives (12%), and antipsychotics (12%). These proportions varied according to the specialty of the prescriber, with GPs prescribing relatively more anxiolytics, and hypnotics and sedatives, whereas psychiatrists and other specialists prescribed relatively more antipsychotics as well as psychostimulants and nootropics (cognitive enhancers).

Mental health-related prescriptions subsidised by the PBS and RPBS rose from 20.4 million in 2007–08 to 21.4 million in 2008–09 (Table S26 🖱). This was in contrast to the decline seen over the previous 3 years. There were increases in the number of psychostimulants and nootropics and antipsychotics prescribed (on average by 20% and 11% per year respectively). On the other hand, prescriptions for hypnotics and sedatives decreased on average by 3.4% per year, while prescriptions for anxiolytics, antidepressants and other medications prescribed by psychiatrists decreased on average by around 1% per year.

The number of prescriptions issued through community pharmacies that are not covered by the PBS and RPBS is estimated through the Pharmacy Guild Survey, which is an ongoing survey of community pharmacies that provide records of all dispensed prescriptions for medicines listed on the PBS and RPBS (AIHW 2007). If these prescriptions are included then the total number of community-dispensed mental health-related medications is estimated to have increased from 27 million in 2007–08 to 28 million in 2008–09.

Specialised mental health care facilities

There were a total of 6,551 specialised mental health hospital beds available in public psychiatric wards and hospitals in 2007–08. The 16 public psychiatric hospitals provided 2,156 beds at an estimated recurrent expenditure of $447 million. In addition, there were 145 public acute hospitals with psychiatric wards or units providing 4,395 beds at a recurrent expenditure of $1.02 billion. The number of beds and expenditure figures for private psychiatric hospitals were not published for 2007–08. Over the 5-year period of 2003–04 to 2007–08, the annual real (inflation-adjusted) change in recurrent expenditure for public psychiatric hospitals declined on average by 1% in real terms, whereas for public acute hospitals with psychiatric wards or units expenditure grew at an average rate of 8% (AIHW 2010a). Equivalent data for private hospitals for 2007–08 were not available.

In 2007–08, there were 2,184 beds provided in 142 residential mental health facilities, both government and non-government operated, with a total recurrent expenditure of $189 million. Annual real growth in this expenditure averaged 2% between 2003–04 and 2007–08 (AIHW 2010a).

Nationally, $1.3 billion was reported as being spent on 958 community mental health care services during 2007–08. Annual average real expenditure growth between 2003–04 and 2007–08 was 7% (AIHW 2010a). These services include hospital outpatient clinics and non-hospital community mental health care services, such as crisis and mobile assessment and treatment services, day programs, outreach services, and consultation and liaison services.

Alcohol and other drug treatment services

Alcohol and other drug treatment services cover a wide variety of treatment interventions and are provided in both residential and non-residential settings. The services provided can include detoxification and rehabilitation programs, information and education courses, pharmacotherapy and counselling treatments.

In 2007–08, 658 treatment agencies that received public funding reported data for the Alcohol and Other Drug Treatment Services National Minimum Data Set (AODTS–NMDS), with half identified as non-government agencies (AIHW 2009d). This data set covers almost all government-funded treatment service agencies. Major exclusions from the data set are services that are specifically for Aboriginal and Torres Strait Islander people and those in which clients only receive treatment with opioid pharmacotherapy (for example methadone maintenance treatment). Any alcohol and drug treatment provided in a general practice setting is also excluded.

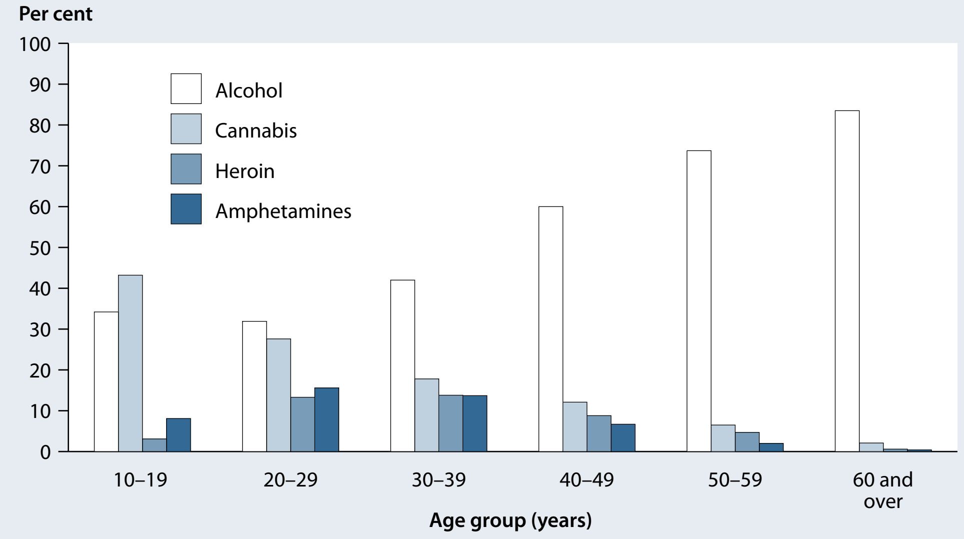
Since 2001–02, data on completed treatment episodes (referred to as 'closed' treatment episodes) have been collected for the AODTS–NMDS. A closed treatment episode refers to a period of contact between a client and a treatment agency that has defined start and end dates. A closed treatment episode may be for a single treatment (such as education and information only) or for a combination of treatments that form part of a larger plan.

Around 154,000 treatment episodes were provided during 2007–08, an increase of about 7,000 clients (5%) compared with 2006–07. The vast majority of treatment episodes (96%) were for people seeking treatment for their own drug use. The largest group of clients was males aged 20–29 years and this finding has been remarkably consistent over time.

Which substances do people seek treatment for?

The 'principal drug of concern' refers to the main substance that clients state led them to seek treatment from an agency. In 2007–08, there were around 148,000 episodes where clients sought treatment for their own substance use and in turn nominated a principal drug of concern. Nationally, alcohol (44%) and cannabis (22%) remained the most common principal drugs of concern to clients, followed by amphetamines and heroin (11% each). The proportion of clients seeking treatment for alcohol increased from 38% in 2002–03 to 44% in 2007–08. The proportion of clients seeking treatment for amphetamines and heroin has remained relatively stable since 2001–02. While nicotine was not the main drug for which clients sought treatment (2%), for about one in five episodes (18%) clients reported that nicotine was a concern in addition to their principal drug of concern.

Cannabis was the drug most commonly recorded for clients in the 10–19 years age group (43% of their episodes), whereas alcohol was the most common drug for those aged 20–29 years (32%) (Figure 7.26). As well as alcohol being the most likely principal drug of concern overall, it was especially so for older clients, nominated in 83% of episodes for those aged 60 years or over, and in 74% for those aged 50–59 years.



Note: These data exclude treatment episodes for clients seeking treatment for the drug use of other people.

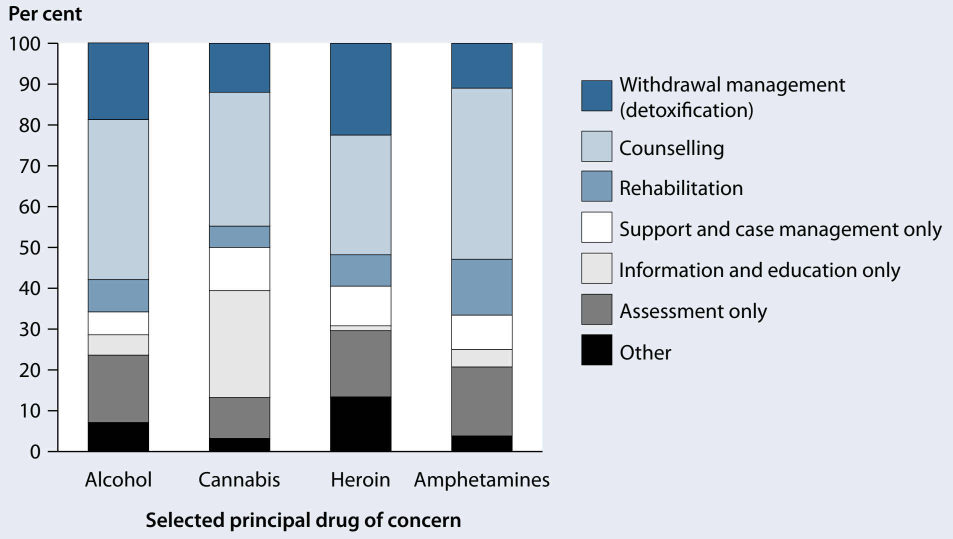
Source: AIHW 2009d.

Figure 7.26: Selected principal drug of concern by age group, 2007–08

What types of treatments are provided?

Among clients seeking treatment for their own drug use, counselling was the most common form of main treatment provided (37% of treatment episodes in 2007–08). This was followed by withdrawal management (detoxification) (16%), assessment (14%), information and education only (10%), support and case management (8%), and rehabilitation (7%).

The type of main treatment varied, depending on the principal drug for which the client sought treatment (Figure 7.27). Overall, counselling accounted for the highest proportion of treatment for all drugs of concern except benzodiazepines, methadone, nicotine and 'other' opioids. Where alcohol was the principal drug, the next most common treatment type was withdrawal management (19% of treatment episodes), followed by assessment (16%) and rehabilitation (8%). This treatment mix was similar for clients whose principal drug was heroin. For treatment episodes where amphetamines are reported as the principal drug, counselling (42%) was the most common treatment, followed by assessment (17%) and rehabilitation (14%). For episodes where cannabis was reported as the principal drug, counselling (33%) was the most common treatment, followed by information and education (26%), withdrawal management (12%) and support and case management (11%).



Notes

1. These data exclude treatment episodes for clients seeking treatment for the drug use of others.
2. 'Other' includes 3,178 closed treatment episodes where the main treatment was reported as pharmacotherapy. This represents a small proportion of pharmacotherapy treatment in Australia as agencies whose sole activity is to prescribe and/or dose for methadone or other opioid pharmacotherapies are currently excluded from the AODTS–NMDS.

Source: AIHW 2009a.

Figure 7.27: Selected main treatment type by selected principal drug of concern, 2007–08

What about other services for alcohol and other drugs?

There were 84,889 hospital separations reported in 2007–08 with a substance use disorder as the principal diagnosis, representing 1.1% of all hospital separations in Australia in that year (AIHW 2009d).

That same year, an estimated 93,000 episodes of care were provided to clients of Australian Government-funded Aboriginal and Torres Strait Islander substance use services. The treatment agencies providing these services all reported providing assistance for alcohol-related problems and the great majority also provided treatments for cannabis (96%), tobacco (76%), amphetamines (72%) and multiple drug use (78%). The treatments comprised about 3,500 episodes of residential treatment or rehabilitation, 17,300 of 'sobering up' or residential respite, and 72,000 episodes of 'other' care.

Nationally, an estimated 41,347 clients were receiving pharmacotherapy treatment for opioid use on a 'snapshot or specified' day in June 2008, with 70% of these clients receiving methadone, while the remainder were receiving buprenorphine or buprenorphine–naloxone (around 15% each) (AIHW 2009e). The proportion of clients receiving buprenorphine–naloxone increased markedly between 2006 (5.5%) and 2008 (15.5%). This combination product is now more commonly used as a treatment for opioid dependence than buprenorphine alone.

Reproductive health services

A range of clinical, community education and professional training services in sexual and reproductive health is provided by family planning organisations. These include contraceptive services, counselling and information services, early intervention and health promotion services, and the management of sexual and reproductive health.

Assisted reproduction technology

Assisted reproduction technology (ART) has been used in Australia since 1979. Policies governing its use vary among states and territories—in some jurisdictions, access is restricted to couples, while others allow single females to use ART services. The three main assisted reproduction technology procedures are in-vitro fertilisation, intra-cytoplasmic sperm injection, and gamete intra-fallopian transfer (Box 7.10).

Box 7.10: Main assisted reproduction technology procedures

In-vitro fertilisation (IVF)

Eggs and sperm are combined in the laboratory for fertilisation outside the body and the fertilised eggs are placed in the uterus. In 2007, IVF accounted for 2 in 5 assisted reproduction technology (ART) cycles in which embryos or oocytes were transferred.

Intra-cytoplasmic sperm injection (ICSI)

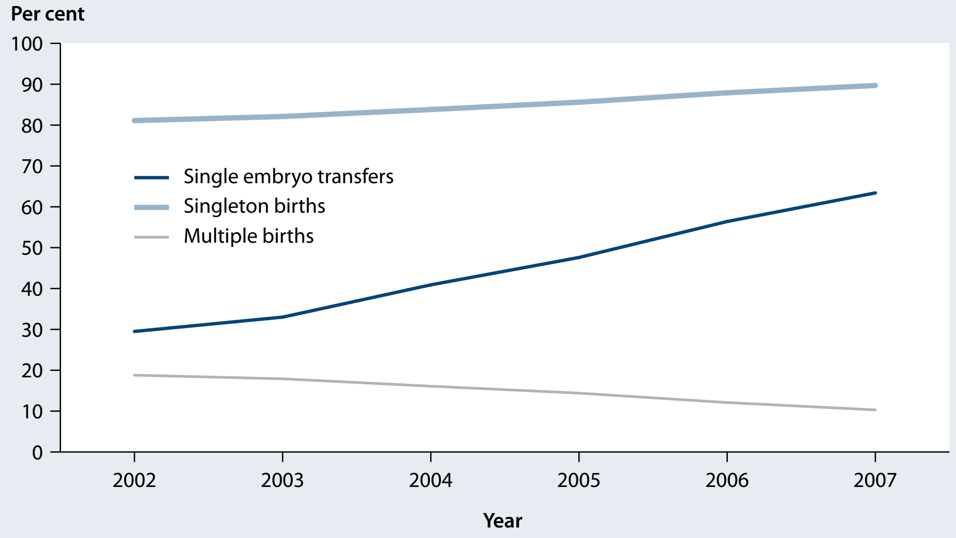
A single sperm is injected into an egg for fertilisation outside the body and the fertilised egg is placed in the uterus. This accounted for over half (58%) of ART transfer cycles in 2006.

Gamete intra-fallopian transfer (GIFT)

Eggs and sperm are placed in the uterus for fertilisation inside the body. In 2007, only 0.2% of transfer cycles used GIFT.

Data from the Australian and New Zealand Assisted Reproduction Database show that, in Australia in 2007, 42,853 ART cycles were started in which embryos or oocytes were transferred—almost 50% more than in 2002. Around 95% of ART transfer cycles involved the use of a female's own egg or embryo (Wang et al. 2009). More than one-quarter (27%) of cycles initiated in 2007 resulted in a pregnancy being detected, and 1 in 5 cycles (21%) resulted in a live birth. The success rate of transfer cycles, both in terms of pregnancies and live births, has risen over recent years (Wang et al. 2009).

A marked recent trend in ART treatment is a reduction in the frequency of multiple births, associated with the increasing practice of transferring a single embryo per cycle (Figure 7.28). Single-embryo transfer cycles accounted for 63% of embryo transfer cycles in 2007, compared with 29% in 2002. Over the same period, the multiple birth rate from ART almost halved from 18% to 10%.



Note: Single embryo transfers expressed as a percentage of all ART transfer cycles; birth plurality expressed as a percentage of all births resulting from ART treatment.

Source: Unpublished ANZARD data provided by NPSU.

Figure 7.28: Single-embryo transfers and birth plurality resulting from ART treatment, 2002–2007

Hearing services

A range of hearing services is provided by private and public practitioners, including hearing assessments and screenings, regular hearing checks to monitor changes in hearing levels, the supply and fitting of hearing devices, the replacement and maintenance of devices, and training to improve listening and communication skills.

The largest public program is administered by the Office of Hearing Services, which operates a voucher scheme covering hearing assessments; audiological rehabilitation and maintenance; prescription, selection and fitting of hearing devices; and subsidiary battery supply and device repair. In some circumstances clients of the voucher scheme may choose to be fitted with a hearing aid with additional features beyond their clinical needs and in these cases clients pay an additional cost. The voucher can be used at either Australian Hearing clinics or private clinics approved to provide services under the program. Groups eligible for the vouchers include pension concession card holders aged over 21 years and their dependents, Department of Veterans' Affairs card holders in certain categories, members of the Australian Defence Force (ADF) and clients undergoing an Australian Government-funded vocational rehabilitation service who are referred by their service provider.

Almost 1 million hearing services were provided through the voucher system in 2008–09 (Table 7.16). The number of hearing services increased by 39% between 2002–03 and 2008–09, with assessments showing the strongest growth of all the hearing service categories.

Table 7.16: Hearing services provided through the voucher system, 2002–03 to 2008–09 (selected years)

	Number of services				Per cent increase
Type of service	**2002–03**	**2004–05**	**2006–07**	**2008–09**	**2002–03 to 2007–08**
Assessments	138,492	176,537	184,558	223,839	61.6
Fittings	107,741	127,520	124,657	143,346	33.0
Maintenance	304,159	336,552	376,452	416,370	36.9
Replacements	17,731	17,973	20,388	26,421	49.0
Other[(a)]	139,631	160,299	163,940	170,568	22.2
Total	**707,754**	**818,881**	**869,995**	**980,544**	**38.5**

(a) Other includes audiological case management, rehabilitation services, aid adjustments, minor repairs and spare aids.

Source: AIHW analysis of Office of Hearing Services data.

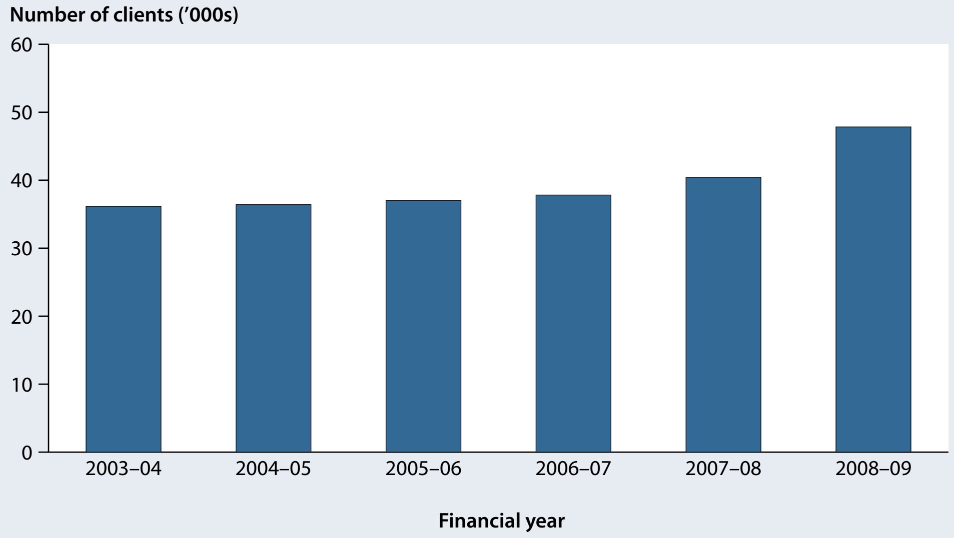
The Australian Government also provides hearing services for special needs groups through Australian Hearing, with funding provided by the Office of Hearing Services (Box 7.11).

Box 7.11: Eligibility for free hearing services provided by Australian Hearing

The following groups are eligible for free hearing services from Australian Hearing under its Community Service Obligations program:

- all Australians under 21 years of age
- adults with complex rehabilitation needs
- Aboriginal and Torres Strait Islander people who are over the age of 50, or are participating in a Community Development Employment Program or have participated in one of these programs between 1 December 2005 and 30 June 2008
- eligible clients living in remote areas.

In 2008–09, Australian Hearing provided services to 47,837 community service obligations program clients—18% more than the previous year (Figure 7.29). The number of services (excluding maintenance) provided to clients under the Community Service Obligations program increased from 73,068 in 2003–04 to 77,098 in 2008–09. During this period services to Indigenous Australians more than tripled.



Source: AIHW analysis of Office of Hearing Services data.

Figure 7.29: Number of clients receiving free hearing services from Australian Hearing from 2003–04 to 2008–09 ('000)

Palliative care services

Palliative care is the specialised care of people who have a terminal illness. The aim is not only to achieve the best possible quality of life for the individual patient under the circumstances but also for their carers and family. Care focuses on the prevention and relief of suffering through the early identification and treatment of pain, disability, and other physical and psychosocial problems. Medical conditions that commonly lead to palliative care include cancer, HIV/AIDS, muscular dystrophy, multiple sclerosis and end-stage dementia.

There is no single model for the delivery of palliative care services. It can be provided in the home, in community-based settings such as nursing homes, in palliative care units and in hospitals. The modern approach to palliative care emphasises flexibility and choice. The care provided is tailored to meet the wishes of the person who is dying, particularly in relation to the place of death.

Palliative care involves coordination of the skills and disciplines of many service providers, some specially qualified in palliative care. Those involved may include:

- specialist providers: medical, nursing and allied health staff who have undertaken further study in palliative care or have significant experience in the area
- generalist providers: those clinicians (medical, nursing and allied health) working in other areas of the health system who have a professional involvement with people requiring palliative care
- support services: those who assist with the processes of daily living, enhancing quality of life, and providing emotional and spiritual support.

In 2006, states and territories identified some 340 government-funded agencies that provided palliative care in Australia. A survey of these agencies found that 63% were specialist palliative care agencies. Sixty-five per cent of agencies delivered care mainly in the community (commonly private residences).

The number of separations for admitted hospital patients receiving palliative care in 2007–08 was 47,100. Public hospitals accounted for some 82% of these separations. Fifty-five per cent were male and 72% were aged 65 years or over. Some 60% of palliative care separations were for cancer patients.

Health services in the Australian Defence Force

All ADF personnel are provided with a comprehensive range of health services including emergency, acute and ongoing clinical care, rehabilitation, health screening, occupational fitness assessment and preventive health activities. Primary health care is provided mainly in-house by ADF staff and contracted health-care providers. ADF health facilities in Australia provide a range of outpatient services, low-dependency inpatient care and limited surgical capability, with some also providing dental, pharmacy, allied health and rehabilitation services. Many of the specialist health services provided to ADF personnel are provided by civilians, using a mix of contract, sessional and fee-for-service arrangements. In general, ADF members are in good health and enjoy a higher than average health status during their term in the ADF (see Section 5.7).

Oral health

The standard of oral health in the ADF is high. Annual dental examinations and biannual dental radiographs and treatment are mandatory for all ADF members. In 2008–09, about 90% of the ADF had no dental problems and were considered unlikely to require treatment within the next 12 months (dentally fit to deploy on operations).

Health promotion

The ADF Health Promotion Program aims to identify and manage health risk factors, lifestyle issues and early disease among ADF members.

All ADF members undergo regular health assessments that include a health questionnaire and physical examination that focus on height, weight and body mass index, blood pressure, vision and hearing; and lifestyle factors including smoking, alcohol consumption, mental health problems, sun protection, dental health and sexual health. Vaccination status is also checked and members are offered appropriate routine screening such as Pap tests, mammography and faecal occult blood tests. Specific assessments are carried out where dictated by an individual's job (for example as aircrew or divers) or as part of a pre-deployment workup.

A specialised health promotion unit within the ADF also provides advice on health promotion issues, and collects and analyses information. An example of this is the recent project on noise-induced hearing loss, in collaboration with the Department of Veterans' Affairs and the Occupational Health and Safety and Compensation Branch of the Department of Defence. This project identified expected work risk areas and validated the safety measures currently in place within the ADF. It also identified recreational risks contributing to noise-induced hearing loss.

Rehabilitation

The ADF regards rehabilitation as an integral part of health care and formalised its rehabilitation program with the introduction of the *Military Rehabilitation and Compensation Act* in 2004. The program combines the elements of health care, occupational health and safety, and personnel management.

In the period from July 2006 to June 2008, the program received 9,361 referrals (Table 7.17), an average of 390 per month. The two most common conditions for which rehabilitation was undertaken were musculoskeletal injuries and conditions (62.9%) and mental health disorders (8.5%). The program had a successful return-to-work rate of 88%.

During the first 2 years of the program's operation, the number of medical discharges from the ADF decreased from 761 to 595. Of this decrease, 136 (82%) were directly attributed to rehabilitation programs that retrained ADF members for alternative duties or trade within the ADF, estimated to represent a saving of $11.8 million.

Table 7.17: Comparison of days on convalescence and return to work rate

Year	Days absent for convalescence	Referrals to rehabilitation	Return-to-work rate
2005–06	101,546	1,849	n.a.
2006–07	92,664	5,096	88%
2007–08	92,560	4,265	86%

n.a. Not available.

Source: Management and Analysis Reporting Solution Database.

Mental health in the Defence Force

The mental health of ADF personnel is a high priority. As well as being the second most common reason for referrals for rehabilitation in the 2-year period from July 2006 to June 2008, mental health disorders were the third most common reason for time off work during the period July 2007 to June 2009 (Epitrack data). They are also the second most common set of conditions leading to consideration of medical discharge from the ADF.

Mental health support in the ADF is undertaken by multidisciplinary teams, comprising uniformed and civilian specialists from general medicine, psychiatry, psychology, nursing, religion and social work.

In 2009 a comprehensive review of mental health services was undertaken and a mental health reform process is now underway. An ADF Centre for Mental Health is being developed, and regional and local multidisciplinary mental health teams are being created around Australia. Five programs have been established, relating to:

- resilience and prevention
- clinical programs (alcohol and other drugs, depression, suicide prevention)
- mental health strategy and services
- operational mental health
- post-traumatic mental health.

Psychology support to the ADF

The Defence Force Psychology Organisation (DFPO) is one of several psychology support agencies within the ADF and it provides that support across the ADF within Australia. In particular it provides services and interventions that aim to contribute to organisational health and effectiveness, performance enhancement, and psychological health and readiness. These 'pillars' of the ADF's psychological support are in turn underpinned by applied research, policy and governance; for example, regular auditing of post-deployment psychological screening and professional development.

Psychological services are provided by uniformed and non-uniformed psychologists and psychology examiners and assistants. This support includes post-deployment psychological screening and support, administrative referrals, medical referrals, self-referrals, training referrals, critical incident mental health support, administration of surveys which assess the psychological health of the organisation and advice to commanders.

Pharmaceutical use

The 15 most common therapeutic classes of agents provided to ADF personnel during 2007–08 and 2008–09 are set out in Table 7.18. Vaccines were the most common item, reflecting the need to protect ADF personnel from vaccine-preventable diseases, particularly on deployment. Analgesics, antipyretics (anti-fever drugs) and other items for symptomatic relief were also commonly provided, as were anti-infective agents, which include antibiotics, antivirals and antifungals.

Table 7.18: Top 15 provided therapeutic classes for 2007–08 and 2008–09

Item by therapeutic class	Average per cent of provided agents for 2007–09
Vaccines	15.2
Analgesics/antipyretics (simple and combination)	13.3
Anti-infective agents	11.7
Expectorants/antitussives/mucolytics/decongestants	11.7
Sunscreen	8.3
Topical oro- and nasopharyngeal medication	6.9
Non-steroidal anti-inflammatory agents	5.9
Supplements	3.2
Antihistamines	2.3
Antihypertensive agents	1.9
Hyperacidity/reflux/ulcer medication	1.8
Lipid-lowering agents	1.7
Hormonal contraception	1.5
Bronchodilators	1.2
Emollients/antipruritics/protective preparations	1.2

Notes

1. Supplements include oral iron, vitamins and glucosamine.
2. Analgesics/antipyretics include simple, combination and strong analgesics.

Source: ADF unpublished data.

7.5 Use of medicines

The use of medicines is a common health-related action. Medicines are mostly obtained by prescription (there were 262 million prescriptions filled in 2008 in Australia), or purchased over the counter without a prescription. Non-prescription medicines include analgesics (pain-killers), cough medicine, vitamins and complementary medications. The use of medicines is an important component of the health-care system, accounting for $13.7 billion or 13% of recurrent health expenditure in 2006–07 (AIHW 2009f).

Prescription medications are provided largely through community pharmacies and hospitals, while non-prescription medicines and complementary and alternative medicines are mainly sourced from pharmacies and other retail outlets. At 31 December 2009 there were 5,117 approved community pharmacies in Australia.

Prescribed medicines

Information on the supply of prescription medicines in the community is derived from two sources and compiled by Medicare Australia. Information on prescriptions for medications that are subsidised by the PBS or the RPBS is held by Medicare Australia (see Box 7.12). Estimates of the use of non-subsidised prescription medicines are sourced from the Pharmacy Guild of Australia’s ongoing survey of community-based pharmacies. Data are not available on the use of prescribed medicines in public hospitals and most private hospitals.

Box 7.12: Pharmaceutical Benefits Scheme and the Repatriation Pharmaceutical Benefits Scheme

The Pharmaceutical Benefits Scheme (PBS) subsidises the cost of a wide range of prescription medications, providing Australians with access to necessary and cost-effective medicines at an affordable price. At December 2009, the scheme covered 874 drug substances (generic drugs), available in 2,168 forms and strengths, and marketed as 3,949 products (brands).

The Repatriation Pharmaceutical Benefits Scheme (RPBS) provides assistance to eligible war veterans and dependants. It is generally similar to the PBS for concessional beneficiaries, but covers a somewhat broader range of pharmaceuticals.

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. The committee takes into account the medical conditions for which the medicine has been approved for use in Australia by the Therapeutic Goods Administration, its clinical effectiveness, its safety and its cost-effectiveness compared with other treatments. Once the committee has recommended a medicine, it is considered by the Pharmaceutical Benefits Pricing Authority. The price is negotiated between the manufacturer and the Australian Government Department of Health and Ageing, and the Australian Government then considers the listing.

Australian residents and visitors from countries with reciprocal health care agreements are eligible for PBS benefits.

Patients are grouped into two classes: general and concessional. As at 1 January 2010, general patients paid up to the first $33.30 for each PBS prescription item. For concessional patients (people with low incomes and sickness beneficiaries who hold a health care card), the payment was $5.40 per prescription item. These copayments are increased on 1 January each year, generally in line with consumer price index increases.

Individuals and families are protected by the PBS safety net from large overall expenses for PBS-listed medicines. For the calendar year to 2011, once a general patient and immediate family has spent $1,281.30 in a calendar year, the patient copayment per item decreases to the concessional rate of $5.40. For concessional patients, the $5.40 copayment is not required once their expenditure on PBS items exceeds $324.00.

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 particular therapeutic group of drugs. These additional payments do not count towards the PBS safety net.

During 2008, there were 179 million PBS prescriptions—26 million for general patients and 153 million for concessional patients (Table 7.19). In addition there were 14 million prescriptions written for war veterans and their dependants under the RPBS.

Also attracting subsidy were 0.4 million PBS doctor's bag prescriptions—that is, drugs provided without charge through the PBS to the doctor, who can then supply them free to patients in an emergency.

In 2008, there were about 68 million prescriptions which did not attract a subsidy under the PBS or the RPBS—50 million below the copayment threshold and 18 million private prescriptions. Private prescriptions are those written by doctors for drugs not eligible for subsidy under the PBS or RPBS, or for a listed medication prescribed for a non-PBS-approved medical reason.

Trends in prescribed medicines

There has been a steady increase in the total number of community prescriptions (PBS and the rest), from 180 million in 1996 to 262 million in 2008 (Table 7.19), representing an average annual growth of 3.2% or a total growth over the period of 46%. The growth in the number of PBS and RPBS prescriptions is less regular than the growth in overall prescriptions because of variations in the copayment schemes over the years. The rate of PBS and RPBS prescriptions as a proportion of the total community prescriptions fluctuated over the period 1996–2006. However, in 2008 it was 74%, the same level as 1996.

Between 1996 and 2006, prescriptions which cost below the copayment threshold decreased from 19% to 15% of total prescriptions. However, in 2008 they increased to 19%. This represents a 45% increase from 35 million prescriptions in 2006 to 50 million in 2008. The rise in under-copayment medications accounted for 62% of the total increase in community prescriptions between 2006 and 2008. The reason for this increase is unclear, although the availability of medications costing less than the copayment threshold due to patent expiry and discounted medications may be contributing to this increase. Policy changes that broaden the eligibility criteria for certain prescription medications may also influence these figures.

Table 7.19: Number of community prescriptions, 1996 to 2008

Type	1996	1998	2000	2002	2004	2006	2008	Change 1996 to 2008	Average annual change 1996 to 2008
				(million)				(per cent)	(per cent)
PBS concession	105.8	107.3	120.5	132.3	141.4	141.9	152.6	44	3.1
PBS general	18.5	18.8	21.8	25.2	29.5	25.8	26.4	43	3.2
RPBS	8.7	10.2	12.5	15.0	15.7	14.7	14.1	62	4.3
PBS/RPBS total	*133.0*	*136.4*	*154.8*	*172.5*	*186.6*	*182.3*	*193.1*	*45*	*3.2*
Private	11.7	15.1	14.3	16.0	18.1	19.3	18.0	55	4.1
Below copayment	34.1	35.4	30.7	27.6	28.2	34.6	50.2	47	3.9
Other[(a)]	0.7	0.6	0.5	0.5	0.4	0.4	0.4	−46	−4.9
Total	**179.5**	**187.5**	**200.3**	**216.6**	**233.3**	**236.7**	**261.7**	**46**	**3.2**

PBS Pharmaceutical benefits scheme.

RPBS Repatriation Pharmaceutical Benefits Scheme.

(a) 'Other' refers to doctor's bag medications.

Source: Drug Utilisation Sub Committee drug utilisation database, DoHA unpublished.

Which drugs are prescribed the most?

One measure of the use of prescription medicine is the defined daily dose per 1,000 population. It is based on the assumed average dose per day of the drug for its main indication (reason for use) by adults. It allows for comparisons of different drugs independent of differences in quantities of drugs per prescription. It is assumed that the amount of medicines supplied is the same as the amount used. However, this will not always be the case.

In 2006–07, atorvastatin (used for lowering blood cholesterol) was the most commonly used generic drug measured by the defined daily dose rate (Table 7.20), followed by ramipril (used for lowering blood pressure) and perindopril (also used for lowering blood pressure). For most of these high-volume prescriptions, the vast majority were provided through the PBS or RPBS. However, amoxycillin was provided as a non-PBS or non-RPBS prescription in 61% of cases (4 million prescriptions).

Table 7.20: Top 15 generic medications, 2007–08

		Defined daily dose per 1,000 population			Prescriptions ('000)		
Generic name	**Action**	**PBS/ RPBS**	**Other[(a)]**	**Total**	**PBS/ RPBS**	**Other[(a)]**	**Total**
Atorvastatin	Lowers blood cholesterol	65.6	0.2	65.8	10,555	30	10,585
Ramipril	Lowers blood pressure	28.4	11.8	40.2	2,678	1,029	3,707
Perindopril	Lowers blood pressure	22.5	7.1	29.6	3,840	1,283	5,123
Simvastatin	Lowers blood cholesterol	25.7	0.2	25.8	5,779	113	5,892
Irbesartan	Lowers blood pressure	16.7	6.9	23.6	3,089	1,248	4,337
Salbutamol	Opens airways	16.2	5.3	21.5	2,810	856	3,666
Esomeprazole	Lowers stomach acid	19.0	0.1	19.1	5,229	15	5,244
Paracetamol	Pain-killer	16.2	0.7	16.9	3,674	170	3,844
Omeprazole	Lowers stomach acid	16.3	0.2	16.5	3,707	54	3,761
Metformin hydrochloride	Lowers blood glucose	11.7	4.2	15.9	2,965	1,041	4,006
Atenolol	Lowers blood pressure	9.3	3.0	12.3	3,249	1,030	4,279
Amoxycillin	Antibiotic	2.7	4.1	6.8	2,553	4,000	6,553
Amoxycillin with clavulanic acid	Antibiotic	1.7	2.3	4.1	1,658	2,281	3,940
Cefalexin	Antibiotic	1.4	1.3	2.7	2,330	2,132	4,462
Codeine with paracetamol	Pain-killer	n.a	n.a	n.a	2,496	1,557	4,053

PBS Pharmaceutical Benefits Scheme.

RPBS Repatriation Pharmaceutical Benefits Scheme.

(a) Prescriptions not subsidised by the PBS or RPBS, because they were private prescriptions or the cost to the patient was not more than the copayment.

Source: Drug Utilisation Sub Committee drug utilisation database (DoHA, unpublished).

The use of some prescription medicines has changed markedly over the last few years. For most drugs appearing in the top 15 in 2003–04 and 2007–08 there has been an increase in the defined daily dose rate. However, there has been a fall in the rate for omeprazole (17%), paracetamol (20%) and salbutamol (16%) (Table S27 🖱). Some medications that were in the top 15 in 2003–04 no longer appear, including celecoxib and rofecoxib (ranked tenth and fourteen respectively in 2003–04). Following the identification of cardiovascular risks associated with cox-2 inhibitor drugs such as these, rofecoxib (Vioxx) was withdrawn from the market and doctors were advised to limit the use of celecoxib (TGA 2010).

Atorvastatin, simvastatin (cholesterol lowering drugs) and clopidogrel (reduces blood clot formation) were the highest cost drugs for the PBS in 2007–08, with expenditure on them totalling $544.1 million, $221.9 million and $171.2 million respectively. The next most costly were esomeprazole (a drug that lowers stomach acid, $166.2 million) and olanzapine (a drug used to treat schizophrenia and bipolar disorders, $152.3 million) (DoHA 2008).

Prescribing patterns of general practitioners

The BEACH survey of general practice activity collects information on drugs prescribed by GPs (Britt et al. 2008). In 2007–08, GPs wrote an estimated 79,051 prescriptions, at a rate of 82 per 100 encounters. Medications for the nervous system, including analgesics (pain-killers) and antidepressants, were the most commonly prescribed group, accounting for 21.6% of all prescriptions. The next most common was cardiovascular medications (20.1%), followed by antibiotics (19.3%), alimentary tract and metabolism medications (9.6%), and respiratory medications (6.2%).

Of the top 10 most commonly prescribed medications, four were antibiotics and two were pain-killers (Table 7.21). Other medications commonly prescribed were cholesterol lowering drugs, blood pressure lowering drugs, drugs for the treatment of diabetes and drugs used to treat asthma.

Table 7.21: Medications most frequently prescribed by GPs, 2007–08

Generic name	Action	Proportion of prescriptions (per cent)	Prescriptions per 100 encounters
Amoxycillin	Antibiotic	4.2	3.5
Paracetamol	Pain-killer	3.0	2.5
Cephalexin	Antibiotic	3.0	2.4
Paracetamol with codeine	Pain-killer	2.3	1.9
Atorvastatin	Lowers blood cholesterol	2.1	1.7
Amoxycillin with potassium clavulanate	Antibiotic	2.1	1.7
Salbutamol	Opens airways	1.6	1.3
Roxithromycin	Antibiotic	1.5	1.2
Metformin	Lowers blood glucose	1.4	1.2
Perindopril	Lowers blood pressure	1.4	1.2

Note: These data refer to prescriptions written by GPs. Actual prescriptions filled per 100 encounters may be higher than the numbers in this table, because many prescriptions have 'repeats'—drugs for chronic disorders frequently have five repeats.

Source: Britt et al. 2008.

Non-prescribed medicines

The only information available on the use of non-prescribed medicines is from the BEACH survey, which collects and reports information on drugs that GPs advise patients to purchase over the counter or that the GPs supply directly.

In 2007–08, 9.8% of medications prescribed, advised or provided by GPs in the BEACH survey were advised for over-the-counter purchase, and 9.9% were supplied by the GP. Over a quarter of drugs (25.2%) advised for over-the-counter purchase were for paracetamol and 5.7% for ibuprofen (an anti-inflammatory drug). The most common medications supplied directly by GPs were vaccines.

7.6 Safety and quality

There are many ways of describing health care and the earlier sections of this chapter have focused mainly on the various types of services and their extent. Another perspective is not simply on services being provided but on how well they are performing. Chapter 9 relates to this approach by discussing Australia's overall health performance, as suggested by a range of indicators. This section complements Chapter 9 by focusing in more detail on certain aspects of the health system's performance—health-care safety and quality (Box 7.13). The principles of safety and quality apply to the entire health system, from community and primary health services to hospital services, as well as across private and public sectors. The broader community, as users and consumers of health care, often have a strong interest in the area.

This section provides an overview of current activities to encourage monitoring and reporting on safety and quality in Australia, with a strong focus on hospitals. It concludes with a brief description of medical indemnity claims. Although medical indemnity claims comprise only a subset of safety and quality events, claims can be regarded as a reflection of patient views of health care, safety and quality, as a patient's decision to pursue legal action against a health-care provider represents significant dissatisfaction with their health-care experience.

Box 7.13: Health-care safety and quality

The safety of the health-care system relates primarily to preventing adverse or undesired health outcomes and can be defined as 'the avoidance or reduction to acceptable levels of actual or potential harm from health care or the environment in which health care is delivered' (NHPC 2001).

Health-care quality is a characteristic of the system that encapsulates how it is performing in an overall sense. There is no universally accepted definition of quality. Typically, quality is defined in terms of different dimensions of performance, including:

- effectiveness—defined as care, intervention or action provided that is relevant to the client's needs, is based on established standards and achieves the desired health outcome
- continuity of care—defined as the ability of the health-care sector to provide uninterrupted, coordinated care or service across programs, practitioners, organisations and levels over time
- responsiveness—defined as the ability of a health-care service to be client oriented: where clients are treated with dignity and confidentiality, participate in choices related to their health care and where services respond to client reported experience and outcomes.

The characteristics of the health-care system that comprise health-care safety and quality are components of the broader concept of 'health performance'. As outlined in Chapter 9, health performance also covers issues such as accessibility of services, population health status and determinants of health.

Measuring and reporting safety and quality

The measurement and reporting of safety and quality occurs at various levels of the health system: at the clinician level (for example, review of surgery outcomes), at the service level (for example, compliance with guidelines or standards), among networks of health services, and at the jurisdictional and national level.

Regardless of the level at which it occurs, the primary aim of safety and quality measurement and reporting is to improve health-care delivery. This could be improvements in the clinical management of patients, refinement of service management policy (for example, infection control) or improvements in broader policy and health system planning (such as workforce development). In most cases information is shared between clinicians, or between clinicians, service administrators or health department employees. This fosters improvements through measuring and comparing outcomes, and though understanding the potential for self-improvement. To this end, the data must be accurate and properly analysed, interpreted and understood. This process is particularly important because safety and quality indicators are generally not exact measures of performance in the area, but rather a 'flag' that can identify potential areas for further analysis.

There is also a role for making safety and quality information publicly available. For example, some data are published for some hospitals on specific safety and quality indicators. And some safety and quality indicators, such as adverse events, are published annually at a national level (see AIHW 2009c and earlier publications).

In some other countries publication of safety and quality information at the service level occurs routinely, for example, National Health Service Choices in the United Kingdom (see <www.nhs.uk>) or Hospital Quality Compare in the United States (see <www.hospitalcompare.hhs.gov>). The publication of service-level indicators recognises the right of health-care users to be informed and included in choices of care, and creates an environment of transparency and accountability at the service level.

A national approach

Over the last few years, there have been a number of recent developments in the monitoring and reporting of safety and quality data at a national level. In 2008, the Council of Australian Governments (COAG) announced a suite of health-care performance indicators in the National Healthcare Agreement (see Box 9.2). Collectively, this indicator set relates to the performance of the entire health system. It includes, for example, indicators that relate specifically to adverse events that arise or are treated in hospitals. These are: health-care associated infections—*Staphylococcus aureus* bacteraemia (HAI-SAB), including methicillin-resistant strains; pressure ulcers; falls; adverse drug events; and intentional self-harm. Unplanned or unexpected hospital readmissions within 28 days of selected surgical procedures are also included.

Due to data limitations, not all of these indicators can be reported by the COAG Reform Council, charged by COAG to report the indicators. Considerable data development and collection efforts are now in progress, for example in the area of HAI-SAB. Under the guidance of the Australian Commission on Safety and Quality in Health Care, work is also underway to ensure that the monitoring of safety and quality in other sections of the health system, such as primary and community care, is developed further at a national level.

Furthermore, in December 2009 Australian health ministers agreed on a national approach to a core set of nine indicators of quality and safety. This set includes:

- two whole-of-health system indicators—potentially avoidable deaths, and selected potentially preventable hospitalisations (see Chapter 9)
- seven hospital-based outcome indicators that draw on a recommended set of safety and quality indicators (AIHW 2009g)
- the NHA indicators
- safety and quality indicators within the revised National Health Performance Framework set.

This work aims to provide individual hospitals with timely, routine reports that facilitate comparisons with similar hospitals.

Data for two safety and quality indicators, adverse events and standardised hospital mortality ratios, are shown below. 'Adverse events' is one of the few safety and quality indicators that have been reported at a national level over some years and is included in the NHPC set (see Chapter 9). Standardised hospital mortality ratios, although relatively new to Australia (see AIHW 2009h), have been identified as an important and useful tool for safety and quality monitoring (for example, they are routinely reported for hospitals in Canada and the United Kingdom). They are included in the set agreed by health ministers in 2009 and their application in Australia is expected to grow.

Adverse events

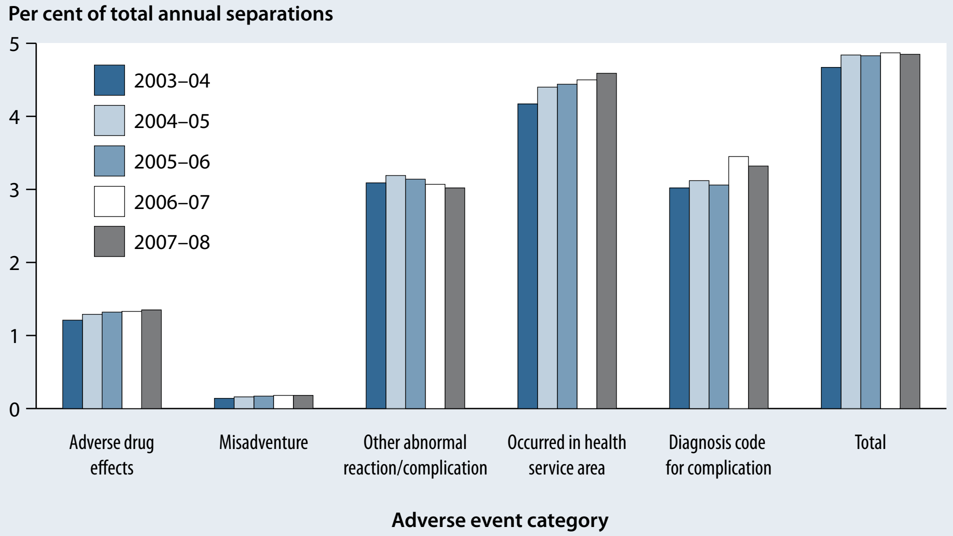
Adverse events are defined as incidents involving harm to a person receiving health care. They include infections, falls and other injuries, and reactions or complications due to surgery, medication or medical devices, some of which may be preventable. Adverse events in health care may occur inside or outside hospitals, and can be the cause of hospitalisation as well. The former Australian Council for Safety and Quality in Health Care estimated that an adverse event is associated with about 10% of hospital separations in Australia and other developed countries (ACSQHC 2001). About 2% of separations have been estimated to be associated with serious adverse events causing major disability (1.7%) or death (0.3%) (Runciman et al. 2000).

Hospital separations data can be used to indicate the occurrence of adverse events because they include information on diagnoses, places of occurrence and external causes of injury and poisoning that can indicate that an adverse event was treated and/or occurred during the hospitalisation. However, other diagnosis codes may also suggest that an adverse event has occurred, and some adverse events are not identifiable using these codes. The data presented below therefore 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.

In 2007–08, there were over 382,000 separations with an ICD-10-AM code for an adverse event, or 4.8 per 100 separations. The data for public hospitals are not comparable with those for private hospitals because their casemix and recording practices may be different.

Procedures causing abnormal reactions/complications were reported for 238,000 separations, 106,000 separations included a report of *Adverse effects of drugs, medicaments and biological substances* and 75,000 separations were reported with *Complications of internal prosthetic devices, implants and grafts*.

Between 2004–05 and 2007–08, the proportion of separations with an ICD-10-AM code for an adverse event remained relatively stable (Figure 7.30), with the number of separations reporting *Adverse effects of drugs, medicaments and biological substances* increasing from 1.2 to 1.3 per 100 separations. Over the same period the reporting of *Health service area* as the place of occurrence (of injury or poisoning) increased from 4.2 to 4.6 per 100 separations. However, these increases may reflect improvements in documenting adverse events rather than an increase in these events.



Notes

1. Separations for which the care type was reported as Newborn with no qualified day as and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.
2. ICD-10-AM codes used are:

   Adverse drug effects: Y40-Y59 *Adverse effects of drugs, medicaments and biological substances.*

   Misadventure: Y60-Y82 *Misadventures to patients during medical or surgical care.*

   Other abnormal reaction/complication: Y83-Y84 *Procedures causing abnormal reactions/complications.*

   Occurred in a health service area: Y92.22 Health service area.

   Diagnosis code for complication: E89, G97, H59, H95, I97, J95, K91, M96, N99, T80–88, T98.3.
3. Categories do not add up to the totals because multiple diagnoses and external causes can be recorded for each separation and can be used together to describe an adverse event.
4. Misadventure can include incidents such as foreign object accidentally left in body or failure in dosage during surgical or medical care.
5. Diagnosis code for complication includes complications of medical and surgical care—such as complications of internal devices or implants, or post-procedural infections or disorders.

Source: AIHW 2009c.

Figure 7.30: Proportion of separations with an adverse event reported, by type of adverse event, all hospitals, 2003–04 to 2007–08

Hospital standardised mortality ratios

The hospital standardised mortality ratio (HSMR) measures whether a death rate for a hospital is higher or lower than would be expected, taking into account factors such as the range and volume of admitted patient care provided by the hospital (Box 7.14).

Box 7.14: Hospital standardised mortality ratios

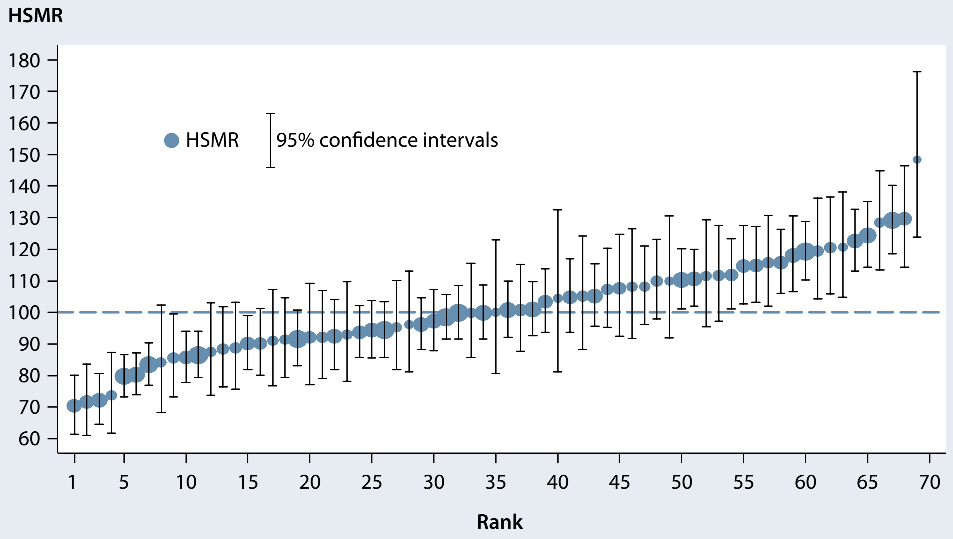
Hospital standardised mortality ratios (HSMRs) are generated from existing hospital data on admitted patients and commonly expressed as the ratio of the observed number of deaths divided by an expected number of deaths, multiplied by 100. In this case, the expected mortality is based on the average mortality of hospitals treating patients of similar complexity.

For example, a hospital with an HSMR of 100 has a mortality rate exactly as expected. An HSMR of 120 implies a mortality rate 20% higher than would be expected, and an HSMR of 80 implies a mortality rate 20% lower.

When calculating HSMRs, compensations known as risk adjustments are made to allow for variation between hospitals in the clinical and demographic characteristics of their patients.

Figure 7.31 displays large variation in HSMRs in Australian *Principal referral and Specialist women's and children's hospitals* (known as Peer Group A public hospitals). The 95% confidence interval associated with each point (represented by a vertical bar) estimates the degree of uncertainty of the HSMR estimate. Hospitals for which the confidence intervals do not overlap can generally be assumed to be different in terms of HSMRs.

HSMRs illustrate variation in mortality among hospitals. Like most safety and quality indicators, they are best regarded as screening tools that indicate where detailed investigation may be required to understand why higher or lower death rates are occurring, rather than as tools to diagnose quality of care.



Source: AIHW 2009h.

Figure 7.31: Variation in hospital standardised mortality ratio for Principal referral and Specialist women's and children's hospitals, 80% of in-hospital mortality, 2005–06

Medical indemnity claims

The patient's view of their health-care experience is of much interest to the safety and quality field and, for example, patient experience measures are to be reported as part of the NHA suite of performance indicators. A number of options are also available to a patient if they are dissatisfied with their health care. Informal and formal complaints can be made, or a patient can pursue legal action against a health-care service or provider, seeking compensation for alleged harm or other loss.

The Medical Indemnity National Collection has been established to collect claims data from both the public and private health sectors, to provide information on trends in the characteristics of claims. Information on medical indemnity claims may complement other data in the safety and quality field, by providing an indication of the types of incidents most likely to result in litigation. However, it must be noted that a number of factors influence whether a medical indemnity claim is made (such as the patient's perception of medical malpractice), and not all claims relate to an adverse event. Health-care complaints, patient surveys and incident reporting systems, like medical indemnity claims, cannot present a 'rate' when aggregated, but should be used to develop insights into types and patterns of adverse events.

The number of new medical indemnity claims in the public sector declined from 2,040 in 2002–03 to 1,292 in 2007–08 (AIHW unpublished data). Issues related to 'procedure' and 'diagnosis' were the most frequent alleged causes for a claim, together accounting for over half of all current claims that were open at 30 June 2007, while 'treatment' and 'general duty of care' were each cited in around 10% of claims (AIHW 2010b).

References

ABS (Australian Bureau of Statistics) 2008. Private hospitals, Australia 2006–07. ABS cat. no. 4390.0. Canberra: ABS.

ABS & Statistics NZ 2006. ANZSCO—Australian and New Zealand Standard Classification of Occupations. 1st edn. ABS cat. no. 1220.0. Canberra: ABS.

ACSQHC (Australian Council for Safety and Quality in Health Care) 2001. First national report on patient safety. Canberra: ACSQHC.

AIHW (Australian Institute of Health and Welfare) 2007. Statistics on drug use in Australia 2006. Drug statistics series no. 18. Cat. no. PHE 80. Canberra: AIHW.

AIHW 2008. Australia's health 2008. Cat. no. AUS 99. Canberra: AIHW.

AIHW 2009a. Public health expenditure in Australia, 2007–08. Health and welfare expenditure series no. 38. Cat. no. HWE 47. Canberra: AIHW.

AIHW & DOHA (Department of Health and Ageing) 2009b. National Bowel Cancer Screening Program: annual monitoring report 2009. Cancer series no. 49. Cat. no. CAN 45. Canberra: AIHW.

AIHW 2009c. Australian hospital statistics 2007–08. Health services series no. 33. Cat. no. HSE 71. Canberra: AIHW.

AIHW 2009d. Alcohol and other drug treatment services in Australia 2007–08: report on the National Minimum Data Set. Drug treatment series no. 9. Cat. no. HSE 73. Canberra: AIHW.

AIHW 2009e. National Opioid Pharmacotherapy Statistics Annual Data collection: 2008 report. Bulletin no. 72. Cat. no. AUS 115. Canberra: AIHW.

AIHW 2009f. Health expenditure Australia 2007–08. Health and welfare expenditure series no. 37. Cat. no. HWE 46. Canberra: AIHW.

AIHW 2009g. Towards national indicators of safety and quality in health care. Cat. no. HSE 75. Canberra: AIHW.

AIHW: Ben-Tovim D, Woodman R, Harrison JE, Pointer S, Hakendorf P & Henley G 2009h. Measuring and reporting mortality in hospital patients. Cat. no. HSE 69. Canberra: AIHW.

AIHW 2010a (in press). Mental health services in Australia 2007–08. Mental health series no. 12. Cat. no. HSE 88. Canberra: AIHW.

AIHW 2010b. Public and private sector medical indemnity claims in Australia 2005–06: a summary. Cat. no. HSE 86. Canberra: AIHW.

Brennan DS, Luzzi L & Roberts-Thomson KF 2008. Dental service patterns among private and public adult patients in Australia. BMC Health Services Research 8:1.

Britt H, Miller GC, Charles J, Henderson J, Bayram C, Harrison C et al. 2008. General practice activity in Australia 2007–08. General practice series no. 22. AIHW cat. no. GEP 22. Canberra: Australian Institute of Health and Welfare.

Britt H, Miller GC, Charles J, Henderson J, Bayram C, Pan Y et al. 2009. General practice activity in Australia 2008–09. General practice series no. 25. AIHW cat. no. GEP 25. Canberra: Australian Institute of Health and Welfare.

Britt H & Miller GC (eds) 2009. General practice in Australia, health priorities and policies 1998 to 2008. General practice series no. 24. AIHW cat. no. GEP 24. Canberra: Australian Institute of Health and Welfare.

DoHA (Australian Government Department of Health and Ageing) 2004. Australian refined diagnosis related groups, version 5.1. Canberra: DoHA.

DoHA 2008. Expenditure and prescriptions twelve months to 30 June 2008. Canberra: DoHA. Viewed September 2009, <www.health.gov.au/internet/main/publishing.nsf/Content/pbs-stats-pbexp-jun08>.

DoHA 2009. National mental health policy 2008. Canberra: DoHA.

HDSC (Health Data Standards Committee) 2006. National health data dictionary. Version 13. AIHW cat. no. HWI 88. Canberra: Australian Institute of Health and Welfare.

Medicare Australia 2009. Annual report 2008–2009 and statistical tables. Canberra: Medicare Australia. Viewed September 2009, <www.medicareaustralia.gov.au/about/governance/reports/08-09/index.jsp>.

NCCH (National Centre for Classifications in Health) 2006. The International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian Modification (ICD-10-AM), Australian Classification of Health Interventions (ACHI) and Australian Coding Standards (ACS), 5th edn. Sydney: University of Sydney.

NHPC (National Health Performance Committee) 2001. National Health Performance Framework report. Brisbane: Queensland Health.

NPHP (National Public Health Partnership) 1997. Public health in Australia: the public health landscape: person, society, environment. Melbourne: NPHP.

PHIAC (Private Health Insurance Administration Council) 2009. Private Health Insurance Administration Council: industry statistics. Canberra: PHIAC. Viewed September 2009, <www.phiac.gov.au>.

RFDS (Royal Flying Doctor Service) 2009. Royal Flying Doctor Service Central Operations annual report 2008–09. Sydney: Australian Council of the RFDS.

Runciman WB, Webb RK, Helps SC, Thomas EJ, Sexton EJ et al. 2000. A comparison of iatrogenic injury studies in Australia and the USA. II: reviewer behaviour and quality of care. International Journal for Quality and Safety in Health Care 12:379–88.

SCRGSP (Steering Committee for the Review of Government Service Provision) 2010. Report on government services 2010. Canberra: Productivity Commission.

Slade GD, Spencer AJ & Roberts-Thomson KF (eds) 2007. Australia's dental generations: the National Survey of Adult Oral Health 2004–06. Dental statistics and research series no. 34. AIHW cat. no. DEN 165. Canberra: Australian Institute of Health and Welfare.

TGA (Therapeutic Goods Administration) 2010. TGA—Therapeutic Goods Administration. Canberra: Department of Health and Ageing. Viewed 15 January 2010, <http://www.tga.gov.au/index.htm>.

Wang YA, Chambers GM, Dieng M & Sullivan EA 2009. Assisted reproductive technology in Australia and New Zealand 2007. Assisted reproduction technology series no. 13. AIHW cat. no. PER 47. Canberra: Australian Institute of Health and Welfare.

Expenditure and workforce

8

KEY POINTS

- Health expenditure during 2007–08 was $103.6 billion, exceeding $100 billion for the first time.
- Health expenditure in 2007–08 equalled 9.1% of gross domestic product (GDP).
- As a share of its GDP, Australia spent more than the United Kingdom in 2007–08 (8.4%), a similar amount to the OECD median (8.9%) and much less than the United States (16%).
- Governments funded almost 70% of health expenditure in 2007–08.
- For Indigenous Australians in 2006–07, spending per person on health and high-level residential aged care was 25% higher than for other Australians.
- In 2007–08, public health was the area of expenditure with the highest growth (20.7%), mainly due to organised immunisation programs, particularly the national human papillomavirus vaccination.
- Employment in health occupations is still growing—23% growth between 2003 and 2008, almost double that across all occupations (13%).
- Between 2002 and 2007, there was a 26% increase in people completing health occupation university courses.
- The profile of the health workforce continues to age—in 2008, 18% of the workforce was aged 55 years and over compared with 13% in 2003.
- The health workforce in 2008 was 75% female, compared with 45% for all occupations.
- The mix of the medical workforce changed between 1997 and 2007
  - the supply of primary care doctors (in 'full-time equivalent' numbers per 100,000 population) has fallen
  - the supply of specialists, specialists-in-training and hospital-based non-specialists has increased.

Services such as those described in the previous chapter depend on extensive resources. These include a large workforce of trained health professionals, the various methods and therapies they use, and the associated facilities and technology. These in turn depend on the universal resource of money. It is provided at a more general level by governments (and therefore by taxpayers), at a more specific level by individuals when they pay out of their own pockets for services, by health insurance companies on behalf of their contributors—and often by some mix of these.

As with all resources, however, those for health are ultimately limited at the level of both government and individual Australians. Only so much can be afforded overall and health expenses compete with expenses for other important aspects of life.

Governments and other funders of health services make policies and choices about which health services should be provided or used. Changes in policy can mean that health resources are increased in some areas and reduced in others. These decisions are illustrated by the patterns of expenditure on health services.

It is therefore of interest to examine the levels and patterns in health spending over the years. For example, is expenditure rising and if so in what areas? How is the health dollar allocated to—or consumed by—various areas of health care or types of ill health? And who pays for what and is this changing? It is also of interest to focus on one key resource that has attracted much attention in recent years, the health workforce. These are the subjects of this chapter. (In considering those patterns of spending over the years, it should be noted that there have been some revisions to previously published estimates of health expenditure—see Box 8.1).

Box 8.1: Revisions to previous estimates

There have been some revisions to previously published estimates of health expenditure, due to the receipt of additional or revised data, or to changes in the methods of analysis. Comparisons over time should be based on the estimates provided in this publication or *Health expenditure Australia 2007–08*, and online data, rather than by reference to earlier editions of *Australia's health*. Estimates in this report are also not comparable with the data published in *Health expenditure Australia* issues before 2005–06, because the expenditure on high-care residential aged care services was reclassified after that time from 'health services' to 'welfare services'.

In addition, capital consumption, which had in previous editions of this report been shown as a separate (non-recurrent) form of expenditure, has now been included as part of recurrent health expenditure estimates for the various types of health goods and services for all years.

8.1 Health expenditure and health funding

This section describes the main components of health expenditure and who provides the health funding. It answers the following questions about health services in Australia:

- How much does Australia spend on health?
- What are the trends in expenditure and funding during the decade up to 2007–08?
- Who provides funding for what types of services?
- How does Australia's health expenditure compare with that of other developed countries, namely those of the Organisation for Economic Co-operation and Development (OECD)?
- What is the average amount spent on each person, and on specific population groups and diseases?
- How much is spent on the different types of health services and on health infrastructure, and who spends it?
- What is the contribution of private health insurance?

First, it is important to understand two terms that are used to describe health finances—'health expenditure' and 'health funding'. They express concepts that are distinct but related (Box 8.2). Both concepts are needed to explain the financial resources used by the overall health system, and those used by the various segments of the system (such as general practice or hospitals).

The bulk of health expenditure is on health goods and services, such as medications and hospital care. Health expenditure also includes spending on a number of health-related activities, such as research and administration. However, spending on the training of health professionals is not treated in Australia's national accounts as health expenditure, as it is regarded as expenditure on education.

Box 8.2: Defining 'health expenditure' and 'health funding'

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 accommodation, medical and surgical supplies, drugs, salaries of doctors and nurses, and so forth) are incurred by the states and territories, but a considerable proportion of those expenditures is funded by transfers from the Australian Government.

Health funding

Health funding is reported in terms of who provides the funds that are used to pay for health expenditure. In the case of public hospitals, for example, the Australian Government funded 39.2% in 2007–08 and the states and territories funded 52.8%, together providing over 90% of the funding. These funds are derived ultimately from taxation and other sources of government revenue. Some of the other funding, in this case, comes from private health insurers and from individuals who incur an out-of-pocket cost when they choose to be treated as private patients in public hospitals.

Expenditure on health comprises recurrent expenditure (which includes depreciation) and capital expenditure, and together they are reported as total health expenditure. Recurrent expenditure, which relates largely to operating costs, is split in this chapter according to the major types of health goods and services, and health-related activities. Recurrent expenditure is also presented in this chapter for Aboriginal and Torres Strait Islander people and other Australians, and by disease.

Sources of funding are described in relation to current expenditure under 'Health care—who provides the funds?'.

How much is spent on health and is it increasing?

One measure commonly used to describe and compare the relative sizes of health systems in different countries is their expenditure on health as a percentage of their expenditure on all goods and services (known as the gross domestic product: GDP).

The estimated total expenditure on health in Australia in 2007–08 was $103.6 billion. The health-to-GDP ratio has grown over the past decade, from 7.8% in 1997–98 to 9.1% in 2006–07 and 2007–08 (Table 8.1).

Table 8.1: Total health expenditure and GDP, current prices, and annual health-to-GDP ratios, 1997–98 to 2007–08

Year	Total health expenditure ($ million)	GDP ($ million)	Ratio of health expenditure to GDP (per cent)
1997–98	44,802	577,373	7.8
1998–99	48,428	607,759	8.0
1999–00	52,570	645,058	8.1
2000–01	58,269	689,262	8.5
2001–02	63,099	735,714	8.6
2002–03	68,798	781,675	8.8
2003–04	73,509	841,351	8.7
2004–05	81,060	897,642	9.0
2005–06	86,685	967,454	9.0
2006–07	94,938	1,045,674	9.1
2007–08	103,563	1,131,918	9.1

GDP Gross domestic product.

Source: AIHW 2009a.

Over the decade, estimated real growth in health expenditure (that is, after removing the effects of inflation) averaged 5.2% per year (Table 8.2). Real growth in expenditure is measured using constant prices (see Box 8.3).

Table 8.2: Total health expenditure and GDP, constant prices[(a)], and annual growth rates, 1997–98 to 2007–08

	Total health expenditure		GDP	
Year	Amount ($ million)	Growth rate (per cent)	Amount ($ million)	Growth rate (per cent)
1997–98	62,305	. .	803,636	. .
1998–99	65,679	5.4	845,425	5.2
1999–00	69,637	6.0	879,242	4.0
2000–01	74,321	6.7	895,947	1.9
2001–02	77,886	4.8	929,993	3.8
2002–03	82,020	5.3	959,753	3.2
2003–04	84,657	3.2	998,143	4.0
2004–05	89,634	5.9	1,026,092	2.8
2005–06	92,191	2.9	1,056,874	3.0
2006–07	97,720	6.0	1,091,751	3.3
2007–08	103,563	6.0	1,131,918	3.7
		Average annual growth rate		
1997–98 to 2002–03		5.7		3.6
2002–03 to 2007–08		4.8		3.4
1997–98 to 2007–08		5.2		3.5

GDP Gross domestic product.

. . Not applicable.

(a) Constant price health expenditure for 1997–98 to 2007–08 is expressed in terms of 2007–08 prices.

Source: AIHW 2009a.

Box 8.3: Constant price and current price expenditure

The use of 'constant prices' is a way of comparing expenditure 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 expenditure reported for any year, unadjusted for inflation.

To obtain constant prices, the current prices for all years are adjusted to reflect the prices in a chosen reference year. This process enables comparisons of the volumes of health goods and services used over the years. Constant prices are also referred to as 'real' expenditure and growth in turn is referred to as 'real growth in expenditure'.

By using constant prices the comparison of expenditure in different years will reflect only the changes in the amount of health goods and services used, not the changes in the prices of these goods and services caused by inflation. The reference year used in this report is 2007–08.

In contrast, changes in current price expenditure reflect changes in prices through inflation, as well as changes in the amount of health goods and services that are used.

Just as prices can increase generally (general inflation), so can those for health items in particular (health inflation). If there is a difference between health inflation and general inflation, this can have an influence on the ratio of health expenditure to GDP (see Box 8.4).

Box 8.4: Inflation

Inflation refers to changes in prices over time. Inflation is usually positive (that is, prices are increasing over time) but can be negative (deflation).

General inflation

General inflation refers to the change in prices throughout the economy over time. The implicit price deflator for gross domestic product (GDP) is calculated by the Australian Bureau of Statistics as a measure of general inflation.

Health inflation

Health inflation is a measure of the average rate of change in prices within the health goods and services sector of the economy. It is measured by changes in the total health price index (the ratio of national health expenditure at current prices, to total national health expenditure at constant prices).

Excess health inflation

Excess health inflation is the amount by which the rate of health inflation exceeds the general rate of inflation. Excess health inflation will be positive if health prices are increasing at a more rapid rate than prices generally throughout the economy. It will be negative when the general level of prices throughout the broader economy is increasing more rapidly than health prices.

Australia’s health inflation over the first half of the decade (1997–98 to 2002–03) for the most part outpaced general inflation, but between 2002–03 and 2007–08 general inflation grew faster than health inflation. As a result, between 1997–98 and 2007–08, both health and general inflation averaged 3.4% a year (Table 8.3).

Table 8.3: Annual rates of health inflation, 1997–98 to 2007–08 (per cent)

Years	Health inflation[a]	General inflation[b]	Excess health inflation
1997–98 to 1998–99	2.5	0.1	2.5
1998–99 to 1999–00	2.4	2.1	0.3
1999–00 to 2000–01	3.9	4.9	–1.0
2000–01 to 2001–02	3.3	2.8	0.5
2001–02 to 2002–03	3.5	3.0	0.6
2002–03 to 2003–04	3.5	3.5	—
2003–04 to 2004–05	4.2	3.8	0.4
2004–05 to 2005–06	4.0	4.6	–0.6
2005–06 to 2006–07	3.3	4.6	–1.2
2006–07 to 2007–08	2.9	4.4	–1.4
	Average annual growth rate		
1997–98 to 2002–03	3.1	2.5	0.6
2002–03 to 2007–08	3.6	4.2	–0.6
1997–98 to 2007–08	3.4	3.4	—

— Nil or rounded down to zero.

(a) Based on the total health price index.

(b) Based on the implicit price deflator for gross domestic product.

Note: Components may not add to totals due to rounding.

Source: AIHW 2009a.

Health care—who provides the funds?

Funding for health goods and services comes from different sources, including the Australian Government, state, territory and local governments, non-government sources such as private health insurers, out-of-pocket payments by individuals and injury compensation insurers. The major two levels of government provide the bulk of the funding (68.7% in 2007–08).

Australian Government

The Australian Government provides most of the funding for recurrent expenditure on:

- services provided by general practitioners and medical specialists (together known as ‘medical services’), and, to a lesser extent, on services provided by other health practitioners. The Australian Government provided 78.2% of the funding for medical services in 2007–08 through Medicare, private health insurance subsidies and benefits for veterans. It also provided 30.9% of the funding for other health practitioners
- pharmaceuticals that are covered or partly covered by the Pharmaceutical Benefits Scheme (PBS) and Repatriation Pharmaceuticals Benefits Scheme (RPBS). In 2007–08, 83.7% of the funding for these pharmaceuticals was contributed by the Australian Government
- health research (78.1%).

The Australian Government also partly funds:

- public hospital services (39.1% in 2007–08) and public health activities such as infectious disease control and health promotion campaigns (60.2%), through direct funding and through Specific Purpose Payments to the states and territories. The main health Specific Purpose Payments in 2007–08 were
  - the Australian Health Care Agreements (AHCAs)
  - the Public Health Outcomes Funding Agreements
  - the provision of highly specialised drugs to outpatients in public and private hospitals
- private hospitals, through subsidising private health insurance premiums. This subsidy amounts to 31.3% of the gross funding that is provided through private health insurance funds.

State and territory governments

State and territory governments provided funding in 2007–08 for:

- community health services (81.8% of the total funding of these services)
- patient transport (64.7%)
- public hospital services (53.7%)
- public health activities (33.5%).

Non-government sources

Non-government recurrent health expenditure funding in 2007–08 came from:

- out-of-pocket funding by individuals (18.2% of the total funding of health services)
- benefits paid and funded by private health insurance (8.0%)
- providers of compulsory motor vehicle third-party insurance and workers' compensation insurance (2.2%)
- other private sources (1.5%).

Non-government sources provided funding in 2007–08 for:

- aids and appliances (84.6% of these goods)
- dental services (79.9% of these services)
- private hospitals (60.4%)
- medications (48.3%).

Health care funding—how much?

In 2007–08, total health expenditure exceeded $100 billion for the first time, at $103,563 million. Government funding of health expenditure was $71.2 billion (68.7% of total health expenditure), with the Australian Government contributing $44.8 billion (43.2%) and state, territory and local governments contributing $26.4 billion (25.5%). The non-government sector funded the remaining $32.4 billion (31.3%) (Table 8.4).

In current prices, from 2006–07 to 2007–08, Australian Government funding of health expenditure increased by 12.3%; state, territory and local government funding increased by 7.7%; and non-government funding increased by 6.0%.

At the broad level, the relative shares of funding of total health expenditure remained fairly stable for both the government and non-government sectors between 1997–98 and 2007–08, with over two-thirds of funding provided by governments and almost a third by non-government providers (Table 8.4). The Australian Government contribution ranged from a low of 42.0% in 2006–07 to a high of 44.4% in 2000–01, while the state, territory and local governments' contribution ranged from a low of 23.2% in 2001–02 to a high of 25.8% in 2006–07. Funding by the non-government sector ranged from 30.8% to 33.0%. Part of the reason for the increase in the Australian Government's share was private health insurance incentives, introduced in July 1997. They are regarded as a form of subsidy in the health expenditure statistics and are allocated across the areas of expenditure in accordance with the health insurance funds' expenditure ratios. The effect has been a substantial shift of funding responsibility from the private health insurance funds to the Australian Government.

Table 8.4: Total health expenditure by broad source of funds, as a proportion of total health expenditure, current prices, 1997–98 to 2007–08

	Government			Non-government				
Year	Australian Government[a]	State/ territory and local	Total	Health insurance funds	Individuals[a]	Other	Total	Total
				Per cent				
1997–98	42.1	25.3	67.4	9.5	16.3	6.8	32.6	100.0
1998–99	43.3	23.7	67.0	8.0	17.3	7.8	33.0	100.0
1999–00	44.3	24.9	69.2	6.9	16.7	7.3	30.8	100.0
2000–01	44.4	23.3	67.7	7.1	18.0	7.2	32.3	100.0
2001–02	44.0	23.2	67.2	8.0	17.5	7.2	32.8	100.0
2002–03	43.6	24.4	68.0	8.0	16.7	7.3	32.0	100.0
2003–04	43.6	23.6	67.2	8.1	17.4	7.3	32.8	100.0
2004–05	43.8	24.0	67.7	7.7	17.4	7.1	32.3	100.0
2005–06	42.8	25.3	68.0	7.6	17.4	6.9	32.0	100.0
2006–07	42.0	25.8	67.8	7.6	17.4	7.2	32.2	100.0
2007–08	43.2	25.5	68.7	7.6	16.8	6.9	31.3	100.0
				Amount ($ million)				
2007–08	44,773	26,379	71,152	7,862	17,416	7,133	32,411	103,563

(a) Funding of expenditure has been adjusted for non-specific tax expenditures.

Note: Components may not add to totals, because of rounding.

Source: AIHW 2009a.

Australian Government

In 2007–08, the Australian Government provided $44.8 billion for health goods and services (43.2% of total expenditure) (Table 8.4). The three areas in which it contributed the most funding were medical services ($14,335 million), public hospital services ($12,063 million) and benefit-paid pharmaceuticals ($6,789 million) (Table S29 🖱). Much of this funding was provided through Medicare, the AHCAs, the PBS and RPBS.

The Australian Government Medicare levy (see Box 8.5) raised $8,049 million in 2007–08 (Table S28 🖱). This was equivalent to 18.2% of the Australian Government's total health funding for that year.

Box 8.5: Medicare levy

All Australian Government funding for health services comes from its general revenues, one part of which is notionally health-related—the Medicare levy. In 2007–08, this levy was equal to 18.2% of total health funding by the Australian Government.

The levy was introduced in 1984 and was originally set at 1.0% of taxable income. It has increased several times since then and is currently set at 1.5% of taxable income. It has also been subject to one-off surcharges from time to time to cover non-health initiatives of the Australian Government.

Since October 1997, a further surcharge of 1.0% was levied on 'high-income' earners (individuals earning more than $50,000 per year and couples earning more than $100,000 per year) who did not have private insurance cover for hospital care. In 2008, these thresholds increased to $70,000 for individuals and $140,000 for couples.

State and territory, and local governments

Almost all of the funding from the remaining two levels of government comes from state and territory governments, with local governments contributing some of the funding for public and community health services. (Estimates of local government funding have only been included in the Australian Institute of Health and Welfare (AIHW) health expenditure database for the years up to 2000–01 because in recent years the data have not been of high quality.) In 2007–08, state and territory governments provided $26,379 million for health goods and services (25.5% of total expenditure) (Table 8.4). State and territory governments were the major source of funding for community health services ($4,251 million) and patient transport services ($1,296 million). Nationally, more than half of the funding by state and territory governments was directed to public hospital services ($16,537 million or 62.7% of total state and territory government health funding for 2007–08).

Non-government sources

In 2007–08, around one-third of funding on health goods and services was provided by the non-government sector ($32,411 million or 31.3% of total expenditure). A little over half of this funding came from out-of-pocket payments by individuals ($17,416 million or 16.8% of total funding). This included circumstances where individuals met the full cost of a service or good, as well as where they shared that funding with third-party payers—for example, with private health insurance funds or the Australian Government. Private health insurance funds provided a further $7,862 million of non-government funding. The remaining $7,133 million came from other non-government sources (mainly compulsory third-party motor vehicle and workers' compensation insurers).

Non-government sources provided the bulk of funding for dental services ($4,881 million) and aids and appliances ($2,634 million). Funding for medications was shared mainly between the Australian Government ($7,097 million) and individual out-of-pocket payments ($6,506 million).

Over the decade from 1997–98 to 2007–08, funding by private health insurance funds decreased from 9.5% to 7.6% of total health expenditure (Table 8.4). This partly reflected the Australian Government's rebate incentive. Private health insurance benefits that were previously funded almost entirely by premiums were instead funded 30–40% by the Australian Government. In 2007–08, 3.5% of total health expenditure was funded by the

Australian Government's private health insurance rebate and 7.6% was funded through private health insurance funds (AIHW 2009a).

What is the role of private insurance in health funding?

All Australians are entitled to receive treatment as public patients in public hospitals at no direct personal cost. As an alternative, private health insurance funds provide cover for their members who choose to be treated as private patients in either public or private hospitals. They may also provide a range of non-hospital benefits to insured people. The health benefits paid out by private insurers finance part of the health costs incurred by their members.

Since the introduction of private health insurance subsidies in 1997 (Box 8.6), the funding for members' health benefits now comes from a combination of:

- the net premiums paid by members of the funds (that is, the cost of their premiums over and above the rebates paid by the Australian Government)
- the rebates on premiums paid by the Australian Government.

Box 8.6: Private health insurance arrangements

Since 1984, private health insurance funds in Australia have offered insurance cover for various services provided in public and private hospitals. They also offer cover for a range of non-hospital health and health-related services such as dentistry, physiotherapy, podiatry, pharmaceuticals and spectacles.

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. From April 2005, the rebate for people aged 65–69 years increased to 35% of the premium, and for people aged 70 years and over it increased to 40% of the premium. Changes to the private health insurance legislation, which took effect on 1 April 2007, allowed health insurers to expand hospital policies to cover those medical treatments outside hospital that substitute for or prevent hospitalisation. They are also able to cover programs to manage chronic diseases.

For members of private health insurance funds, health insurance arrangements changed substantially on 1 July 2000, with the introduction of Lifetime Health Cover incentives. These encourage people to continue private health insurance cover throughout their lives. From that date, people who join a health insurance fund before the July following their 30th birthday, and maintain their hospital cover, pay lower premiums throughout their lives than those who join later in life. People aged over 30 years who take out hospital cover pay a loading of 2% for each year their entry age is over 30. Fund members who had hospital cover at 1 July 2000 and maintain it are exempt from the loading. People who were aged 65 years or over at 1 July 1999 are also exempt from premium loading. Changes to Lifetime Health Cover were announced in 2006 and were being implemented progressively from 2007. Under the new legislation, people who keep their health insurance for 10 continuous years, and remain members, will stop paying a loading.

Who funds private health insurance?

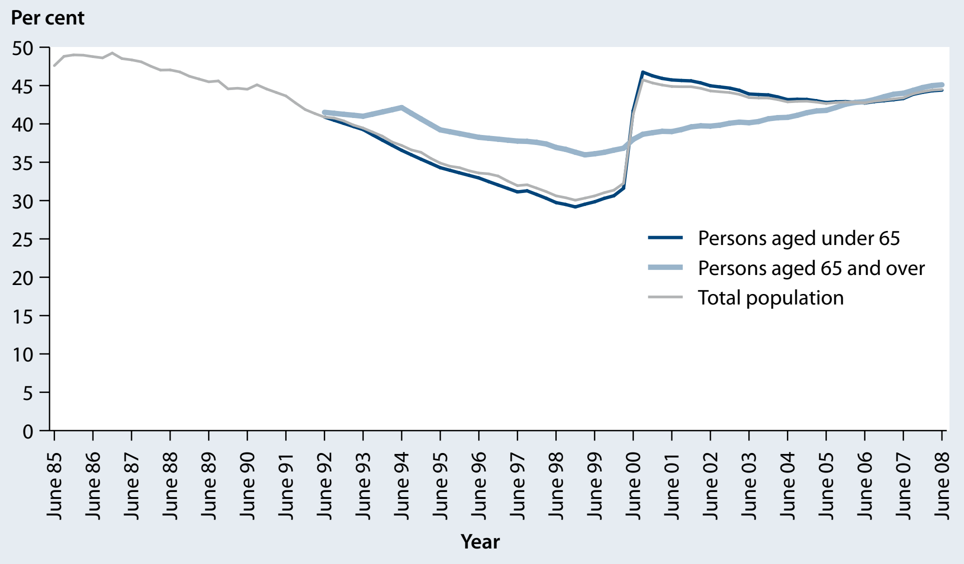
In 2007–08, the amount of funding for health services through private health insurance funds, including the Australian Government private health insurance premium rebate, was $11,449 million. This was 11.7% of recurrent expenditure on health in that year. Of that, $3,587 million (31.3%) was funded from the rebates on private health insurance premiums provided by the Australian Government. The net funding of health services by the funds themselves (that is, by contributors or members) increased from $7,216 million in 2006–07 to $7,862 million in 2007–08 (Table S37 🖱).

What health services are funded?

Funding by private health insurers is chiefly directed towards private hospital services. During 2007–08, private hospitals received $3,762 million (47.8%) of the $7,862 million in funding provided by health insurance funds. Other major health areas that received funding were dental services ($927 million or 11.8%), administration ($881 million or 11.2%) and medical services ($813 million or 10.3%) (Table S37 🖱). The funding for medical services covers some of the cost of in-hospital medical services that are provided to private patients in hospitals.

Trends in coverage

At the end of June 2008, 44.5% of the Australian population was covered by private hospital insurance (PHIAC 2008). This was similar to the coverage in the March 2008 quarter (44.4%) but was a fall from a peak of 45.7% at the end of the September 2000 quarter that followed the introduction of the lifetime cover arrangements in July that year (Figure 8.1). Private hospital coverage increased from a low of 30.2% in December 1998 to a high of 45.7% in September 2000 and was 44.7% in December 2009.



Sources: PHIAC 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008; PHIAC unpublished data.

Figure 8.1: Population covered by basic private hospital insurance, 1985–2008

How does Australia's health expenditure compare?

For the international comparisons shown in this section, the estimates of Australia's total health expenditure have been adjusted to fit the OECD's System of Health Accounts framework (see Box 8.7).

Box 8.7: OECD definition of 'health expenditure'

This section uses a slightly different definition of 'health expenditure' from the rest of the chapter. This is because for national (that is, internal) reporting, Australia uses the concept of health expenditure that was adopted by the World Health Organization (WHO) in the 1970s. In 2000, however, the Organisation of Economic Co-operation and Development (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 exclusion from health expenditure by the OECD of 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 continue to be some small 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 OECD median health-to-GDP ratios for 1997, 2002 and 2007 were 7.7%, 8.4% and 8.9% respectively. Australia's ratio was similar for these periods—slightly lower in 1997 (7.6%), higher in 2002 (8.6%) and the same in 2007 (8.9%) (Table 8.5).

Australia's health-to-GDP ratio in 2007 was comparable to Norway's (8.9%), Sweden's (9.1%), New Zealand's (9.2%) and Italy's (8.7%), was more than the United Kingdom's (8.4%) and much lower than the United States (16.0%), which had by far the highest ratio.

Australia's average per-person expenditure on health was higher than the OECD median in each of the 3 years reported. In 2007 Australia's average was $4,732 per person, which was similar to that of Sweden, Iceland and Ireland—all far below the United States at $10,352 per person. (All these values are expressed here in Australian dollars.)

Australia's per-person out-of-pocket expenditure for health was $186 above the median for OECD countries in 2007, compared with $17 above the median in 1997 (Table S36 🖱). As a percentage of total health expenditure and total household expenditure, Australia's out-of-pocket health expenditure rose between the two periods from 16.6% to 18.0% and from 2.2% to 2.9%, respectively. For the OECD as a whole, although the weighted average of out-of-pocket expenditure as a proportion of household final consumption expenditure rose from 2.6% to 2.7% between 1997 and 2007, the weighted average fell as a percentage of total health expenditure (16.2% to 14.5%) over the same period.

Table 8.5: Health expenditure as a proportion of GDP and per person, OECD countries, 1997 to 2007[(a)]

	1997		2002		2007	
Country[(b)]	Health-to-GDP ratio (per cent)	Per person (A$)	Health-to-GDP ratio (per cent)	Per person (A$)	Health-to-GDP ratio (per cent)	Per person (A$)
United States	13.4	5,353	15.1	7,307	16.0	10,352
France	10.2	2,938	10.5	3,915	11.0	5,113
Switzerland	10.0	3,757	10.9	4,922	10.8	6,272
Germany	10.2	3,185	10.6	3,936	10.4	5,095
Belgium	8.3	2,599	9.0	3,598	10.2	5,105
Austria	9.8	3,189	10.1	4,096	10.1	5,343
Canada	8.8	2,841	9.6	3,854	10.1	5,531
Denmark	8.2	2,719	8.8	3,613	9.8	4,987
Netherlands	7.9	2,529	8.9	3,796	9.8	5,449
Greece	8.4	1,787	9.1	2,633	9.6	3,872
Iceland	8.1	2,790	10.2	4,229	9.3	4,713
New Zealand	7.3	1,785	8.2	2,468	9.2	3,564
Sweden	8.1	2,491	9.3	3,614	9.1	4,719
Australia[(c)]	**7.6**	**2,371**	**8.6**	**3,398**	**8.9**	**4,732**
Norway	8.4	3,102	9.8	4,863	8.9	6,763
Italy	7.7	2,281	8.3	2,979	8.7	3,814
Spain	7.3	1,715	7.3	2,338	8.5	3,793
United Kingdom	6.6	1,964	7.6	2,935	8.4	4,249
Finland	7.6	2,120	7.8	2,873	8.2	4,033
Slovak Republic	5.8	744	5.6	978	7.7	2,208
Ireland	6.4	1,843	7.1	3,172	7.6	4,862
Hungary	6.8	896	7.6	1,493	7.4	1,971
Czech Republic	6.7	1,217	7.1	1,601	6.8	2,309
Korea	4.3	822	5.3	1,336	6.8	2,397
Poland	5.6	657	6.3	982	6.4	1,470
Mexico	4.8	537	5.6	783	5.9	1,169
Japan	7.0	2,237	8.0	2,864	n.a.	n.a.
Luxembourg	5.6	2,603	6.8	4,129	n.a.	n.a.
Portugal	8.0	1,566	9.0	2,220	n.a.	n.a.
Turkey	3.1	330	5.9	647	n.a.	n.a.
Weighted average[(d)(e)]	**9.6**	**2,725**	**10.7**	**3,722**	**11.3**	**5,213**
Median[(d)]	**7.7**	**2,259**	**8.4**	**3,075**	**8.9**	**4,481**

n.a.	Not available.
GDP	Gross domestic product.
OECD	Organisation for Economic Co-operation and Development.

(a) See definition of 'OECD financial year' in Box 5.1 in AIHW 2009a.

(b) Countries in this table are sorted in descending order according to the 2007 health-to-GDP ratio.

(c) Expenditure based on the OECD System of Health Accounts framework.

(d) Averages for 2007 incorporate 2006 data for Japan, Luxembourg and Portugal, and 2005 data for Turkey.

(e) Average weighted by GDP or population.

Note: Expenditures converted to Australian dollar values using GDP purchasing power parities.

Source: AIHW 2009a.

How much is health expenditure per person?

To make international comparisons, health expenditure per person is expressed in Australian dollar values and is calculated after adjusting for differences in the purchasing powers of national currencies.

In 2007–08, Australia spent around $4,874 per person on average on health (Table 8.6). This includes expenditure funded by government, non-government organisations such as private health insurance funds, and by individuals through out-of-pocket expenses. After adjustment for inflation, per-person health expenditure grew at an average of 3.8% per year between 1997–98 and 2007–08.

Table 8.6: Average health expenditure per person[(a)], current and constant prices[(b)], and annual growth rates, 1997–98 to 2007–08

	Amount ($)		Annual change in expenditure (per cent)	
Year	**Current**	**Constant**	**Current prices**	**Real growth**
1997–98	2,407	3,347	. .	. .
1998–99	2,573	3,490	6.9	4.3
1999–00	2,760	3,657	7.3	4.8
2000–01	3,022	3,854	9.5	5.4
2001–02	3,230	3,987	6.9	3.4
2002–03	3,479	4,147	7.7	4.0
2003–04	3,672	4,229	5.6	2.0
2004–05	4,001	4,424	8.9	4.6
2005–06	4,218	4,486	5.4	1.4
2006–07	4,546	4,679	7.8	4.3
2007–08	4,874	4,874	7.2	4.2
			Average annual growth rate	
1997–98 to 2002–03			7.6	4.4
2002–03 to 2007–08			7.0	3.3
1997–98 to 2007–08			7.3	3.8

. . Not applicable.

(a) Based on annual average resident population.

(b) Constant price health expenditure for 1997–98 to 2007–08 is expressed in terms of 2007–08 prices.

Source: AIHW 2009a.

From 2005–06 to 2007–08, estimated per-person expenditure on health grew at an average of 4.3% per year. Five jurisdictions—Tasmania (7.0%), Queensland (5.9%), Western Australia (5.4%), the Northern Territory (5.1%) and South Australia (5.0%)—all had annual growth rates that were higher than the national average (Table 8.7).

Table 8.7: Average health expenditure per person[(a)] by state and territory[(b)], constant prices[(c)], 2005–06 to 2007–08 ($)

State/territory[(d)]	2005–06	2006–07	2007–08	Average annual growth rate 2005–06 to 2007–08 (per cent)
New South Wales	4,292	4,448	4,613	3.7
Victoria	4,255	4,374	4,513	3.0
Queensland	4,003	4,255	4,492	5.9
Western Australia	4,210	4,413	4,677	5.4
South Australia	4,389	4,488	4,840	5.0
Tasmania	4,045	4,225	4,630	7.0
Northern Territory	5,417	5,571	5,981	5.1
Australia	**4,242**	**4,409**	**4,613**	**4.3**

(a) Based on annual average resident population.

(b) Per-person expenditure includes all monies spent on health within a state or territory regardless of funding source. That is, it includes expenditure funded by the Australian Government, by state and territory, and local governments, and by non-government organisations.

(c) See Box 8.3 for explanation of constant price estimation.

(d) ACT per-person figures are not included, as the expenditure estimates for the ACT include substantial expenditure for NSW residents. Thus, the ACT population is not an appropriate denominator.

Source: AIHW health expenditure database.

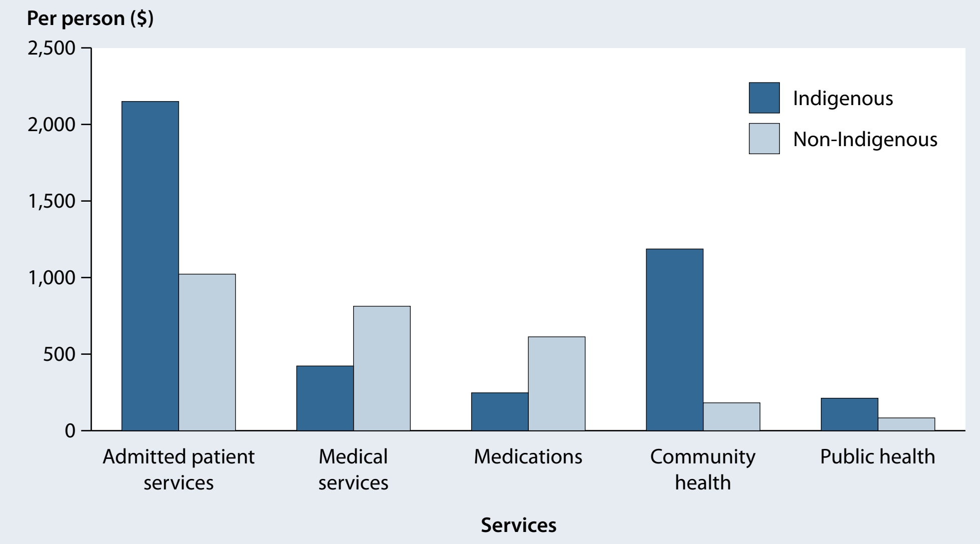
How much is health expenditure for Aboriginal and Torres Strait Islander people?

Expenditure on health for Aboriginal and Torres Strait Islander people is of interest given their considerably poorer health status when compared with the non-Indigenous population. In 2004–05, 22% of Aboriginal and Torres Strait Islander adults surveyed reported their health as fair or poor. After adjusting for differences in the age structures of Indigenous and non-Indigenous populations, Indigenous Australians were twice as likely as non-Indigenous Australians to report their health as fair or poor (ABS & AIHW 2008).

Life expectancy is much lower for the Indigenous population—particularly for Indigenous males. According to estimates by the Australian Bureau of Statistics, overall male Aboriginal and Torres Strait Islander persons have a life expectancy of 67.2 years, 11.5 years less than non-Indigenous males (78.7 years). Female Aboriginal and Torres Strait Islander persons have a life expectancy of 72.9 years, 9.7 years less than non-Indigenous females (82.6 years) (ABS 2009). See Section 5.1 for information on Indigenous health.

Estimates of recurrent expenditure on health for Aboriginal and Torres Strait Islander people have been undertaken by the AIHW at 2-yearly intervals; the estimates include expenditure on high-care residential aged care services. The latest in the series is for 2006–07 (AIHW 2009b); the previous report was for 2004–05 (AIHW 2008).

In 2006–07, the total health and high-care residential aged care expenditure for Aboriginal and Torres Strait Islander people was estimated at $2,976 million, or 3.1% of corresponding national expenditure. This represents an average expenditure per Aboriginal and Torres Strait Islander person of $5,696 compared with $4,557 for each non-Indigenous person.



Source: AIHW 2009b.

Figure 8.2: Expenditure per person on selected health services for Aboriginal and Torres Strait Islander people and non-Indigenous people, by service type, 2006–07

Figure 8.2 shows the differences between the patterns of expenditure on health services for Aboriginal and Torres Strait Islander people and those for non-Indigenous Australians. Indigenous people were more likely to use the kinds of health services for which states and territories are mainly responsible, such as admitted patient services and community health services.

Benefits to Aboriginal and Torres Strait Islander people through Medicare—including some benefits for non-medical services—were estimated at $175 million. Their benefits through the PBS were estimated at a further $92 million.

Medicare expenditure per person for Aboriginal and Torres Strait Islander people was well below the non-Indigenous average (58%). For the PBS, the corresponding percentage was similar at 60%.

The ratio of health expenditure for Aboriginal and Torres Strait Islander people to the health expenditure for non-Indigenous Australians in 2006–07 was 1.31, and the ratio for health and high-level residential aged care expenditure was 1.25. This means that $1.25 was spent on health and high-care residential aged care services for an Aboriginal and Torres Strait Islander person for every $1 spent for a non-Indigenous person (Table 8.8).

This represents an increase from 2004–05, where the ratio was 1.17. Part of this increase may be due to better methods for estimating Aboriginal and Torres Strait Islander health expenditure, particularly for Medicare Benefits Scheme and PBS expenditure. Some of the increase is due to greater growth since 2004–05 for some types of services for Aboriginal and Torres Strait Islander people, particularly public hospital services.

Table 8.8: Expenditure on health and high-care residential aged care services for Aboriginal and Torres Strait Islander and non-Indigenous people, 2006–07

	Expenditure ($ million)			Indigenous share	Expenditure per person ($)		Ratio (Indigenous to non-Indigenous)	
Area of expenditure	**Indigenous**	**Non-Indigenous**	**Total**	**(per cent)**	**Indigenous**	**Non-Indigenous**	**2006–07**	**2004–05**
Total hospitals	1,483.1	33,687.6	35,170.7	4.2	2,838.3	1,654.6	1.72	1.60
Public hospital services[(a)]	1,450.9	26,565.3	28,016.2	5.2	2,776.6	1,304.8	2.13	2.01
Admitted patient services[(b)]	1,123.5	20,817.0	21,940.5	5.1	2,150.0	1,022.4	2.10	1.99
Non-admitted patient services	327.4	5,748.3	6,075.7	5.4	626.5	282.3	2.22	2.09
Private hospitals[(c)]	32.3	7,122.3	7,154.5	0.5	61.7	349.8	0.18	0.21
Patient transport	115.9	1,672.4	1,788.3	6.5	221.8	82.1	2.70	3.05
Medical services	220.8	16,544.5	16,765.3	1.3	422.6	812.6	0.52	0.46
Medicare services	193.2	13,441.1	13,634.3	1.4	369.7	660.2	0.56	0.42
Other	27.6	3,103.4	3,131.0	0.9	52.9	152.4	0.35	0.59
Dental services	72.9	5,676.2	5,749.1	1.3	139.5	278.8	0.50	0.40
Community health services	620.1	3,706.3	4,326.4	14.3	1,186.7	182.0	6.52	6.59
Other professional services	22.3	3,250.8	3,273.1	0.7	42.8	159.7	0.27	0.40
Public health	110.9	1,700.2	1,811.0	6.1	212.2	83.5	2.54	2.66
Medications	129.4	12,481.0	12,610.3	1.0	247.5	613.0	0.40	0.40
Aids and appliances	21.0	3,004.6	3,025.6	0.7	40.3	147.6	0.27	0.29
Research	32.1	2,317.0	2,349.1	1.4	61.5	113.8	0.54	1.11
Health administration	75.7	2,294.0	2,369.7	3.2	144.8	112.7	1.29	1.34
Other health services (nec)[(d)]	5.5	141.9	147.4	3.7	10.5	7.0	1.51	—
Total health	**2,909.7**	**86,476.4**	**89,386.1**	**3.3**	**5,568.5**	**4,247.3**	**1.31**	**1.25**
High-care residential aged care	66.7	6,305.0	6,371.7	1.0	127.6	309.7	0.41	0.27
Total health and high-care residential aged care	**2,976.4**	**92,781.4**	**95,757.9**	**3.1**	**5,696.1**	**4,557.0**	**1.25**	**1.17**

— Nil or rounded down to zero.

(a) Excludes dental services, community health services, patient transport services, public health and health research undertaken by the hospital.

(b) Admitted patient expenditure estimates allow for Aboriginal and Torres Strait Islander underidentification, except for Tasmania.

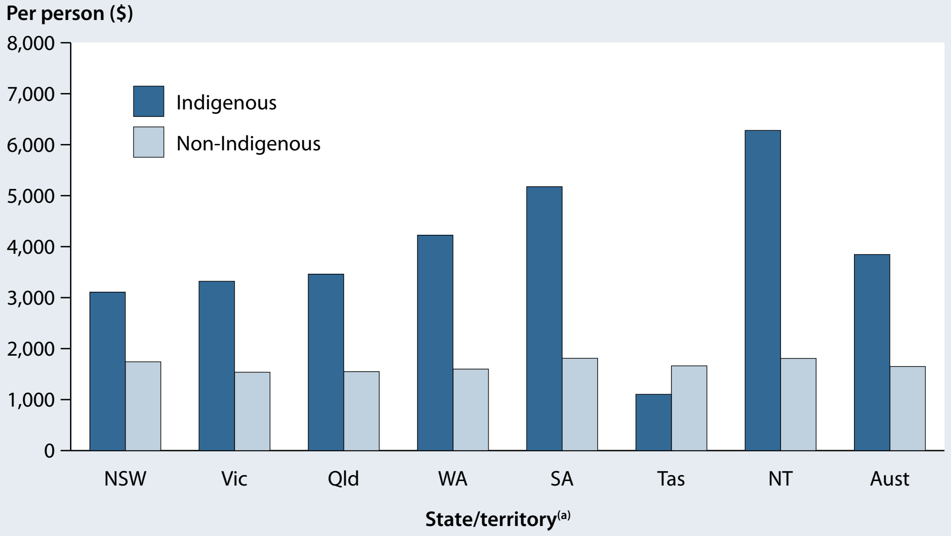
(c) Includes state and territory government expenditure for services provided for public patients in private hospitals ($249.5 million).

(d) Other health services (not elsewhere classified) includes expenditure on health services such as family planning.

Source: AIHW health expenditure database.

Expenditure by state and territory governments

State and territory governments spent $35,614 million on health services in 2006–07 for Indigenous and non-Indigenous people.



(a) ACT per-person figures are not calculated, as the expenditure numbers for the ACT include substantial expenditures for NSW residents. As a result, the ACT population is not the appropriate denominator. ACT data are included in the Australian total.

(b) Includes all health expenditure undertaken by, or directly funded by, the states and territories. Does not include expenditure undertaken by the Australian Government or the non-government sector.

Source: AIHW health expenditure database.

Figure 8.3: Average state and territory expenditure[b] per person for Aboriginal and Torres Strait Islander people and non-Indigenous people, 2006–07

There were some quite large differences across the states and territories in their expenditure per Aboriginal and Torres Strait Islander person, and rather less marked ones for non-Indigenous people (Figure 8.3).

For example, at $6,280 per person in 2006–07, the Northern Territory's spending on Aboriginal and Torres Strait Islander people was more than twice the amount spent in New South Wales, at $3,107. For non-Indigenous people, the Northern Territory's spending was $1,808 per person in 2006–07, slightly higher than that in New South Wales, where it was $1,741.

Economies of scale and the relative isolation of some Aboriginal and Torres Strait Islander target populations influence the costs of both producing and delivering health goods and services. These factors can have large effects on both the levels of health expenditure and the quantity of goods and services that can be provided to particular population groups. For example, the Northern Territory, with its relatively small population, faces substantial cost disadvantages in comparison with, say, Victoria, in providing health goods and services to its population. Differences in the relative isolation of the two jurisdictions' populations further compound this comparative disadvantage. This disparity is even more pronounced for the Aboriginal and Torres Strait Islander populations of the two jurisdictions (AIHW 2009b).

The different pattern for Tasmania is consistent with the ratio published for the 2004–05 reference period.

Growth in expenditure per person

Over the period from 2004–05 to 2006–07, government expenditure per person for health and high-care residential aged care for Aboriginal and Torres Strait Islander people rose by 9.1% (in constant prices). The major contribution (about 70%) to the growth rate was state and territory expenditure on admitted patient services.

This increase amounted to $446 more per person in 2006–07 than in 2004–05. State and territory government expenditure per person grew by 10.5% between 2004–05 and 2006–07, and Australian Government expenditure by 5.8%.

The increase in the Indigenous to non-Indigenous health expenditure per-person ratio between 2006–07 and 2004–05 is partly due to greater growth in expenditure for Aboriginal and Torres Strait Islander people for certain types of services, particularly public hospital services. Public hospital services expenditure is the most significant area of health expenditure for Indigenous people. In 2004–05, that share of total expenditure on public hospital services was 4.7% but in 2006–07 it had increased to 5.2%. Some of the increase in the Indigenous to non-Indigenous health expenditure per-person ratio may be due to method changes, particularly the new method for estimating medical and pharmaceutical expenditure.

Sources of funding

Governments fund the vast majority of health services for Aboriginal and Torres Strait Islander people, with the state and territory governments and the Australian Government contributing fairly similar amounts. In 2006–07, the funding contributions were:

- state and territory governments, 51.4%
- Australian Government, 42.0%
- non-government, 6.6% (including out-of-pocket payments).

In contrast, the funding for health services provided to non-Indigenous people were split between:

- state and territory governments, 24.2%
- Australian Government, 44.0%
- non-government, 31.8% (including out-of-pocket payments).

How does per-person expenditure vary by region?

The average per-person health spending is examined on a regional basis, as defined by the Australian Standard Geographical Classification (ASGC) system. The expenditure categories are:

- services for patients admitted to hospitals
- Medicare medical and other services
- PBS and Section 100 drugs.

These categories account for 47% of total recurrent health expenditure.

Areas of health expenditure that are not included in this analysis are community health, patient transport, programs aimed specifically at rural health, aids and appliances, over-the-counter pharmaceuticals, dental services not funded by Medicare, and other health professional services.

Table 8.9: Expenditures per person on health services, by ASGC region[(a)], 2007–08 ($)

Service	Major city	Inner regional	Outer regional	Remote and very remote	Total
Admitted patient[(b)]	1,311	1,428	1,468	1,723	1,369
Medicare	753	661	576	409	710
PBS pharmaceuticals[(c)]	312	346	318	243	318
Total	**2,376**	**2,436**	**2,362**	**2,375**	**2,397**

ASGC Australian Standard Geographical Classification.

PBS Pharmaceutical Benefits Scheme.

(a) By area of patient residence.

(b) Data for which the care type was reported as *Newborn* with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.

(c) Includes Section 100 pharmaceuticals distributed through Aboriginal Community Controlled Health Organisations in *Remote* and *Very remote* areas.

Source: AIHW health expenditure database.

The average expenditure per person for these selected areas ranged from $2,362 per person on those in outer regional areas to $2,436 for those in inner regional areas (Table 8.9). However, differences in expenditure between remoteness areas may simply reflect the different age structures of populations rather than any differences in the levels of services. For example, people living in remote and very remote regions are generally younger than the Australian average; there are proportionally more children and fewer older people in these regions. In inner regional and outer regional areas there is a higher than average proportion of people in their 50s, 60s and 70s, but fewer people in their 20s and 30s. Age standardisation has been used to adjust for such differences (Table 8.10).

The age-standardised average expenditure per person for these selected areas ranged from $2,311 per person on average for inner regional residents to $2,791 for those in remote and very remote areas. Expenditure on patients admitted to hospitals increased with remoteness while expenditure through Medicare declined (Table 8.10).

Table 8.10: Age-standardised expenditures per person on health services, by ASGC region[(a)], 2007–08 ($)

Service	Major city	Inner regional	Outer regional	Remote and very remote	Total
Admitted patient[(b)]	1,324	1,359	1,460	2,036	1,369
Medicare	761	636	569	453	710
PBS pharmaceuticals[(c)]	321	317	306	302	318
Total	**2,406**	**2,311**	**2,335**	**2,791**	**2,397**

ASGC Australian Standard Geographical Classification.

PBS Pharmaceutical Benefits Scheme.

(a) By area of patient residence.

(b) Data for which the care type was reported as *Newborn* with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.

(c) Includes Section 100 pharmaceuticals distributed through Aboriginal Community Controlled Health Organisations in *Remote* and *Very remote* areas.

Source: AIHW health expenditure database.

Table 8.11 shows the number of hospital separations and the average expenditure per separation according to regional area. In general, average expenditure per separation increased with remoteness.

Expenditure per separation was calculated from data in the AIHW Hospital Morbidity Cost Model. Cost estimates take into account differences in hospital operating costs across the regions, but the expenditure per separation is not adjusted for casemix.

Table 8.11: Hospital separations and average expenditure per separation[(a)(b)], 2007–08

	Public and private hospitals	
Region	**Separations (million)**	**Expenditure per separation ($)**
Major cities	5.12	3,651.62
Inner regional	1.52	3,887.49
Outer regional	0.74	3,965.07
Remote	0.12	4,328.61
Very remote	0.08	4,422.33
Total separations/average expenditure	**7.60**	**3,759.35**

(a) The expenditure on private medical services delivered to private admitted patients is not included in these expenditures.

(b) Data for which the care type was reported as *Newborn* with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.

Source: AIHW health expenditure database.

How much is spent on each type of disease and injury?

Along with understanding the patterns of disease, it is also of some interest to examine expenditure on different types of disease. The latest analysis of that expenditure applies to 2004–05.

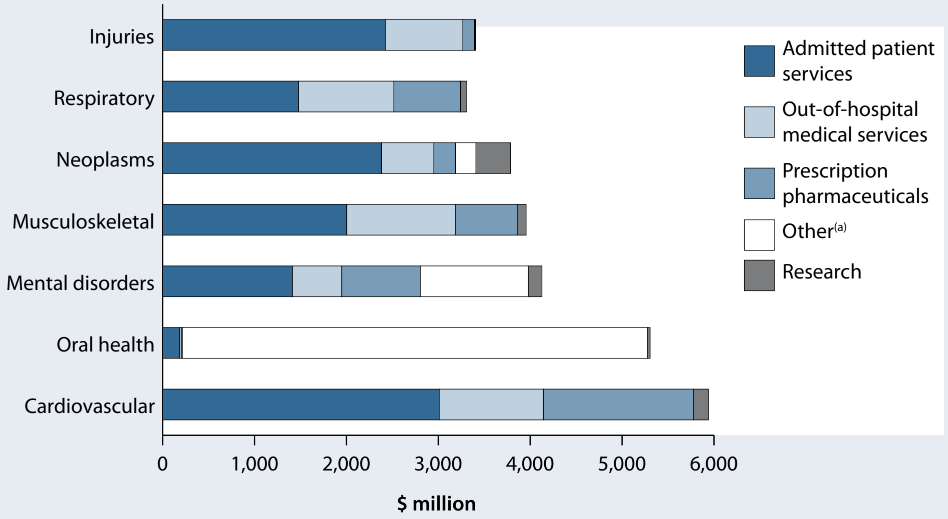
In 2004–05, total health expenditure in Australia was $81.1 billion. Of this, $52.7 billion (65%) could be allocated to specific disease categories. The largest expenditure categories that could be allocated in this way were admitted patient hospital services (29% of recurrent health expenditure), out-of-hospital medical services (16%), prescription pharmaceuticals (11%), and optometrical and dental services (7%).

The remaining $28.4 billion of health expenditure that could not be allocated by disease included recurrent expenditure of $23.7 billion, including such categories as non-admitted patient expenditure (9% of total recurrent expenditure) and over-the-counter pharmaceuticals (4%), as well as capital expenditure of $4.7 billion.

Which diseases have the most spent on them?

Seven broad disease groups accounted for an estimated $29,834 million, or 57% of the allocatable health expenditure in Australia in 2004–05 (Table 8.12). Cardiovascular disease was the disease group that accounted for the greatest amount of this expenditure ($5,942 million or 11% of expenditure), followed by oral health ($5,305 million or 10%).

Different diseases have different patterns of expenditure by type of health service (Figure 8.4). For cardiovascular diseases, injuries, neoplasms and musculoskeletal diseases, expenditure on hospital admitted patient services accounted for a relatively high proportion of total expenditure.



(a) Includes dental services, community mental health and cancer screening programs.

Source: AIHW disease expenditure database.

Figure 8.4: Expenditure on disease by type of health service for selected broad disease groups, 2004–05 ($ million)

Table 8.12: Diseases and injury by broad groups: expenditure by area of health expenditure, 2004–05 ($ million)

Disease group	Admitted patients[a]	Out-of-hospital medical services	Optometrical and dental services	Prescription pharmaceu-ticals [b][c]	Community and public health[d]	Research	Total expenditure allocated by disease	Per cent of total allocated expenditure 2004–05
Infectious and parasitic	482	451		199		184	1,315	2.5
Respiratory	1,477	1,039		725		69	3,311	6.3
Maternal conditions	1,539	116		4		12	1,671	3.2
Neonatal causes	422	20		1		12	455	0.9
Neoplasms	2,381	570		236	222	378	3,787	7.2
Diabetes mellitus	371	288		275		55	989	1.9
Other endocrine, nutritional and metabolic	448	500		1,042		110	2,100	4.0
Mental disorders	1,411	538		854	1,177	148	4,128	7.8
Nervous system disorders	985	782	218	464		291	2,739	5.2
Cardiovascular	3,009	1,133		1,636		164	5,942	11.3
Digestive system	1,849	447		764		48	3,107	5.9
Genitourinary	1,431	779		111		24	2,345	4.5
Skin diseases	398	454		102		13	966	1.8
Musculoskeletal	2,003	1,181		680		92	3,956	7.5
Congenital anomalies	209	24		2		54	290	0.6
Oral health	186	22	5,064	6		27	5,305	10.1
Injuries	2,422	845		124		14	3,405	6.5
Signs, symptoms, ill-defined conditions and other contact with health system[e]	3,195	2,712		919		22	6,848	13.0
Total	**24,221**	**11,900**	**5,282**	**8,144**	**1,399**	**1,715**	**52,660**	**100.0**
Proportion of total allocated expenditure (%)	**46.0**	**22.6**	**10.0**	**15.5**	**2.7**	**3.3**	**100.0**	

(a) Includes admitted patients in public and private acute hospitals, and psychiatric hospitals. Also includes medical services provided to private admitted patients in hospital.

(b) Includes all pharmaceuticals for which a prescription is needed, including benefit-paid prescriptions, private prescriptions and below-copayment prescriptions.

(c) Excludes over-the-counter medications such as vitamins and minerals, patient 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 and ill-defined conditions' includes diagnostic and other services for signs, symptoms and ill-defined conditions where the cause of the problem is unknown. 'Other contact with the health system' includes fertility control, reproduction and development; elective plastic surgery; general prevention, screening and health examination; and treatment and aftercare for unspecified disease.

Source: AIHW disease expenditure database.

Expenditure differences by age and sex

Health expenditure classified by disease in 2004–05 was 18% higher for females than for males—$28.5 billion compared with $24.1 billion. Expenditure per person was $2,781 for females, which was 17% higher than the $2,380 for males. When maternal conditions are excluded, expenditure per person for females was 10% higher than for males (Table 8.13). The remaining difference is due to the higher numbers of females in the older age groups, where expenditure is highest.

In 2004–05, total allocated health expenditure for males was higher than for females for the young age groups (up to 14 years) and for the older age groups (from 55 years onwards). In contrast, total allocated health expenditure for females was higher than males for the age groups between 15 and 54 years, reflecting costs for child bearing and health expenditure related to the genitourinary system (Table 8.13). The per-person pattern of health expenditure was similar for both sexes with the exception of the peak for females at ages 25–34, when they are in their child-bearing years.

Total allocated health expenditure per person in 2004–05 ranged from $786 for females aged 5–14 years to $11,131 for males aged 85 years and over. The male–female difference in per-person cost was the greatest, in dollar terms, for the 85 and over age group ($11,131 for males and $9,053 for females) (Table 8.13).

Table 8.13: Allocated health expenditure per person by age, sex and disease group, 2004–05 ($)

	Age group (years)										
Disease group and sex	**0–4**	**5–14**	**15–24**	**25–34**	**35–44**	**45–54**	**55–64**	**65–74**	**75–84**	**85 and over**	**Total**
Cardiovascular											
All persons	10	7	14	36	85	229	533	1,091	1,718	1,858	291
Male	11	7	14	37	94	276	652	1,333	1,990	2,195	322
Female	8	7	14	34	77	183	414	861	1,511	1,699	261
Neoplasms[(a)]											
All persons	32	18	28	44	88	188	353	656	831	755	186
Male	32	19	22	30	61	134	350	732	1,115	1,157	183
Female	33	18	33	59	116	241	356	584	613	567	189
Musculoskeletal											
All persons	15	27	46	71	119	207	373	612	777	611	194
Male	16	28	53	76	125	190	327	513	652	561	169
Female	15	26	40	67	114	224	419	705	872	634	218
Nervous system[(b)]											
All persons	73	49	41	57	80	115	168	339	643	731	134
Male	81	49	36	51	73	111	163	330	664	854	125
Female	64	48	47	63	86	119	174	347	627	673	143

Disease group and sex	Age group (years)										
	0–4	**5–14**	**15–24**	**25–34**	**35–44**	**45–54**	**55–64**	**65–74**	**75–84**	**85 and over**	**Total**
Injuries											
All persons	74	84	147	124	115	126	165	267	571	1,099	167
Male	82	102	203	165	140	142	178	264	502	916	178
Female	65	65	89	84	90	110	151	270	623	1,185	156
Maternal conditions											
Female	—	—	249	679	223	3	—	—	—	—	163
Other causes(c)											
All persons	1,554	628	1,204	1,216	1,201	1,379	1,851	2,749	3,959	4,663	1,528
Male	1,695	633	952	1,011	1,037	1,227	1,800	2,782	4,191	5,447	1,403
Female	1,404	623	1,467	1,421	1,363	1,529	1,903	2,717	3,782	4,296	1,651
Total											
All persons	1,757	812	1,601	1,888	1,801	2,246	3,443	5,714	8,499	9,717	2,582
Male	1,917	837	1,279	1,369	1,530	2,080	3,469	5,955	9,114	11,131	2,380
Female	1,589	786	1,937	2,407	2,068	2,409	3,416	5,485	8,028	9,053	2,781
Female (excluding maternal conditions)	1,589	786	1,689	1,727	1,845	2,406	3,416	5,485	8,028	9,053	2,618

— Nil or rounded to zero.

(a) Comprises expenditures on cancer (malignant neoplasms) and other benign, in situ and unspecified neoplasms.

(b) Excludes mental disorders.

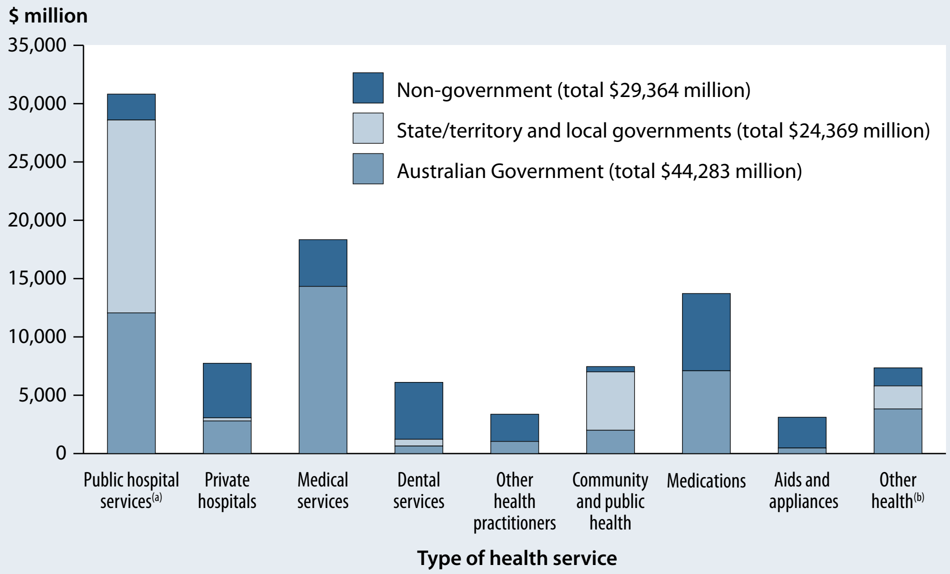
(c) 'Other causes' includes infectious and parasitic, respiratory, neonatal causes, oral health, diabetes mellitus, other endocrine, nutritional and metabolic, mental disorders, digestive system, genitourinary, skin diseases, congenital anomalies, and signs, symptoms, ill-defined conditions and other contact with the health system.

Source: AIHW disease expenditure database.

How much was spent on each kind of health service and who provided the funding?

This section is derived from *Health expenditure Australia 2007–08* (AIHW 2009a), which contains more detailed information about expenditure on, and funding of, different types of health services. Recurrent expenditure on health in 2007–08 was estimated at $98,017 million (94.6% of total health expenditure). The largest component was expenditure on hospital services, totalling $38,557 million (39.3% of recurrent expenditure) (Figure 8.5; Table S30 🖱).

The next largest component was medical services, comprising mainly services provided by general practitioners and specialists, excluding those provided to public admitted patients or public outpatients in public hospitals ($18,338 million or 18.7% of recurrent health expenditure). Medications (excluding those dispensed in hospitals) came next at $13,720 million or 14.0%. Expenditure on dental services ($6,106 million) and community health ($5,195 million) accounted for 6.2% and 5.3% respectively.



(a) Public hospital services exclude certain services undertaken in hospitals, can include services provided off-site such as hospital in the home, dialysis or other services.

(b) Other health comprises patient transport services, administration and research.

Source: AIHW 2009a.

Figure 8.5: Recurrent health expenditure by type of health service and source of funds, 2007–08

Hospitals

Expenditure

In 2007–08, recurrent hospital expenditure was $38,557 million or 39.3% of total recurrent health expenditure. Spending on public hospital services in 2007–08 was estimated at $30,817 million or 31.4% of total recurrent health expenditure, while an estimated $7,740 million or 7.9% was spent on private hospitals. In real terms, this expenditure on hospitals (both public and private) grew by 4.5% per year between 1997–98 and 2002–03, and by 5.1% between 2003–04 and 2007–08 (Table S30 🖱).

For public hospitals, real growth in expenditure was 4.2% per year from 1997–98 to 2002–03. This expenditure increased on average by 5.7% per year from 2003–04 to 2007–08 (Table S30 🖱).

Real growth in expenditure on private hospitals was slightly lower at 4.2% each year between 1997–98 and 2007–08.

Funding

In 2007–08, governments provided 82.1% of the funding for hospitals.

Over the decade to 2007–08, governments increased their share of hospital funding by 5.1 percentage points—the Australian Government by 1.3 percentage points and the states and territories by 3.8 percentage points. At the same time, the non-government funding of public and private hospitals decreased from 23.0% to 17.9% (Table 8.14).

Table 8.14: Recurrent expenditure on hospitals[(a)] by source of funds, 1997–98 to 2007–08 (per cent)

	Government				
Year	Australian Government[(b)]	State/territory and local	Total	Non-government[(b)]	Total
1997–98	37.2	39.8	77.0	23.0	100.0
1998–99	40.4	38.3	78.7	21.3	100.0
1999–00	42.3	38.1	80.3	19.7	100.0
2000–01	43.4	37.1	80.5	19.5	100.0
2001–02	42.6	37.1	79.7	20.3	100.0
2002–03	42.1	39.4	81.5	18.5	100.0
2003–04	40.9	40.8	81.7	18.3	100.0
2004–05	40.4	41.1	81.5	18.5	100.0
2005–06	38.8	43.0	81.8	18.2	100.0
2006–07	37.6	44.2	81.8	18.2	100.0
2007–08	38.5	43.6	82.1	17.9	100.0

(a) Includes public and private hospitals. For public hospitals, this includes dental services, community health services, patient transport services, public health and health research undertaken by public and public psychiatric hospitals.

(b) Funding by the Australian Government and private health insurance funds has been adjusted for the private health insurance rebate (see Box 3.1 in AIHW 2009a).

Note: Components may not add to totals because of rounding.

Source: AIHW 2009a.

The subsidies for private health insurance are an important component of the Australian Government's funding for hospitals. The introduction of these subsidies led to a fall in the share of funding by private health insurance funds.

From 2002–03, state and territory governments began identifying services purchased from private hospitals as part of their funding of private hospital expenditure. This change in practice resulted in a rise in the estimated state and territory share of funding of hospital expenditure from 37.1% in 2001–02 to over 39% in 2002–03, with a corresponding fall in the non-government share of funding of this expenditure (Table 8.14).

In 2007–08 the state and territory governments maintained a higher share of overall hospital funding (43.6%) than the Australian Government (38.5%). For the first time in several years, however, the Australian Government's share of hospital funding increased in that year (having previously decreased from 43.4% in 2000-01 to 37.6% in 2006–07), and that of state and territory governments decreased (having previously increased from 37.1% in 2001–02 and 2002–03 to 44.2% in 2006–07).

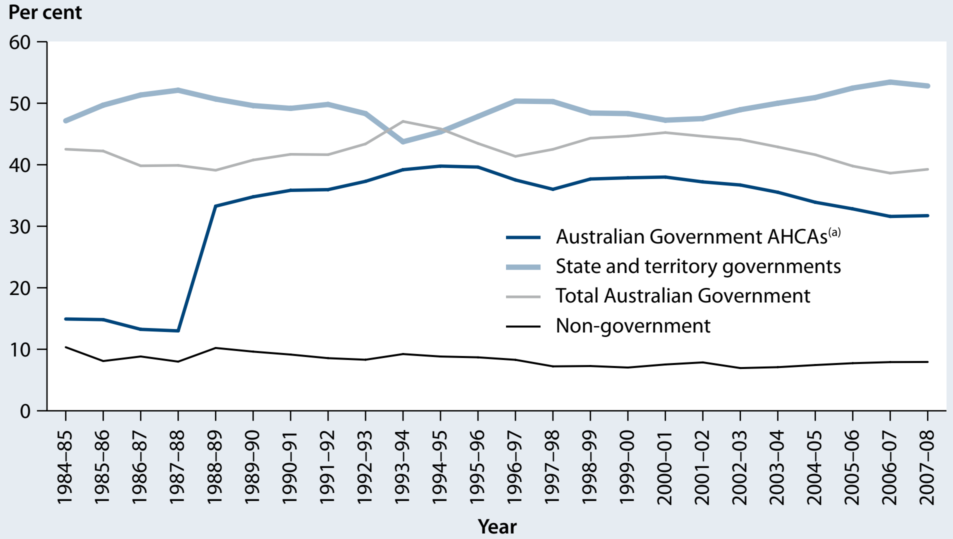
Changes affecting time series

In considering the following data, it is important to note that there have been changes in the methods used that have led to two different time series for expenditure on public hospitals.

Before 2003–04, the AIHW's public hospital expenditure data were based on total hospital operating expenses, including expenditure on community health services, public health services, non-admitted dental services, patient transport services and health research where these were delivered by or on behalf of a public hospital. This expenditure was referred to as 'public hospital' expenditure.

From 2003–04, the AIHW has collected these data from states and territories using a uniform data collection template, making the data more consistent among jurisdictions. Since then, the expenditure by public hospitals on community health services and the other specific services listed above have been reported separately. The balance of public hospital expenditure is now referred to as 'public hospital services' expenditure.

As a result, 'public hospital services' expenditure from 2003–04 onwards cannot be compared with 'public hospital' expenditure from previous years. However, in order to provide a longer time series across this break, the AIHW continues to make an estimate of aggregate 'public hospital' expenditure from 2003–04 onwards so it can be compared with previous expenditure (see Figure 8.6). The following pages first report on 'public hospital' expenditure and then on 'public hospital services' expenditure.



AHCAs Australian Health Care Agreements.

(a) Includes Medicare agreements from 1984–85 to 1997–98.

Note: Public hospital expenditure includes dental services, community health services, patient transport services, public health and health research undertaken by public hospitals.

Source: AIHW health expenditure database.

Figure 8.6: Recurrent expenditure on public hospitals by source of funds, current prices, 1984–85 to 2007–08 (per cent)

'Public hospital' expenditure

This section covers the category of 'public hospital' expenditure as described above, with the category being carried forward to 2007–08 to provide a continuous time series since its origin in 1984–85.

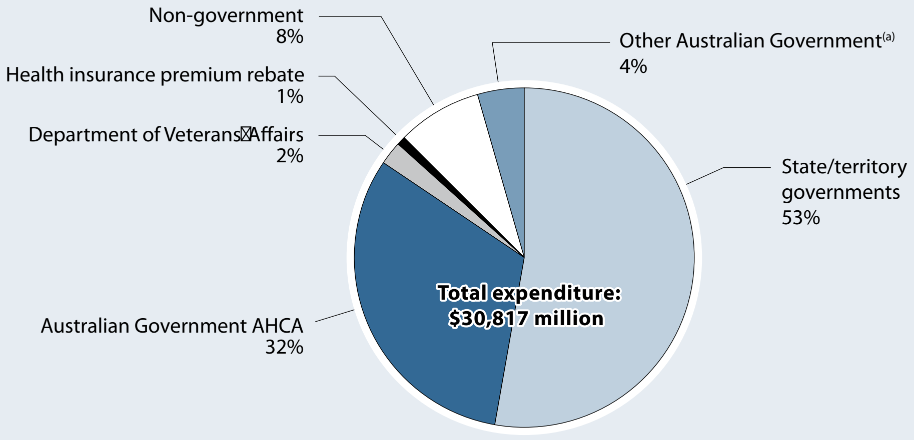
Considering this category, governments provided more than 90% of total funding for public hospitals. The Australian Government's contribution—estimated at 39.1% in 2007–08—was largely in the form of Specific Purpose Payments (SPPs) under the AHCAs (Table 8.15). The states and territories, which have the major responsibility for operating and regulating public hospitals that operate within their jurisdictions, provided 53.7% of the funding for public hospitals in 2007–08.

Over the two decades since 1984–85, the relative contributions to public hospital funding by governments and non-government have varied. In 1984–85, the Australian Government and the state and territory governments funded around 45% each and non-government sources funded the balance (10%) (Figure 8.6). This was the highest proportion of funding by the non-government sector over these two decades. Funding by the Australian Government peaked at 47.0% in 1993–94 and by the state and territory governments at 53.4% in 2006–07.

In 1997–98, the Australian Government's share of public hospital funding was 42.5% and the state and territory governments' share was 50.3%. In 2007–08, the difference in the relative shares had increased, with the Australian Government providing 39.2% of public hospital funding and state and territory governments providing 52.8% (Figure 8.7).

The Australian Government's funding growth from 2006–07 to 2007–08 (12.3%) was greater than that of the state and territory governments (8.2%). This resulted in an increase in the Australian Government's share of funding from 38.6% to 39.2% and a fall in the share met by state and territory governments, from 53.4% to 52.8% (Figure 8.6). The increase in the Australian Government's share of public hospital funding in 2007–08 reflects additional national funding in 2008 for the AHCAs base grants, the Elective Surgery Waiting List Reduction program and funding to Tasmania for the Mersey Community Hospital.

The non-government contribution was 7.2% in 1997–98 and 7.9% in 2007–08. In 2007–08, this non-government funding consisted of funding from private health insurance (1.7%), individual out-of-pocket payments (0.9%) and other non-government funding (5.3%) such as workers' compensation insurers, motor vehicle third-party insurers and other revenue (Figure 8.7).



AHCA Australian Health Care Agreement.

(a) Includes Department of Health and Ageing direct expenditure on public hospitals, such as for blood sector payments and non-AHCA Specific Purpose Payments such as highly specialised drugs, hepatitis C funding, health program and positron emission tomography scanner grants.

Source: AIHW health expenditure database.

Figure 8.7: Recurrent expenditure on public hospitals, by source of funds, 2007–08

'Public hospital services' expenditure

This section covers 'public hospital services' expenditure. It therefore applies only to the period beginning in 2003–04, when this category was created.

In 2007–08, the Australian Government provided 39.1% ($12,063 million) of the funding for 'public hospital services', a 3.5 percentage point decrease in the share of funding from 2003–04 but an increase from 2006–07 (38.3%) (Table 8.15). In comparison, state and territory governments contributed 53.7% ($16,537 million) of funding in 2007–08, an increase from 2003–04, but a slight decrease from 54.5% in 2006–07.

Non-government funding of public hospital services represented 7.2% of total funding for public hospital services in 2007–08 ($2,218 million), also higher than in 2003–04.

Table 8.15: Recurrent expenditure on public hospital services(a)(b) by source of funds, current prices, 2003–04 to 2007–08

	Australian Government							
Year	**DVA**	**AHCA**	**Rebates of health insurance premiums**	**Other Australian Government(c)**	**Total**	**State/territory governments**	**Non-government**	**Total**
				Amount ($ million)				
2003–04	743	7,500	140	677	9,059	10,881	1,303	21,243
2004–05	814	7,919	169	826	9,727	11,937	1,607	23,271
2005–06	685	8,321	187	896	10,089	13,577	1,763	25,429
2006–07	770	8,781	207	983	10,741	15,279	1,996	28,016
2007–08	738	9,747	244	1,334	12,063	16,537	2,218	30,817
				Proportion (per cent)				
2003–04	3.5	35.3	0.7	3.2	42.6	51.2	6.1	100.0
2004–05	3.5	34.0	0.7	3.6	41.8	51.3	6.9	100.0
2005–06	2.7	32.7	0.7	3.5	39.7	53.4	6.9	100.0
2006–07	2.7	31.3	0.7	3.5	38.3	54.5	7.1	100.0
2007–08	2.4	31.6	0.8	4.3	39.1	53.7	7.2	100.0

AHCA Australian Health Care Agreement.

DVA Department of Veterans' Affairs.

(a) Public hospital services exclude dental services, community health services, patient transport services, public health and health research undertaken by the hospital, but can include services provided off-site such as hospital in the home, dialysis or other services.

(b) Public hospital services expenditure does not include expenditure on public patients who are contracted with private hospitals as this is part of private hospital expenditure. In 2007–08, this expenditure was $269 million.

(c) Includes Department of Health and Ageing direct expenditure on public hospital services, such as for blood sector payments and Specific Purpose Payments for public hospital services which are not AHCAs. These include Specific Purpose Payments for highly specialised drugs, hepatitis C funding, health program and positron emission tomography scanner grants.

Source: AIHW 2009a.

Private hospitals

In 2007–08, more than two-thirds of the $7,740 million spent on private hospitals was funded by private health insurance ($5,478 million). Almost half of the total was from premiums paid by contributors and other revenues, and the remaining 22.2% was indirectly funded out of the 30–40% premium rebates paid by the Australian Government.

In 2007–08, those rebates totalled $3,587 million, and $1,716 million of that was estimated to have been used in the funding of private hospitals (Table S37 🖱).

Private hospital funding also includes payments from public hospitals where they contract a private hospital to provide a service for public patients.

Medical services

The term 'medical services' refers to services provided by private medical practitioners operating on a fee-for-service basis, notably general practitioners and specialists operating privately. Most of these services are generally funded by a combination of Medicare benefits and payments by individuals in the form of patient copayments under the Medicare Benefits Scheme, both of which are included in the estimates presented here. Also included are:

- medical services provided to private patients in both public and private hospitals
- expenditure under some Australian Government programs, such as those encouraging the supply of medical practitioners in regions where there is a shortage.

Medical services provided to public patients in public hospitals are excluded.

Expenditure

Expenditure on medical services increased from $8,539 million in 1997–98 to $18,338 million in 2007–08, an increase in real terms of 3.3% per year over the decade (Table S30 🖱).

Funding

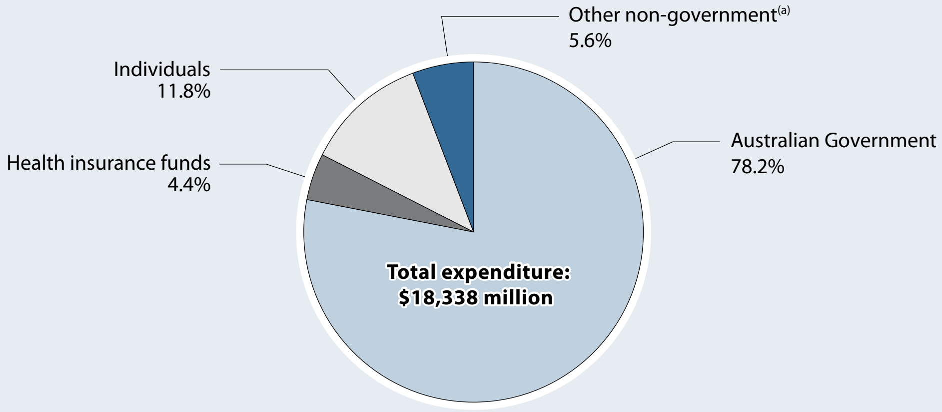
Most Australian Government funding for medical services was through Medicare benefits (Figure 8.8). The Australian Government also funded medical services for veterans and their dependants through the Department of Veterans' Affairs.

Most of the non-government funding for medical services (estimated at $4,003 million in 2007–08) was in the form of copayments by individuals for services provided under Medicare (Table S29 🖱). It also includes contributions paid by health insurance funds for services to individuals provided in hospitals and payments by other non-government sources (mostly workers' compensation and compulsory motor vehicle third-party insurers).

Of the $18,338 million spent on medical services in 2007–08, 78.2% ($14,335 million) was funded by the Australian Government. This was made up almost exclusively of medical benefits paid under Medicare, with some funding from the Department of Veterans' Affairs for medical services to veterans and their dependants, as well as payments to general practitioners under alternative funding arrangements to Medicare. Of the remaining 21.8% expenditure, 11.8% was funded out-of-pocket by individuals, 4.4% was from health insurance funds and 5.6% was other non-government funding.

In 2007–08, individuals' funding of medical services through out-of-pocket payments increased by $164 million (8.2%) over the previous year to reach $2,170 million (Table S29 🖱).

Between 1997–98 and 2007–08, the Australian Government's share of funding for medical services decreased from 81.7% to 78.2%, reflecting a rise in the share being met by all parts of the non-government sector (Table 8.16).



(a) Includes funding by injury compensation insurers.

Source: AIHW 2009a.

Figure 8.8: Recurrent expenditure on medical services, current prices, by source of funds, 2007–08

Bulk-billing

Bulk-billing affects the relative shares of funding by the Australian Government and individuals, because services that are bulk-billed do not require any copayment by individuals. Trends in the bulk-billing rate parallel trends in the proportion of medical services expenditure funded by individuals. Therefore, the peak for individuals' payments in 2003–04 of 12.4% of medical services expenditure also represented the lowest bulk-billing rate in this period (67.5%). Bulk-billing rates have fluctuated over the last 10 years and in 2007–08 the rate was 73.4%—higher than at any other time in the previous decade (Table 8.16).

The increase in the Australian Government proportion and the corresponding decrease in the individual proportion in 2004–05 were the result of the introduction of the Strengthening Medicare program. This program included the introduction of the Extended Medicare Safety Net, the Bulk-Billing Incentive Scheme and the increase to the Medicare benefit paid for general practitioner services from 85% to 100% of the schedule fee.

Table 8.16: Recurrent expenditure on medical services by source of funds and proportion of medical services bulk-billed, 1997–98 to 2007–08 (per cent)

		Non-government					
Year	Australian Government	Health insurance funds	Individuals	Other	Total	Total	Bulk-billing rate
1997–98	81.7	2.5	10.6	5.2	18.3	100.0	71.8
1998–99	81.7	2.2	10.7	5.3	18.3	100.0	72.0
1999–00	82.1	2.2	10.3	5.3	17.9	100.0	72.3
2000–01	81.4	2.8	10.6	5.2	18.6	100.0	71.4
2001–02	80.0	3.7	10.7	5.6	20.0	100.0	70.4
2002–03	78.2	4.1	11.9	5.8	21.8	100.0	67.8
2003–04	77.1	4.4	12.4	6.1	22.9	100.0	67.5
2004–05	79.0	4.2	11.1	5.8	21.0	100.0	70.2
2005–06	78.8	4.3	11.3	5.6	21.2	100.0	71.7
2006–07	78.1	4.4	12.0	5.6	21.9	100.0	72.9
2007–08	78.2	4.4	11.8	5.6	21.8	100.0	73.4

Source: AIHW 2009a.

Medications

Medications comprise:

- pharmaceuticals whose payments are subsidised by the PBS or the RPBS, including Section 100 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
  - below-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, bandaids and condoms.

Expenditure on medications also includes drugs used in hospitals, including highly specialised drugs, for the care of admitted patients, but this is included in estimates of hospital expenditure (and excluded from Table 8.17).

Expenditure

In 2007–08, total expenditure on medications was $13,720 million, comprising $8,110 million spent on benefit-paid pharmaceuticals and $5,611 million spent on other medications; this represented 14.0% of recurrent health expenditure. For the period 1997–98 to 2007–08, real growth in medications expenditure averaged 8.3% per year. In 2007–08, growth in medication expenditure from 2006–07 was 7.7% (Table S30 🖱; AIHW 2009a).

In 2007–08, expenditure on pharmaceuticals for which a prescription is required was $12,203 million (Table 8.17). This excludes the cost of vaccines purchased and administered under public health programs and is 89% of total expenditure on medications. The majority of pharmaceutical expenditure was for benefit-paid pharmaceuticals (66.5% or $8,110 million)—including $313 million for Section 100 payments—and most of this was funded by the Australian Government (83.7%). Individuals' out-of-pocket expenses accounted for the remaining 16.3% of benefit-paid pharmaceuticals expenditure.

In-hospital drugs expenditure amounted to $1,982 million by public hospitals and $175 million by private hospitals (Table 8.17). This expenditure included $677 million for Section 100 highly specialised drugs.

Table 8.17: Expenditure on pharmaceuticals for which a prescription is required, dispensed in the community and by hospitals[a], 2007–08 ($ million)

Provider and funder	Benefit-paid pharmaceuticals	All other pharmaceuticals Non-hospital[b]	All other pharmaceuticals Hospital[c]	Total
Community pharmacies				
Funded by				
Australian Government DVA	461	. .	. .	461
Australian Government DoHA[d][e]	6,329	308	. .	6,636
Health insurance funds	. .	46	. .	46
Individuals	1,321	1,511	. .	2,831
Injury compensation insurers and other	. .	71	. .	71
Total community pharmacies	*8,110*	*1,936*	. .	*10,046*
Public hospitals[f]	. .	. .	1,982	1,982
Private hospitals[g]	. .	. .	175	175
Total	**8,110**	**1,936**	**2,157**	**12,203**

. . Not applicable.

DoHA Department of Health and Ageing.

DVA Department of Veterans' Affairs.

(a) Excludes complementary and alternative medicines and over-the-counter medicines for which a prescription is not required.

(b) Includes private prescriptions and under-copayment prescriptions.

(c) Does not include the costs of paying hospital staff to dispense these medications. Dispensary costs are, however, included in the first two columns of this table.

(d) Does not include $677 million in payments for highly specialised drugs, which are included in the public hospitals and private hospitals rows.

(e) Includes $313 million in Section 100 payments for human growth hormones, in-vitro fertilisation drugs and other subsidised medications. Also includes the cost of doctor's bag pharmaceuticals, safety net cards and other DoHA-administered expenses items related to the PBS.

(f) Includes $502 million in Australian Government payments to states for highly specialised drugs.

(g) Comprises Australian Government payments for highly specialised drugs only.

Source: AIHW 2009a.

Funding

The Australian Government contributed $6,790 million for pharmaceuticals under the PBS and the RPBS in 2007–08. Individuals paid $1,321 million in copayments under these schemes and an estimated $1,511 million for non-benefit medications (Table 8.17).

For 2007–08, government funding under the PBS alone for benefit-paid pharmaceuticals was estimated at $5,912 million, an increase of $446 million from 2006–07 (Table 8.18). The shares of funding for the PBS provided by the Australian Government through benefits and by individuals through their copayments changed little until 1 January 2005, when the copayment increased from $23.70 per prescription to $28.60 for general patients and from $3.80 to $4.60 for concessional patients. From 1 January 2010, PBS copayments have been adjusted, increasing from $32.90 to $33.30 for general patients and from $5.30 to $5.40 for concessional patients (DoHA 2009).

Table 8.18: Funding of Pharmaceutical Benefits Scheme(a) subsidised medications, 2003–04 to 2007–08 ($ million)

Funding source	2003–04	2004–05	2005–06	2006–07	2007–08
Patient contributions					
General patients	545	597	634	619	630
Concessional patients	393	444	489	533	560
Total patient contributions	938	1,041	1,123	1,151	1,189
Government benefits					
General patients—no safety net	824	851	850	890	1,039
General patients—safety net	191	223	216	174	173
Total general patients	*1,015*	*1,073*	*1,066*	*1,064*	*1,213*
Concessional patients—no safety net	2,972	3,077	3,145	3,334	3,561
Concessional patients—safety net	1,005	1,145	1,173	1,067	1,138
Total concessional patients	*3,977*	*4,223*	*4,318*	*4,401*	*4,699*
Total funding by government	*4,992*	*5,296*	*5,384*	*5,466*	*5,912*
Total cost of PBS benefit-paid items(b)	**5,929**	**6,337**	**6,508**	**6,617**	**7,102**

(a) Does not include Repatriation Pharmaceutical Benefits Scheme or doctor's bag pharmaceuticals.

(b) Excludes Section 100 payments for human growth hormones, in-vitro fertilisation and other non-subsidised medications. Also excludes the cost of safety net cards and other DoHA-administered expenses items related to the PBS that were included in Table 8.17.

Note: Components may not add to totals, because of rounding.

Source: AIHW 2009a.

Dental services

Expenditure

In 2007–08, expenditure on dental services was $6,106 million, representing 6.2% of total recurrent expenditure on health. For the period 2003–04 to 2007–08, real growth in dental services expenditure averaged 1.9% per year—1.8% for state and territory dental services and 1.9% for private providers. This was just over one-third of the annual real growth in total recurrent health expenditure of 5.0% (Table S30 🖱).

Funding

Just under two-thirds ($3,944 million or 64.6%) of dental services expenditure was funded by individual out-of-pocket payments, 20.1% by governments and 15.2% by health insurance funds (Table S29 🖱).

Public health activities

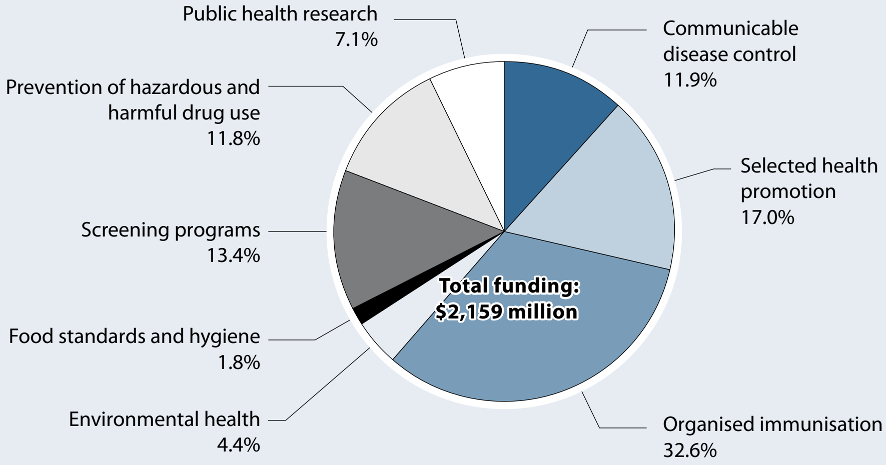
Expenditure

Public health activities are those that focus on the whole population or on population groups, such as those who are targets of cancer screening or immunisation programs. This population approach distinguishes them from treatment services for disease or injury, such as those provided to patients in hospitals.

Public health expenditure was $1,556 million in 2005–06, $1,811 million in 2006–07, and $2,264 million in 2007–08 (AIHW 2009a).

In 2007–08, governments in Australia, through programs administered by their health departments, spent a total of $2,159 million on public health activities (Figure 8.9); this represented 2.2% of total recurrent expenditure on health — a growth from $1,715 million, or 2.0% of total recurrent health expenditure, in 2006–07. A large part of this growth in public health expenditure was due to increased spending on organised immunisation programs, mainly resulting from the costs associated with the implementation of the human papillomavirus vaccination program.

Expenditure on organised immunisation accounted for $704 million (32.6% of all government expenditure on public health activities) during 2007–08 and was the largest single area of such expenditure. Selected health promotion activities accounted for a further $367 million (17.0%) and screening programs cost $289 million (13.4%). Screening programs cover breast, bowel and cervical cancer screening activities. Communicable disease control activities cost $257 million (11.9%) and activities directed at preventing hazardous and harmful drug use accounted for $254 million (11.8%) (Figure 8.9; Table S33 🖱).



Source: Table S33 🖱.

Figure 8.9: Government expenditure on public health activities, 2007–08

Funding

In 2007–08, governments in Australia provided $2,122 million in funding for public health activities. This was split between the Australian Government ($1,363 million or 60.2% of public health expenditure in 2007–08) and state and territory governments ($758 million or 33.5%). Individuals account for just a small proportion of total funding ($30 million or 1.3%) through out-of-pocket payments (Table S29).

Capital expenditure

There are multiple sources of funding for health infrastructure. For example, the Australian Government funds capital expenditure through grants and subsidies to other levels of government and to non-government organisations. State and territory governments fund large capital assets such as hospitals and community health centres.

Total capital expenditure in 2007–08 was estimated to be $5,546 million—5.4% of total health expenditure (Table S29). Over half of this (61.8%) was funded by non-government sources. State, territory and local governments funded 36.2% of total capital expenditure and the Australian Government funded 1.9% (Table 8.19). Estimates of capital expenditure are sourced from the Australian Bureau of Statistics and they have been revised for most of the earlier years. Therefore comparisons should not be made with data provided in previous editions of *Australia's health*.

The long-term nature and 'lumpiness' of capital investments means that trend analysis, even over a period as long as a decade, needs to be done with care.

Table 8.19: Capital health expenditure by source of funds, 1997–98 to 2007–08 (per cent)

	Government				
Year	Australian Government	State/territory and local	Total	Non-government	Total
1997–98	2.6	57.0	59.7	40.3	100.0
1998–99	4.4	36.5	40.9	59.1	100.0
1999–00	1.2	46.0	47.2	52.8	100.0
2000–01	4.0	37.8	41.8	58.2	100.0
2001–02	2.2	40.2	42.4	57.6	100.0
2002–03	1.8	39.2	41.0	59.0	100.0
2003–04	2.4	28.7	31.1	68.9	100.0
2004–05	2.8	36.4	39.2	60.8	100.0
2005–06	2.0	40.9	42.9	57.1	100.0
2006–07	2.0	38.8	40.7	59.3	100.0
2007–08	1.9	36.2	38.2	61.8	100.0

Note: Components may not add to totals, because of rounding.

Source: AIHW health expenditure database.

8.2 Health workforce

Access to health care and advice is regarded as essential to quality of life, and therefore the nature, size, distribution and effectiveness of the health workforce is the subject of much scrutiny by governments, the media and the community. There is great interest—not only among those providing health care but also in the populations they serve—in real and potential changes in the size and composition of the health workforce. For example, there have been numerous reports in the media about shortages of doctors and nurses, particularly for rural areas. These pressures have led to a number of recent government initiatives in relation to the health workforce (see Box 8.8).

Box 8.8: National Partnership Agreement on Hospital and Health Workforce Reform

In 2008 the Council of Australian Governments (COAG) agreed to a National Partnership Agreement on Hospital and Health Workforce Reform. This agreement included a series of reforms aimed at alleviating the shortages in Australia's health workforce and ensuring that the workforce would be able to meet expected increases in the demand for health care resulting from the ageing population, higher levels of chronic disease and rising community expectations. Central to these reforms was the establishment of the National Health Workforce Agency to:

- improve the capacity of the health sector to provide clinical education for health professionals-in-training, and to facilitate complementary reforms in the education and training sectors
- develop, trial and evaluate new workforce strategies and promote and facilitate those strategies that are found to improve the efficiency and effectiveness of the health workforce
- develop new employment structures and funding and payment mechanisms to support new models of care, and new and expanded roles
- streamline the international recruitment of health professionals by consolidating state- and territory-based programs into a single program covering all professions
- build statistical databases using data from the National Registration and Accreditation Scheme and other sources for the effective planning and monitoring of the health workforce.

Source: COAG 2008.

This part of the chapter provides the most recent data on the numbers, demographic characteristics, activity and distribution of health workers. Information on the proportion of females in the workforce is provided and, on average, they work fewer paid hours per week than their male counterparts. The proportion of the workforce aged 55 years and over provides an indication of those likely to retire in the short to medium term.

Data on the health workforce are collected by the ABS through the 5-yearly national population Censuses and monthly labour force surveys; and data on the medical, nursing, midwifery and dental workforces are collated by the AIHW from surveys of those registering as health professionals. These sources are described in Box 8.9.

Box 8.9: Sources of data on the health workforce

There are three main sources of data on the health workforce:

- The Australian Bureau of Statistics (ABS) Labour Force Survey is a monthly sample survey that includes about 30,000 private dwellings. Households selected for the survey are interviewed each month for 8 months, with one-eighth of the sample being replaced each month. Some data from this survey are reported monthly (for example the unemployment rate) while more detailed information (for example, occupation and industry) is reported quarterly. This edition of *Australia's health* uses data from this source as it provides information on the number of people employed according to their industry and occupation, as well as the total hours worked. This allows workload measures, such as full-time equivalents, to be calculated (see Box 8.10).
- The ABS Census of Population and Housing, conducted every 5 years, collects information from all persons aged 15 years or over about their employment status, occupation and industry. The last Census occurred in 2006.
- The Australian Institute of Health and Welfare (AIHW) compiles data from surveys of the medical, nursing and dental workforces that are conducted by the states and territories, usually in conjunction with the registration of these health professionals. These are completed annually.

Each of these data sources has its strengths and weaknesses. The ABS Labour Force Survey allows annual reporting of the size and distribution of the health workforce but, because it is based on a sample population, has limited capacity to provide detailed information about smaller population groups, particularly smaller allied health professions, or those from small areas. Unlike AIHW surveys, which are based on actual health professional registrations, health workforce data from the ABS Labour Force Survey are based on self-reported occupations.

The AIHW health labour force surveys provide more detailed data on a more limited number of health occupations than the ABS collections. The surveys are usually of all people registered or enrolled with the relevant registration boards, regardless of employment status. Information is collected on demographic characteristics, labour force status, type of work and location, specialty fields and qualifications of health professionals. However, the AIHW surveys are not compulsory and response rates vary over time.

The more recent ABS Labour Force Survey has been used rather than Census data in this chapter. Health workforce data from the 2006 Census were reported in *Health and community services labour force 2006* (AIHW 2009c). The most recent information on the medical and nursing workforces, as reported in this chapter, is from the 2007 AIHW surveys. The most recent information on the dental workforce is from the 2006 AIHW survey.

Health occupations and industries

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. This workforce comprises those employed in health occupations, which include medical, dental and nursing workers, medical imaging workers, pharmacists, allied health workers, complementary therapists and other health workers (ABS & Statistics New

Zealand 2006). For the purposes of this publication, social workers have been added to the health workforce.

People in the health workforce work mainly in the health services industries. The health services industries include those organisations that are mainly engaged in providing health services, such as hospitals, medical services, pathology and diagnostic imaging services, allied health services, other health care services and residential care services (ABS & Statistics New Zealand 2008). Retail pharmacies belong to the retail trade industries and are therefore not included in health services industries.

The number of people employed in health occupations and whether they work in the health services industries is shown in Figure 8.10. Most workers in the health services industries (64%) in 2008 were employed in health occupations that is; direct health-care occupations. The remaining workers in the health services industries held other occupations.

	Health services industries	**Other industries**	**Total**
Health occupations	525,400 employed persons e.g. doctors, nurses, dentists, allied health workers, ambulance officers, social workers.	129,400 persons employed in health occupations in other industries e.g. retail pharmacists.	**654,800**
Other occupations	299,600 persons employed in other occupations in the health services industries e.g. clerical workers, service workers, welfare professionals.		
Total	**825,000**		

(a) Excludes veterinary services.

Note: Numbers are derived for 2008 by averaging the number employed in February, May, August and November of that year.

Source: Unpublished data from ABS Labour Force Survey, 2008.

Figure 8.10: The relationship of health occupations to health and other industries, 2008

The health services industries comprised 7% of the civilian labour force in 2008 (Table 8.20). Over the past two decades, the number of people employed in the health services industries has grown considerably, from 523,600 in 1988 to 825,000 in 2008. In the 5 years from 2003 to 2008, growth in health industries employment was 16%, compared with an 11% growth in the civilian labour force over the same period.

In 2008, there were 654,800 people working in health occupations, of whom 4 in 5 (525,400) were working in the health services industries (Figure 8.10).

Between 2003 and 2008, the number of workers in these occupations increased by 23%, from 533,400 to 654,800. This was higher than the increase of 13% across all occupations over the same period (Table 8.21). Growth over this period was highest for psychologists (66%), complementary therapists (61%) and 'other health workers' (50%). The two groups with the lowest growth rates were dental associate professionals and assistants, which actually declined in numbers by 3%, and midwifery and nursing professionals, which grew by 8%.

Table 8.20: Persons employed in the health services industries[(a)], 1988 to 2008

Year	Employed in health services industries ('000)[(a)(b)(c)]	All employed persons ('000)[(b)(c)]	Proportion of all employed persons (per cent)	Civilian labour force ('000)[(c)(d)]	Proportion of civilian labour force (per cent)[(c)]
1988	523.6	7,366.0	7.1	7,932.2	6.6
1993	563.9	7,644.8	7.4	8,589.0	6.6
1998	615.6	8,572.4	7.2	9,300.5	6.6
2003	708.5	9,464.9	7.5	10,060.9	7.0
2008	825.0	10,740.3	7.7	11,210.7	7.4
2003 to 2008 increase (per cent)	16.4	13.5	. .	11.4	. .
1998 to 2008 increase (per cent)	34.0	25.3	. .	20.5	. .

. . Not applicable.

(a) Excludes persons employed in veterinary services.

(b) Because of a definitional change in 'employed' and 'unemployed' persons, there is a break in the series for data at the detailed industry level after 1996. Some care should therefore be taken in comparing numbers of employed people within the health industries over time.

(c) Derived by averaging the estimate for February, May, August and November of that year.

(d) Includes unemployed persons looking for work. Civilian labour force excludes members of the permanent defence forces, certain diplomatic personnel of overseas governments customarily excluded from census and estimated population counts, overseas residents in Australia, and members of non-Australian defence forces (and their dependants) stationed in Australia.

Source: Unpublished data from ABS Labour Force Survey, 1988, 1993, 1998, 2003, 2008.

People working in health occupations are mainly female. In 2008, 75% of people working in health occupations were female compared with 45% across all occupations (Table 8.21). The health occupations with the highest proportion of females in 2008 were enrolled and mothercraft nurses (92%), midwifery and nursing professionals (91%), dental associate professionals and assistants (89%), nursing and personal care assistants (82%), psychologists and social workers (both 80%).

Table 8.21: Persons employed in health occupations, 2003 and 2008

	2003			2008			
Occupation	**Number**	**Per cent female**	**Per cent aged 55 years and over**	**Number**	**Per cent female**	**Per cent aged 55 years and over**	**Per cent increase in numbers, 2003–2008**
Generalist medical practitioners	34,500	36	21	42,000	41	22	22
Specialist medical practitioners[(a)]	17,000	*27	30	24,700	32	*18	45
Medical imaging workers	10,500	58	**8	13,300	68	*13	27
Dental practitioners	8,800	*26	*15	11,100	*22	*32	26
Dental associate professionals and assistants	23,900	87	*5	23,200	89	**6	–3
Midwifery and nursing professionals[(b)]	184,300	92	13	199,500	91	18	8
Enrolled and mothercraft nurses	24,100	92	*11	29,600	92	21	23
Nursing and personal care assistants	64,000	81	16	73,800	82	20	15
Pharmacists	15,700	49	*22	19,200	68	*23	22
Physiotherapists	11,000	73	**5	16,400	72	*16	49
Psychologists	13,100	70	*19	21,700	80	*24	66
Other allied health workers[(c)]	25,800	72	*8	29,200	68	*16	13
Complementary therapists[(d)]	14,500	78	*9	23,400	72	*13	61
Social workers	12,600	78	*9	17,000	80	*14	35
Other health workers[(e)]	73,500	61	10	110,600	64	16	50
All health workers	*533,400*	*75*	*13*	*654,800*	*75*	*18*	*23*
All other occupations	8,931,500	43	12	10,085,500	43	15	13
Total all occupations	**9,464,900**	**45**	**12**	**10,740,300**	**45**	**15**	**13**

* Indicates a ratio that has a relative standard error (RSE) of 25% or more. The ABS advises that Labour Force Survey estimates with an RSE of 25% or more should be used with caution.

** Indicates a ratio that has a RSE of 50% or more. The ABS advises that Labour Force Survey estimates with an RSE of 50% or more are too unreliable for general use.

(a) Includes anaesthetists, internal medicine specialists, psychiatrists, surgeons and other specialist medical practitioners.

(b) Includes midwifery and nursing professionals not further defined, midwives, nurse educators and researchers and registered nurses.

(c) Includes dietitians, optometrists, orthoptists, chiropractors, osteopaths, occupational therapists, podiatrists, speech professionals and audiologists.

(d) Includes health therapy professionals not further defined, massage therapists and personal care consultants.

(e) Includes health professionals not further defined, health/welfare service managers and nurse managers, medical laboratory scientists, occupational and environmental health professionals, other health diagnostic and promotion professionals, medical technicians, ambulance officers and paramedics, diversional therapists and Indigenous health workers.

Source: Unpublished data from ABS Labour Force Survey 2003, 2008.

Workforce supply—the stocks and flows

Whether the supply of health workers is adequate to meet future needs is of much interest nationally. To monitor and adjust this supply, the current size, composition and working hours of the existing health workforce must be measured. As well, the entries to and exits from the workforce must be measurable, and the inherent lead and lag times understood.

New entrants to the workforce are mainly from the education system and skilled immigration. Departures from the workforce include resignations, retirements, migration and deaths.

Not all of these elements of workforce supply can be accurately measured. For example, the data on immigration of health workers are not considered to be of sufficient quality to provide a reasonable measure.

Three aspects of supply are examined here in further detail: the number of students completing higher education health courses, the number of health workers who are likely to retire soon from the workforce, and the hours worked by health workers.

How many people are completing health courses?

For the health professions (such as registered nurses, medical practitioners, dental practitioners, pharmacists and so forth), graduation from a relevant university course is a requirement to practise. Accordingly, an important source of entrants into these occupations is Australian residents completing health-related higher education courses each year.

Between 2002 and 2007, there was an overall increase of 26% in those completing such courses (Table 8.22). Increases were recorded for all health fields. The largest growth occurred in the fields of nutrition and dietetics (up 94%), and podiatry (64%). The smallest increases were for occupational therapy (8%) and rehabilitation therapies (11%). It should be noted that enrolled nurses undertake their initial education through the vocational education and training (VET) system, rather than universities, and are not included in these figures.

Table 8.22: Completions of selected health-related higher education courses[(a)] by Australian citizens and permanent residents (excluding New Zealand citizens), 2002 and 2007

Field	2002 Number	2002 Per cent female	2002 Per cent under-graduate[(b)]	2007 Number	2007 Per cent female	2007 Per cent under-graduate[(b)]	Per cent change in number, 2002 to 2007
Medical studies[(c)]	2,156	54.5	67.3	2,541	58.8	67.7	17.9
Nursing	8,553	89.1	67.9	10,063	88.9	69.9	17.7
Pharmacy	754	63.7	90.6	1,181	65.4	73.3	56.6
Dental studies	336	56.5	84.2	520	58.7	85.6	54.8
Optometry	138	60.1	74.6	188	55.3	59.0	36.2
Public health[(d)]	1,704	69.4	36.9	2,204	69.1	34.8	29.3
Radiography	609	70.3	68.8	781	69.1	65.8	28.2
Physiotherapy	739	65.8	78.8	971	68.0	71.5	31.4
Occupational therapy	698	88.0	89.8	756	89.0	85.1	8.3
Speech pathology/ audiology	436	94.7	77.8	543	94.7	63.7	24.5
Podiatry	113	62.8	88.5	185	68.1	97.3	63.7
Rehabilitation therapies[(e)]	740	60.8	53.6	823	67.2	50.4	11.2
Complementary therapies[(f)]	333	76.0	91.0	482	77.8	85.9	44.7
Nutrition and dietetics	302	91.1	68.2	586	91.5	71.7	94.0
Other health[(g)]	2,004	47.7	84.8	2,883	59.3	76.3	43.9
Total	**19,529**	**74.7**	**69.4**	**24,560**	**76.2**	**67.7**	**25.8**

(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 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.

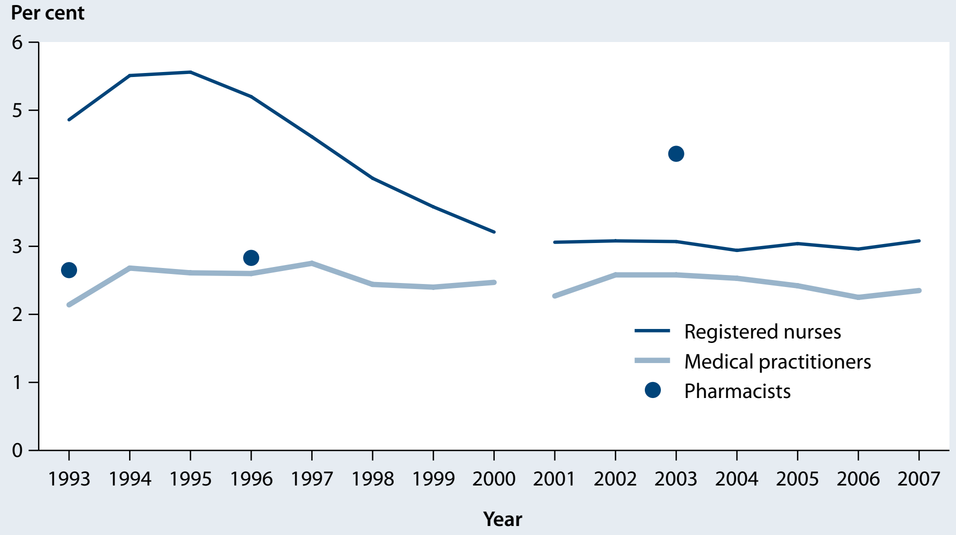
Source: DEEWR Higher Education Student Data Collection.

The sustainability ratio is an indicator developed by the National Health Performance Committee to measure the sustainability of nursing, medical practice and pharmacy. The ratio is the number of graduates in nursing, medicine and pharmacy as a percentage of the total nursing, medical and pharmacy workforce (NHPC 2004).

Between 2002 and 2007 the sustainability ratio for employed registered nurses was around 3% (Figure 8.11). Between 1994 and 1996, this ratio was above 5% due to many registered nurses taking the opportunity to upgrade their hospital-based training to academic qualifications (National Review of Nursing Education 2002). The subsequent decline can be accounted for by fewer nurses upgrading their qualifications.

The sustainability ratio for medical practitioners has remained consistently between 2% and 3%.

The sustainability ratio for pharmacists was 4.4% in 2003 (up from 2.8% in 1996). Course completion information from the Department of Education, Employment and Workplace Relations shows that the number of completions of undergraduate pharmacy courses by domestic students increased from 602 in 2001 to 866 in 2007.



Notes

1. The points in the figure are calculated as the number of Australian citizens and permanent residents (excluding New Zealand citizens) who completed undergraduate degrees at an Australian university in nursing, medicine or pharmacy by the estimated number of employed registered nurses, medical practitioners and pharmacists (respectively) in the following year (multiplied by 100).
2. Care should be taken when interpreting the relationship between completions and employed workforce numbers as the relationship is not always a direct one. That is, not all those who complete an undergraduate course in a particular field will go on to become employed in that field. Some nurses will have already been employed as registered nurses before completing a university course, as training moved from hospitals to universities.
3. Completions refer to undergraduate courses in the relevant field of study (before 2001) and field of education (from 2001 onward). There is a break in the series due to this change in education classification.
4. Registered nurses only are included, as enrolled nurse training is undertaken in the VET sector, not at university.
5. Data on the number of employed registered nurses were not available for 1996, 1998, 2000, 2002 and 2006. Trend estimates have been used to fill in gap years.
6. Only three points are given for pharmacists — 1993, 1996 and 2003. While estimates of the number of employed pharmacists are also available for 1999, completion data for 1998 (and 1997) cannot be used due to a shift from 3-to 4-year training courses at that time.

Sources: AIHW Medical, Nursing and Midwifery and Pharmacy Labour Force Surveys; DEEWR Higher Education Student Data Collection.

Figure 8.11: Australian citizens and permanent residents who completed selected undergraduate health degrees, as a percentage of employed people in the relevant workforce, 1993 to 2007

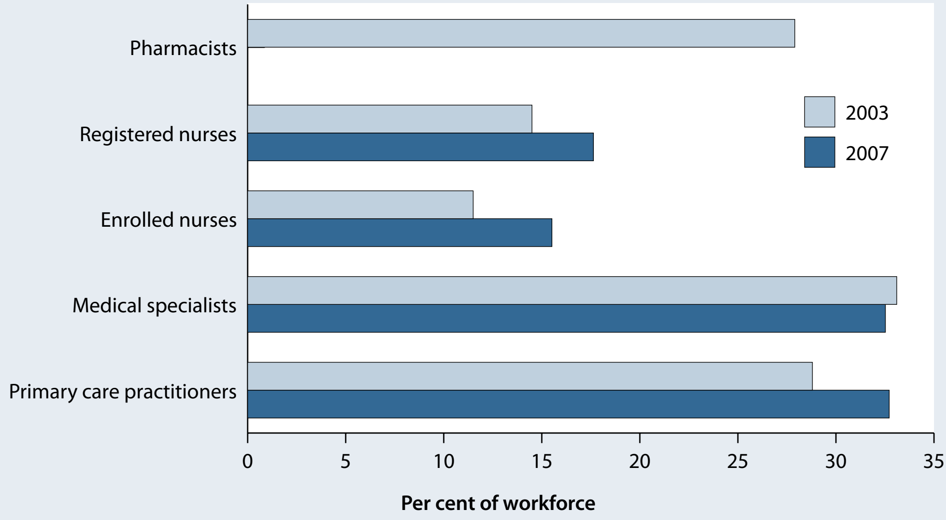
How many health professionals will be retiring from the workforce?

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 2008, 18% of the health workforce was aged 55 years or more, compared with 13% in 2003, 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 years or more rose from 12% in 2003 to 15% in 2008) (Table 8.21).

While many health workers are replaced by new entrants there is concern that the rate of workforce replacement is not keeping up with the increased demand for health-care services as a result of the ageing population.

According to the AIHW health labour force surveys, one-third of medical specialists and primary care practitioners (both 33%) were aged 55 years and over in 2007 (Figure 8.12). The percentage of registered nurses aged 55 years and over increased from 15% in 2003 to 18% in 2007 and the percentage of enrolled nurses in that age group increased from 12% to 16%. The percentage of pharmacists aged 55 years and over in 2003 (the latest year available) was 28%.



Notes

1. Excludes hospital non-specialists and specialists-in-training due to the low proportions aged 55 years and over (5% in 2007).
2. Data for registered nurses, enrolled nurses, medical specialists and primary care practitioners are based on practitioners who mainly practise as clinicians.
3. Latest data available for pharmacists are for 2003.

Sources: AIHW Medical, Nursing and Midwifery, and Pharmacy Labour Force Surveys.

Figure 8.12: Proportion of employed medical, nursing and pharmacist workforce aged 55 years and over, 2003 and 2007

How many hours do health workers work?

Measuring supply is not just a matter of head counts. Equally important is the number of hours spent working. For example, in some professions, particularly those with a high proportion of females such as nursing, a substantial number work part time. In others, such as the medical profession, it is usual to work more than the 'standard' 35 hours per week.

In 2008, health workers worked an average 31.7 hours per week, compared with 34.7 hours for workers in all other occupations (Table 8.23). The health professions with the longest average working weeks were specialist medical practitioners (44.4 hours), generalist medical practitioners (38.5) and dental practitioners (36.4); and those with the shortest average working weeks were complementary therapists (27.3), nursing and personal care assistants (28.1), enrolled and mothercraft nurses (28.5), medical imaging workers, and midwifery and nursing professionals (both 29.2).

Among the health professions, specialist medical practitioners, generalist medical practitioners and 'other health workers' had the lowest proportion of females (32%, 41% and 64% in 2008 respectively). At the other end of the spectrum, with 80% or more being female, were dental associate professionals and assistants, midwifery and nursing professionals, enrolled and mothercraft nurses, nursing and personal care assistants, psychologists and social workers (Table 8.21).

Between 2003 and 2008 there was little change in average hours worked in health occupations. In terms of full-time equivalents (FTE: see Box 8.10), the combination of changes in numbers and hours worked resulted in a 23.0% increase in supply overall (from 481,600 FTE to 593,100 FTE).

Box 8.10: Measuring supply: full-time equivalent numbers and rates per 100,000 population

The full-time equivalent (FTE) number is the number of full-time workloads provided by health workers. This provides a useful measure of supply as it takes into account both the number of health workers who are working and the hours that they work.

FTE is calculated by 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 Australian Bureau of Statistics (ABS) designates 35 hours per week to be full-time work, and this has been used as the basis for calculating FTE for all occupations where ABS data have been sourced. The Australian Institute of Health and Welfare (AIHW) also uses 35 hours per week for estimating FTE, except for medical practitioners (Table 8.25 and Figure 8.13), where 45 hours per week is used.

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 of supply can be made across geographic areas and over time. In Table 8.23 the FTE rate is calculated as: the number of FTE health workers divided by the estimated resident population of Australia respectively at 30 June 2003 and 30 June 2008, multiplied by 100,000.

The FTE rate (see Box 8.10) of the health workforce overall increased by 14% between 2003 and 2008 (from 2,421 to 2,767 per 100,000 population) (Table 8.23). The greatest increases in FTE rates between 2003 and 2008 were for complementary therapists (57%), psychologists (54%), specialist medical practitioners (46%) and 'other health workers' (38%).

Table 8.23: Persons employed in health occupations: average hours worked per week and full-time equivalent (FTE) number[(a)] and rate, 2003 and 2008

	2003			2008		
Occupation	**Average hours worked per week**	**FTE number(a)**	**FTE rate(b)**	**Average hours worked per week**	**FTE number(a)**	**FTE rate(b)**
Generalist medical practitioners	42.6	42,000	211.1	38.5	46,200	215.6
Specialist medical practitioners(c)	41.1	20,000	100.3	44.4	31,300	146.2
Medical imaging workers	35.6	10,700	53.7	29.2	11,100	51.8
Dental practitioners	35.4	8,900	44.7	36.4	11,500	53.9
Dental associate professionals and assistants	29.4	20,100	100.9	32.8	21,700	101.4
Midwifery and nursing professionals(d)	28.3	149,000	749.0	29.2	166,400	776.6
Enrolled and mothercraft nurses	29.2	20,100	101.1	28.5	24,100	112.5
Nursing and personal care assistants	27.7	50,700	254.6	28.1	59,300	276.5
Pharmacists	36.4	16,300	82.1	33.2	18,200	85.0
Physiotherapists	33.4	10,500	52.8	31.2	14,600	68.2
Psychologists	31.4	11,800	59.1	31.4	19,500	90.8
Other allied health workers(e)	33.2	24,500	123.0	31.5	26,300	122.6
Complementary therapists(f)	26.0	10,800	54.1	27.3	18,300	85.2
Social workers	31.8	11,400	57.5	31.3	15,200	70.9
Other health workers(g)	35.5	74,500	374.2	34.9	110,300	514.7
All health workers	*31.6*	*481,600*	*2,420.6*	*31.7*	*593,100*	*2,767.2*
All other occupations	34.8	8,880,500	44,635.7	34.7	9,999,100	46,655.3
Total all occupations	**34.7**	**9,383,800**	**47,165.5**	**34.5**	**10,586,900**	**49,398.0**

(a) Based on a standard full-time working week of 35 hours per week.

(b) FTE per 100,000 population.

(c) Includes anaesthetists, internal medicine specialists, psychiatrists, surgeons and other specialist medical practitioners.

(d) Includes midwifery and nursing professionals not further defined, midwives, nurse educators and researchers and registered nurses.

(e) Includes dietitians, optometrists, orthoptists, chiropractors, osteopaths, occupational therapists, podiatrists, speech professionals and audiologists.

(f) Includes health therapy professionals not further defined, complementary health therapists, massage therapists and personal care consultants.

(g) Includes health professionals not further defined, health/welfare service managers and nurse managers, medical laboratory scientists, occupational and environmental health professionals, other health diagnostic and promotion professionals, medical technicians, ambulance officers and paramedics, diversional therapists and Indigenous health workers.

Source: Unpublished data from ABS Labour Force Survey 2003, 2008.

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 upon the department's labour market research (DEEWR 2008a).

The department identified shortages in a broad range of health occupations across all jurisdictions as at 2007 and 2008 (Table 8.24). In all jurisdictions there was a state-wide shortage in registered nurses, registered midwives, medical diagnostic radiographers and sonographers. In 7 of the 8 jurisdictions there was a state-wide shortage in registered mental health nurses, dentists, dental specialists and physiotherapists. Medical practitioners were not included in the research although studies have shown there to be an overall shortage in Australia (AMWAC 2005; Joyce et al. 2006).

Note that the occupations listed in Table 8.24 are based on the Australian Standard Classification of Occupations, whereas occupations listed elsewhere in this chapter are based on the Australian and New Zealand Standard Classification of Occupations.

Table 8.24: Skills in demand, health occupations, states and territories, 2007 and 2008

Occupation[a]	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Director of nursing	*	*	*	*	*	S	*	S
Nurse manager	D	S	S	S	*	D	S	S
Nurse educator	S	D	S	S	*	R-D	*	*
Registered nurse	S	S	S	S	S	S	S	S
Registered midwife	S	S	S	S	S	S	S	S
Registered mental health nurse	S	S	S	S	S	R	S	S
Dentist	S	*	S	S	S	S	S	S
Dental specialist	S	*	S	S	S	S	S	S
Hospital pharmacist	S	*	S	S	*	D	S	S
Retail pharmacist	R	*	S	S	*	D	S	S
Occupational therapist	M-D,R	*	S	S	S	D	S	S
Optometrist	*	*	*	*	*	*	*	*
Physiotherapist	S	D	S	S	S	S	S	S
Speech pathologist	*	*	*	*	*	*	*	*
Chiropractor	*	*	*	*	*	D	*	*
Podiatrist	*	*	*	*	*	*	*	*
Medical diagnostic radiographer	S	S	S	S	S	S	S	S
Nuclear medicine technologist	*	*	S	S	*	*	*	*
Radiation therapist	D	*	S	*	S	*	*	*
Sonographer	S	S	S	S	S	S	S	S
Social worker	S	S	S	S	*	R	S	S
Rehabilitation counsellor	*	*	*	*	D	*	*	*
Clinical psychologist	S	S	S	R-D	S	S	*	S

(continued)

Table 8.24 (continued): Skills in demand, health occupations, states and territories, 2007 and 2008

Occupation[(a)]	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Occupational health and safety officer	D	*	*	*	*	*	*	*
Environmental health officer	R	D	S	D	*	S	*	S
Enrolled nurse	S	*	S	S	D	D	S	*
Dental technician	S	*	S	S	S	S	S	D
Optical dispenser	*	*	*	*	*	*	*	*
Optical mechanic	*	*	*	*	*	*	*	*

(a) Occupation is based on the Australian Standard Classification of Occupations.

Notes

1. 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 2008b).
2. S State-wide shortage.
   M Shortage in metropolitan (capital city) areas.
   R Shortage in regional areas.
   D Recruitment difficulty.
   R-D Recruitment difficulty in regional areas.
   * No shortage assessed.

Source: DEEWR 2008a.

Selected health professions

The AIHW health labour force surveys provide more detailed data than the ABS Labour Force Survey on the demographic characteristics, working patterns and distribution of some of the major health professions. The AIHW surveys cover all medical practitioners, nurses, midwives and dental practitioners registered (or enrolled in the case of enrolled nurses) with the relevant professional registration board. AIHW health labour force surveys and ABS Labour Force Survey data should be compared with caution due to differences in scope, occupation definitions and sampling variability in the ABS Labour Force Survey data (see Box 8.9).

Medical labour force

In 2007 there were 77,193 persons registered as medical practitioners in Australia, of whom 67,208 (87%) reported that they were working in medicine at the time of the survey (AIHW 2009d). Between 1997 and 2007 the number of employed medical practitioners increased by 39% (Table 8.25). The FTE supply of practitioners increased by 11% in the same period, from 275 FTE per 100,000 population in 1997 to 305 in 2007.

In 2007, 93% of employed medical practitioners were clinicians (practitioners who spent most of their working time doing clinical work) and the remaining 7% were non-clinicians (administrators, teachers, researchers, public and occupational health physicians, and other non-clinicians). Of the clinicians, 38% were primary care practitioners, 35% were specialists, and the remainder were specialists-in-training (14%) and non-specialists working in hospitals (12%) (Table 8.25).

Table 8.25: Employed medical practitioners: selected characteristics, 1997 and 2007

Type of practitioner	Number	Per cent female	Average age	Per cent aged 55 years or over	Average hours per week	FTE number[(a)]	FTE rate[(b)]
				1997			
Clinicians	44,194	27.9	44.5	21.2	48.0	47,140	255
Primary care practitioners	20,134	33.0	46.3	22.5	44.7	19,999	108
Hospital non-specialists	4,321	41.9	30.6	4.5	50.8	4,878	26
Specialists	15,155	15.6	49.6	30.1	50.0	16,839	91
Specialists-in-training	4,584	33.1	31.8	1.9	53.8	5,481	30
Other clinicians	. .	. .	. .	. .	. .	. .	. .
Non-clinicians	4,004	29.5	47.5	29.3	42.4	3,773	20
Total	**48,198**	**28.0**	**44.7**	**21.9**	**47.6**	**50,983**	**275**
				2007			
Clinicians	62,652	34.1	45.6	24.7	43.4	60,424	287
Primary care practitioners	24,121	37.6	49.8	32.7	39.0	20,905	99
Hospital non-specialists	7,412	47.2	33.7	4.8	47.5	7,824	37
Specialists	21,702	23.0	49.8	32.5	44.5	21,461	102
Specialists-in-training	8,853	40.0	33.3	—	49.6	9,758	46
Other clinicians	564	43.6	46.0	28.0	34.8	436	2
Non-clinicians	4,556	32.4	51.2	37.7	39.0	3,948	19
Total	**67,208**	**34.0**	**45.9**	**25.6**	**43.1**	**64,370**	**305**

— Nil or rounded down to zero.

. . Not applicable.

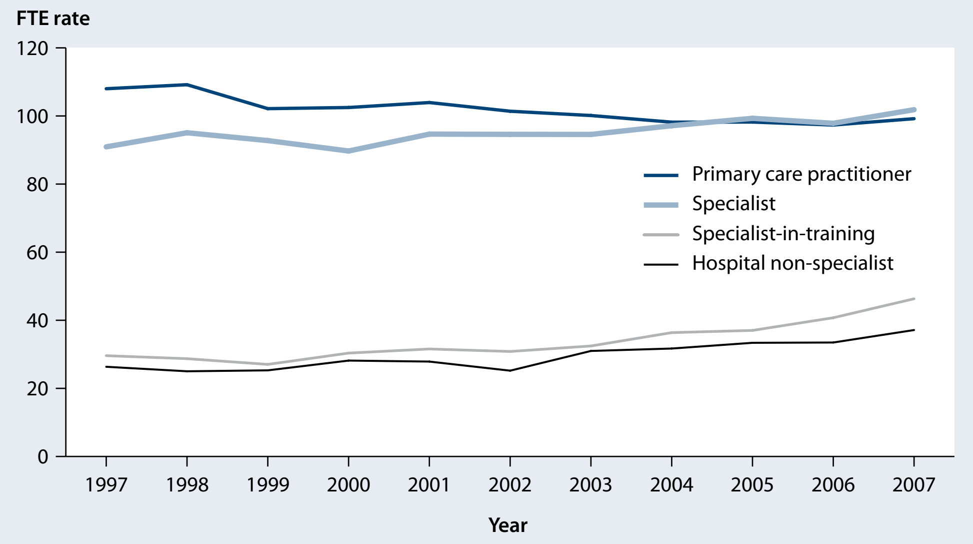
(a) Based on a standard full-time working week of 45 hours.

(b) FTE per 100,000 population.

Source: AIHW Medical Labour Force Survey 2003, 2007.

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 2007 was highest in major cities, with 332 FTE per 100,000 population. This was higher than the rates of 186 and 157 in inner regional and outer regional, areas respectively (tables S38 🖱 and S39 🖱). The FTE rate of specialists in major cities were 2, 3 and 4 times as high as inner regional, outer regional and remote and very remote areas, respectively. The supply of primary care practitioners was more even across the geographical regions, ranging from 84 FTE per 100,000 population in outer regional areas to 95 in major cities.

Between 1997 and 2007, the number of primary care clinicians rose by 20% (from 20,134 to 24,121), while their average working hours declined from 44.7 hours to 39.0 hours. As a result, the supply of primary care clinicians declined from 108 FTE to 99 FTE per 100,000 population over the period. For other clinicians, however, the supply of specialists, specialists-in-training and hospital non-specialists increased over the period (Figure 8.13).



Sources: AIHW Medical Labour Force Survey 1997, 2007.

Figure 8.13: Employed clinical medical practitioners: FTE rate per 100,000 population by year, 1997 to 2007

The supply of hospital non-specialists, specialists and specialists-in-training increased in all regions between 1997 and 2007 (Table S39 🖱).

Nursing labour force

Nurses are the largest occupational group in the health workforce. There are two main types of nurses, registered nurses and enrolled nurses. In 2007 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 2007 there were 305,834 registered and enrolled nurses, of whom 263,331 (86%) were employed in nursing (AIHW 2009e). Between 1997 and 2007 the number of employed nurses increased by 18% (Table 8.26). Between 1997 and 2007 there was a 21% increase in the number of employed registered nurses and a 10% increase in the number of employed enrolled nurses.

Nationally, the supply of nurses increased 13% between 1997 and 2007, rising from 1,054 FTE nurses per 100,000 population in 1997 to 1,189 in 2007 (Table 8.26).

In 2007, the supply of registered and enrolled nurses was highest in remote areas (1,281 FTE nurses per 100,000 population) and lowest in major cities (1,095) (tables S40 🖱 and S41 🖱).

Table 8.26: Employed registered and enrolled nurses, 1997 and 2007

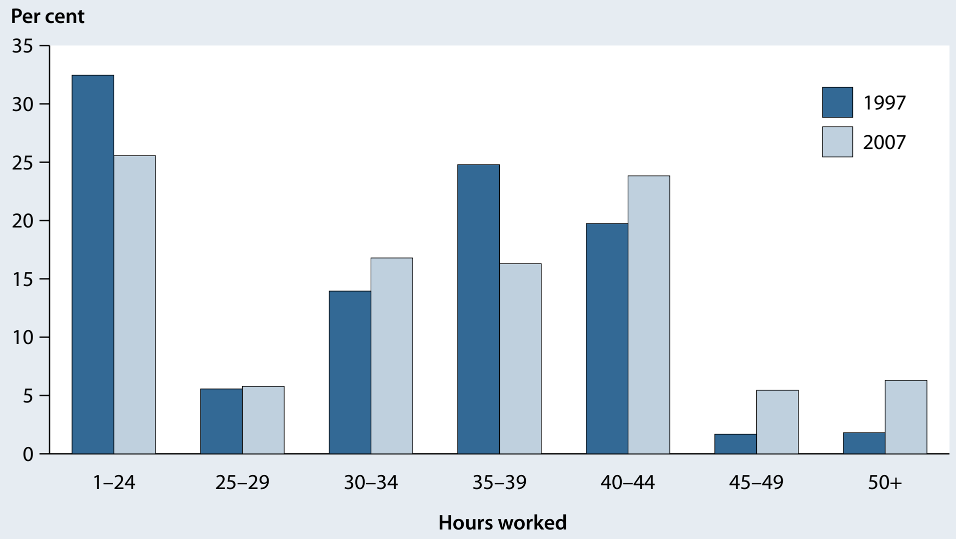
Type of nurse	Number	Per cent male	Average age	Per cent aged 55 years or more	Average hours per week	FTE number[a]	FTE rate[b]
				1997			
Registered	176,217	8.0	40.5	9.4	31.0	156,078	843
Enrolled	46,311	6.3	39.6	5.9	29.2	38,637	209
Total	**222,528**	**7.6**	**40.3**	**8.7**	**30.7**	**195,189**	**1,054**
				2007			
Registered	212,342	9.6	43.8	18.0	33.6	203,848	967
Enrolled	50,990	9.5	43.4	15.9	31.9	46,473	221
Total	**263,331**	**9.6**	**43.7**	**17.6**	**33.3**	**250,541**	**1,189**

(a) Based on a standard full-time working week of 35 hours.

(b) FTE per 100,000 population.

Sources: Nursing and Midwifery Labour Force Survey, 1997, 2007.

Between 1997 and 2007 average hours worked by nurses increased from 31 hours to 33 hours per week. Figure 8.14 shows the changing pattern in hours worked by nurses between 1997 and 2007. In 1997, 32% of nurses worked less than 25 hours per week compared with 26% in 2007. The proportion of nurses working 40 hours or more increased from 23% to 36% over the period.



Sources: AIHW Nursing and Midwifery Labour Force Survey 1997, 2007.

Figure 8.14: Hours worked per week by employed nurses, 1997 and 2007

Dental labour force

The dental labour force comprises dentists, dental therapists, dental hygienists and dental prosthetists. The data are collected annually with the assistance of registration boards, state and territory health departments, and professional associations. There are an increasing number of allied dental practitioners (hygienists and therapists) who are dual-qualified as both therapists and hygienists. As of 2006, the estimated numbers of employed dual-registered therapists and hygienists are reported as a separate labour force group.

In 2006, an estimated 10,404 dentists were employed in Australia, an 8% increase in number since 2003. There was also an increase in the practising rate (number per 100,000 population), from 48.7 to 50.3 dentists per 100,000 population. Between 2003 and 2006, the number of employed dental allied practitioners increased by 22%. Between 2003 and 2005, the dental prosthetist labour force remained relatively stable, decreasing marginally by 2%.

Table 8.27: Employed dental labour force, 2005 or 2006[(a)]

Dental occupation	Number	Per cent female	Average age	Average hours per week[(b)]	Practising rate[(c)]	FTE number[(d)]	FTE rate[(e)]
Dentists	10,404	28.9	45.1	38.5	50.3	11,444.7	55.3
Dental therapists	1,171	98.7	42.9	28.0	5.7	936.8	4.5
Dental hygienists	675	96.7	37.7	28.8	3.3	555.4	2.7
Dental hygienists–therapists[(a)]	372	94.9	36.4	33.4	1.8	355.0	1.7
Dental prosthetists [(f)]	862	9.8	50.3	42.6	4.2	1,049.2	5.2

(a) As of 2006 the estimated numbers of practising 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 hours based on hours totalled for all practice locations reported.

(c) Number employed per 100,000 population.

(d) FTE based on a full-time working week of 35 hours.

(e) FTE per 100,000 population.

(f) Data for dental prosthetists were not available for 2006; 2005 data have been reported.

Sources: AIHW DSRU Dental Labour Force data collection 2005, 2006.

In 2006, 29% of employed dentists were female; dentists were on average 45.1 years of age and worked 38.5 hours per week (Table 8.27). Dental therapists, dental hygienists and dual-registered practitioners were overwhelmingly female (99%, 97% and 95% respectively). Dental therapists and dental hygienists worked similar average hours per week (28.0 and 28.8 respectively), while dual-registered practitioners worked on average a longer week (33.4 hours per week). Dental therapists were slightly younger than dentists (42.9 years of age), and hygienists and dual-registered practitioners were markedly younger (37.7 and 36.4 years of age respectively). Dental prosthetists tended to be mainly male (90%), work longer hours (42.6 hours per week) and be on average older (50.3 years) than the other dental professionals.

The distribution of the dental labour force varied with remoteness. In 2006, dentists were concentrated in major cities, where the number per 100,000 population (59.5) was over 3 times the rate in remote and very remote areas (17.9). Dental hygienists had a similar distribution to dentists. In contrast, dental therapists were more evenly spread.

The number of prosthetists per 100,000 population in remote and very remote areas was low (0.6 compared to the national rate of 4.2) (Table S42 🖱).

How does Australia's health workforce compare with other OECD countries?

The OECD health database includes information on the numbers of health workers in member countries, including those with economies and health systems most similar to Australia's—New Zealand, Canada, the United States and the United Kingdom. In 2007, Australia had higher numbers of general practitioners relative to the population than the four other countries (Table 8.28). The rate of medical specialists ranged from 0.8 to 1.8 per 100,000, with Australia ranking higher than New Zealand and Canada but lower than the United States and the United Kingdom.

The definition of general practitioners used by the OECD includes those medical practitioners working in the ambulatory sector or in hospitals. Of the 31,533 general practitioners in the OECD figures for Australia for 2007 (Table 8.28), 24,121 were primary care practitioners and the remaining 7,412 were non-specialist clinicians working in hospitals (including interns, resident medical officers and career medical officers).

Table 8.28: Health professionals employed in selected OECD countries, number and rate[a], 2003 and 2007

Occu-pation/ year	Australia		New Zealand		Canada		USA		United Kingdom	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
General practitioners[b]										
2003	27,834	1.4	3,006	0.8	32,088	1.0	281,957	1.0	40,007	0.7
2007	31,533	1.5	3,195	0.8	34,401	1.0	290,791	1.0	43,640	0.7
Medical specialists										
2003	23,985	1.2	2,873	0.7	34,061	1.1	409,916	1.4	89,480	1.5
2007	30,555	1.4	3,357	0.8	37,404	1.1	441,443	1.5	107,930	1.8
Dentists										
2003	9,666	0.5	1,582	0.4	18,265	0.6	173,574	0.6	n.a.	n.a.
2007	10,404[c]	0.5[c]	1,877	0.4	19,201	0.6	179,594[d]	0.6[d]	25,512	0.4
Nurses										
2003	195,975	9.9	36,514	9.1	269,154	8.5	2,929,020	10.1	604,598	10.2
2007	212,480	10.1	41,980	9.9	297,388	9.0	3,187,580	10.6	610,957	10.0

(a) Number of workers per 1,000 population.

(b) Figures for GPs for Australia include hospital-non-specialists to be consistent with the OECD definition.

(c) Figures for dentists in Australia are 2006 data.

(d) Figures for dentists in USA are 2006 data.

Sources: OECD 2009; data for Australia are from AIHW Medical and Nursing and Midwifery Labour Force Survey 2003, 2007, and AIHW DSRU Dental Labour Force data collection, 2006.

References

ABS (Australian Bureau of Statistics) 2009. Experimental life tables for Aboriginal and Torres Strait Islander Australians, 2005–2007. ABS cat. no. 3302.0.55.003. Canberra: ABS.

ABS & AIHW (Australian Institute of Health and Welfare) 2008. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2008. ABS cat. no. 4704.0, AIHW cat. no. IHW 21. Canberra: ABS & AIHW.

ABS & Statistics New Zealand 2006. ANZSCO—Australian and New Zealand Standard Classification of Occupations: First Edition, Revision 1. ABS cat. no. 1220.0. Canberra: ABS.

ABS & Statistics New Zealand 2008. Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (Revision 1.0). ABS cat. no. 1292.0. Canberra: ABS.

AIHW (Australian Institute of Health and Welfare) 2007. Health expenditure Australia 2005–06. Health and welfare expenditure series no. 30. Cat. no. HWE 37. Canberra: AIHW.

AIHW 2008. Expenditures on health for Aboriginal and Torres Strait Islander peoples 2004–05. Health and welfare expenditure series no. 33. Cat. no. HWE 40. Canberra: AIHW.

AIHW 2009a. Health expenditure Australia, 2007–08. Health and welfare expenditure series no. 37. Cat. no. HWE 46. Canberra: AIHW.

AIHW 2009b. Expenditure on health for Aboriginal and Torres Strait Islander people 2006–07. Health and welfare expenditure series no. 39. Cat. no. HWE 48. Canberra: AIHW.

AIHW 2009c. Health and community services labour force 2006. National health labour force series no. 42. Cat. no. HWL 43. Canberra: AIHW.

AIHW 2009d. Medical labour force 2007. National health labour force series no. 44. Cat. no. HWL 45. Canberra: AIHW.

AIHW 2009e. Nursing and midwifery labour force 2007. National health labour force series no. 43. Cat. no. HWL 44. Canberra: AIHW.

AMWAC (Australian Medical Workforce Advisory Committee) 2005. The general practice workforce in Australia: supply and requirements to 2013. AMWAC report 2005.2. Sydney: AMWAC. Viewed 19 November 2009, <http://www.nhwt.gov.au/documents/Publications/2005/The%20general%20practice%20workforce%20in%20Australia%20-%20Summary.pdf>.

COAG (Council of Australian Governments) 2008. National partnership agreement on hospital and health workforce reform. Melbourne: National Health Workforce Taskforce. Viewed 21 September 2009, <http://www.nhwt.gov.au/documents/COAG/National%20Partnership%20Agreement%20on%20Hospital%20and%20Health%20Workforce%20Reform.pdf>.

DEEWR (Australian Government Department of Education, Employment and Workplace Relations) 2008a. State and territory skill shortages list. Canberra: DEEWR. Viewed 11 August 2009, <http://www.workplace.gov.au/workplace/Publications/LabourMarketAnalysis/SkillShortages/StateandTerritorySkillShortagelists/>.

DEEWR 2008b. Skill shortage methodology 2008–09. Canberra: DEEWR. Viewed 22 October 2009, <http://www.workplace.gov.au/NR/rdonlyres/5155EAC7-0400-438F-A9B5-2DB0B89F20C0/0/WorkplaceMethodologypaper200809.pdf>.

DoHA (Australian Government Department of Health and Ageing) 2009. About the PBS. Canberra: DoHA. Viewed 30 January 2009, <http://www.pbs.gov.au/html/consumer/pbs/about>.

Joyce CM, McNeil JJ & Stoelwinder JU 2006. More doctors, but not enough: Australian medical workforce supply 2001–2012. Medical Journal of Australia 184(9):441–6.

National Review of Nursing Education 2002. National review of nursing education 2002: our duty of care. Canberra: Department of Education, Science and Training.

NHPC (National Health Performance Committee) 2004. National report on health sector performance indicators 2003. AIHW cat. no. HWI 78. Canberra: Australian Institute of Health and Welfare.

OECD (Organisation for Economic Co-operation and Development) 2009. OECD health data 2009. Paris: OECD.

PHIAC (Private Health Insurance Administration Council) 2001. Annual report 2000–01. Canberra: AusInfo.

PHIAC 2002. Private Health Insurance Administration Council annual report 2001–02. Canberra: AusInfo.

PHIAC 2003. Private Health Insurance Administration Council annual report 2002–03. Canberra: AusInfo.

PHIAC 2004. Private Health Insurance Administration Council annual report 2003–04. Canberra: AusInfo.

PHIAC 2005. Private Health Insurance Administration Council annual report 2004–05. Canberra: PHIAC.

PHIAC 2006. Private Health Insurance Administration Council annual report 2005–06. Canberra: PHIAC.

PHIAC 2007. Private Health Insurance Administration Council annual report 2006–07. Canberra: PHIAC.

PHIAC 2008. Private Health Insurance Administration Council annual report 2007–08. Canberra: PHIAC.

Productivity Commission 2005. Australia's health workforce. Research report. Canberra: Productivity Commission.

Australia’s health performance

9

Separate chapters of this report provide detailed information about the health status of Australians, the determinants of that health status and the health services provided in Australia. Wherever possible, previous chapters have also highlighted whether those factors vary for different population groups and over time.

It is also helpful to bring key information about health and health interventions together for a concise and integrated picture of Australia's health performance. Accordingly, Australia's health ministers have selected 42 indicators to provide a broad perspective of health and health system performance. The indicators are presented here against a revised version of the National Health Performance Framework (NHPF) and the ministers have asked the Australian Institute of Health and Welfare (AIHW) to report against them in each issue of *Australia's health*. This chapter is the result of that request, with the AIHW having first presented a similar chapter in *Australia's health 2008*.

The chapter begins with a brief description of the NHPF and the various factors considered in selecting the indicators. The indicator findings are then presented against each of the three framework 'domains', namely health status, determinants of health and health system performance. The focus is on the key questions about performance: 'Where are we improving and by how much?' and 'Is performance the same for different population groups?'. Within this broad approach, a selection of the most interesting available information is presented for each indicator—for example, trends over time, population group variations or, where possible, international comparisons. Readers are referred to other chapters of this report where appropriate.

9.1 The National Health Performance Framework and indicators

The framework

The NHPF was developed by the National Health Performance Committee (NHPC) under the auspices of the Australian Health Ministers' Advisory Council (AHMAC). The framework aims to help us understand and evaluate the health system, making it easier to determine how well the system is performing (NHPC 2001). The NHPF was reviewed by AHMAC in 2008 and this chapter is the first comprehensive presentation to meet the requirements of the revised version (AIHW 2009a).

The framework contains 14 health performance dimensions, grouped under the three broad domains (Figure 9.1). For example, 'health conditions' is one of four dimensions in the 'health status' domain, 'environmental factors' is one of four in the 'determinants of health' domain, and 'effectiveness' is one of six in the 'health system performance' domain.

Health status

How healthy are Australians? Is it the same for everyone?
Where are the best opportunities for improvement?

Health conditions

Prevalence of disease, disorder, injury or trauma, or other health-related states

Human function

Alterations to body structure or function (impairment), activity limitations and restrictions in participation

Wellbeing

Measures of physical, mental and social wellbeing of individuals

Deaths

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

Physical, chemical and biological factors such as air, water, food and soil quality

Community and socioeconomic

Community factors such as social capital, support services, and socioeconomic factors such as housing, education, employment and income

Health behaviours

Attitudes, beliefs, knowledge and behaviours such as patterns of eating, physical activity, smoking and alcohol consumption

Biomedical factors

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

Care, intervention, or action provided is relevant to the client's needs and based on established standards. Care, intervention or action achieves desired outcome

Safety

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

Responsiveness

Service is client orientated. Clients are treated with dignity and confidentiality, and encouraged to participate in choices related to their care

Continuity of care

Ability to provide uninterrupted, coordinated care or service across programs, practitioners, organisations and levels over time

Accessibility

People can obtain health care at the right place and right time irrespective of income, physical location and cultural background

Efficiency & sustainability

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: AIHW 2009a.

Figure 9.1: National Health Performance Framework (2nd edition)

Developing indicators under the framework

In general terms, 'indicators' can be defined as statistical measures selected to describe a situation concisely; to track change, progress and performance; and to act as a guide in decision making. Chosen carefully within a suitable framework, indicators should provide a systematic and efficient aid to monitoring and planning. Indicators can range from the very specific to the very broad. It is important to keep in mind that indicators *indicate: they are generally not designed to give a perfect or full picture*. While the best indicators are robust and present a simple picture that can be used confidently as a basis for decisions, other indicators may serve as flags for issues that need further investigation before conclusions can be drawn and action taken. For example, an increasing incidence of a type of cancer may represent an underlying growth in rates of disease. Alternatively, it may be due to improved detection. The policy implications for these two possibilities are quite different.

Performance indicators, in particular, are defined as 'statistics or other units of information that reflect, directly or indirectly, the extent to which an anticipated outcome is achieved or the quality of the processes leading to that outcome' (NHPC 2001). Such indicators commonly cover health system structures, processes and outcomes. Because outcomes tend to be more difficult to measure, process indicators are often used instead, on the assumption that a good process will lead to a good outcome. However, the extent to which outcomes can be attributed to interventions varies (Box 9.1).

Box 9.1: The health system and outcomes

How much credit or blame can the health system take for our health? Health status and health determinants are often described as 'outcomes' because the health system aims to improve them. However, as discussed in chapters 1 and 3, so many factors can influence health. The health system is one influence, and probably a major one for many people. But the system itself has many parts, involving many forms of prevention and treatment, and delivered in a range of settings such as a general practice or hospitals or through mechanisms such as the mass media.

At a broad level, this makes it difficult to know which aspects of our health status can be attributed to the health system rather than to other influences in our lives, to what extent, and to which parts of the system. Outcomes can be clear when the focus is narrow. For example, a clinical trial can show the benefit of a particular medication or surgical procedure for a particular health condition. In contrast, some indicators aim to provide information about the performance of the health system as a whole and cannot be used to assess the extent to which the health system, or any particular component of the system, can take the credit or blame.

The indicators selected for presentation here are an update of the NHPC set presented in the previous edition of *Australia's health*, revised to reflect current priorities in the health sector and to focus (more than before) on the indicators for which data are available and able to be interpreted.

The indicators presented cover all dimensions of the revised NHPF and were selected based on the original NHPC criteria for good performance indicators, specifically that indicators should:

- be worth measuring
- be measurable for diverse populations
- be understood by people who need to act
- galvanise action
- be relevant to policy and practice
- reflect results of actions when measured over time
- be feasible to collect and report
- comply with national processes of data definitions (NHPC 2004).

The chapter includes a selection of indicators developed for a range of new intergovernmental agreements (see Box 9.2) and a small number of indicators that describe broader factors influencing the health system. These broader factors are generally not the direct responsibility of health authorities but they may be considered in the authorities' objectives and planning. For example, many preventable diseases and risk factors (such as obesity) are seen as amenable to health intervention, and therefore within the responsibility of health authorities. On the other hand, community characteristics such as income levels and educational attainment are largely beyond the influence of health authorities but, as important determinants of health, may be considered in designing and evaluating policies and services.

Box 9.2: Other health system performance indicators

Since the last edition of *Australia's health* (2008), a new landscape for health sector performance reporting has emerged in Australia. In late 2008, the Australian Government and state and territory governments signed the Intergovernmental Agreement on Federal Financial Relations and a series of associated agreements. Among these was the new National Healthcare Agreement, which outlines the goals of the health system and specifies roles and responsibilities of these governments in managing and providing health services. Under these arrangements, the Australian Government and state and territory health authorities have committed to regularly report on a range of performance indicators and performance benchmarks specified in the National Healthcare Agreement (COAG 2008). There are also a significant number of indicators contained in various health-related National Partnership Agreements, such as the National Partnership Agreement on Preventative Health. Some of the indicators developed for these agreements are presented in this chapter.

The result of these considerations is that some indicators that were previously reported in *Australia's health* and by the NHPC are not included in this set. These include some 'health status and outcome' indicators (for example, mortality for any specific health conditions), some 'determinants of health' indicators (for example, informal care), and some 'health system performance' indicators (for example, hysterectomy rates and delivery by caesarean section). While clearly worth measuring for other purposes, these indicators did not sufficiently meet the criteria for inclusion in this set.

How are indicators presented here?

The following sections present indicators against the health performance framework domains of health status (Section 9.2), determinants of health (Section 9.3) and health system performance (Section 9.4). Sections start with a brief overview of the domain before presenting a summary table that provides the most current measures of the indicators and describes whether there have been favourable or unfavourable trends over time.

A trend may be marked for any indicator in the summary table, provided that:

- the time span of comparable information is at least 5 years
- there are three or more pieces of comparable information spread over that period (not just at the beginning and end)
- the change in levels is generally progressive over the period cited.

A trend is marked as 'favourable' where the measure of interest has generally moved in the desired direction for that indicator, over the time period presented. This movement can be either an increase or decrease in the indicator value. For example, an increase in life expectancy is considered favourable as it means that people are living longer on average, but a decrease in the proportion of adults who smoke is also considered favourable. Conversely, a trend is considered 'unfavourable' if the measure has moved in the opposite direction to what is desired. It is important to note that for simplicity this report takes all trends at face value and marks them accordingly as favourable or unfavourable.

For indicators where the measure does not appear to have changed over the time period, the trend is described as 'no change' and, for indicators where there are insufficient data to support trend analysis (or where the result of that analysis is not clear), the trend is described as 'not available/not clear'.

Each indicator is then presented separately, highlighting its most interesting features. Cross-references are provided also to material in this report and elsewhere, and to directly related National Healthcare Agreement indicators.

📖	Complementary content in *Australia's health 2010*
📘	Data source reference
COAG	Indicator part of the National Healthcare Agreement

9.2 Health status

This domain covers health status as the overall measure of Australia's success or failure in improving the population's health. Indicators are intended to reflect health outcomes, which are defined as a change in the population's health that may be wholly or partially attributed to a health service or intervention (but see Box 9.1). It should be noted that some of the indicators presented in this section are long-term health outcomes, reflecting actions that have taken place over years or even decades previously.

The domain 'Health status' has four components that summarise the impact of disease and injury on Australians:

- *Health conditions* are measured through the incidence of selected diseases.
- *Human function* focuses on disability measured as core activity limitation; that is, a limitation in self-care, mobility and communication.
- *Wellbeing* incorporates measures of self-assessed health status and psychological distress as indicators of overall wellbeing.
- *Deaths* information incorporates life expectancy as the summary statistic of the overall health status of the population. Premature deaths are represented by indicators for infant and young child mortality.

Table 9.1: Health status—indicator values and trends

Indicator	Measure	Year(s)	Value[(a)]	Trend
	Health conditions			
Incidence of heart attacks	Number of deaths recorded as coronary heart disease deaths plus the number of heart attacks, per 100,000 population	1997–2007	506	✓
Incidence of selected cancers	Number of new cases of:			
	• bowel cancer, per 100,000 population	1996–2006	62.2	~
	• melanoma, per 100,000 population	1996–2006	47.9	~
	• lung cancer, per 100,000 population	1996–2006	43.8	~
	• female breast cancer, per 100,000 females	1996–2006	112.4	~
	• cervical cancer, per 100,000 females	1996–2006	6.6	✓
Incidence of sexually transmissible infections and bloodborne viruses	Number of new cases, per 100,000 population, of:			
	• syphilis (congenital, and cases of < 2 years duration)	1999–2009	5.3	. .
	• HIV (human immunodeficiency virus)	1999–2008	4.7	✕
	• hepatitis B (whether or not sexually transmitted)	2004–2009	36.0	✕
	• hepatitis C (whether or not sexually transmitted)	2005–2009	58.8	~
	• chlamydia	1999–2009	284.3	✕
	• gonococcal infection	1999–2009	36.6	✕
Incidence of end-stage kidney disease (ESKD)	Number of people commencing kidney replacement therapy for ESKD plus the number who died from ESKD each year, per 100,000 population	2003–2006	21.3	. .

Indicator	Measure	Year(s)	Value[(a)]	Trend
Hospitalisations for injury and poisoning	Number of hospitalisations with a principal diagnosis of injury and poisoning, per 1,000 population	2002–03 to 2007–08	24.1	✗
Human function				
Severe or profound core activity limitation	Percentage of people who sometimes or always need help with core activities of daily living (mobility, self-care or communication)	1981–2003	6.3	~
Wellbeing				
Self-assessed health status	Percentage of persons aged 15 years or over who self-assess their health as very good or excellent	2001 to 2007–08	55.8	~
Psychological distress	Percentage of adults with very high levels of psychological distress, measured using the Kessler 10 scale	2001 to 2007–08	3.5	~
Deaths				
Infant/young child mortality rate	Number of deaths:			
	• of infants (< 1 year), per 100,000 live births	1997–2007	420	✓
	• of Indigenous infants (< 1 year), per 100,000 live births (5-year average)	2003–2007	1,030	..
	• of children aged 1–4 years, per 100,000 population	1997–2007	21.2	✓
Life expectancy	The average number of years a person could expect to live from birth:			
	• for all males	1995–1997 to 2005–2007	79	✓
	• for all females	1995–1997 to 2005–2007	84	✓
	• for Indigenous males	2005–2007	67	..
	• for Indigenous females	2005–2007	73	..

(a) Value at most recent point.

KEY ✓ favourable ✗ unfavourable ~ no change .. trend data unavailable/not clear

Incidence of heart attacks. The number of major coronary events among people aged 40–90 years; 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.

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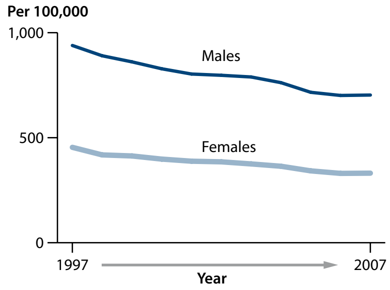
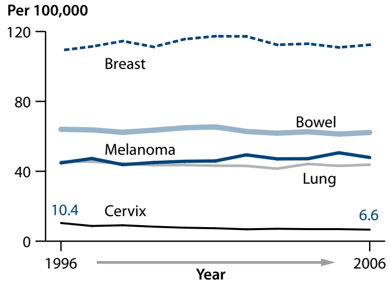
- Around 49,400 major coronary events in 2006—506 per 100,000 people.
- Twice as common among males as among females.
- Rate fell by more than a quarter between 1997 and 2007, despite increased use of more sensitive diagnostic tests, that may have led to a rise in the number of less severe heart attacks being diagnosed over time.



Incidence of selected cancers. The number of new cases of selected cancers of public health importance (breast, bowel, cervical and lung cancers, and melanoma). Presented as age-standardised numbers per 100,000 people (or, for breast and cervical cancer, per 100,000 females).



- Lung cancer, bowel cancer and melanoma all more common in males than females.
- Cervical cancer rates fell by one-third between 1996 and 2006.
- Breast cancer and melanoma incidence rose during the 1980s and early 1990s but have since stabilised; lung cancer and bowel cancer rates are also flat.

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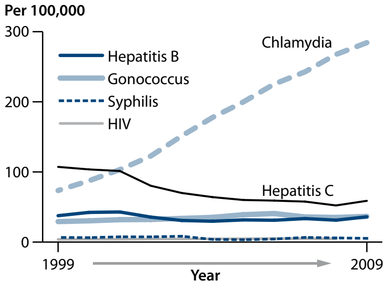
COAG

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 age-standardised numbers per 100,000 population.

- Incidence rates higher for males than females for all listed infections except chlamydia.
- Patterns of incidence by age vary: chlamydia and gonococcal infections peak at 15–24 years; hepatitis B and C peak in the 30s, and syphilis in the early 40s.
- Chlamydia incidence rose almost fourfold between 1999 and 2009.
- HIV incidence rose from 3.8 per 100,000 in 1999 to 4.7 in 2008.



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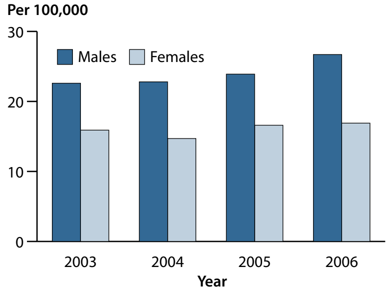
Incidence of end-stage kidney disease (ESKD). The number of people commencing kidney replacement therapy for ESKD plus the number who died from ESKD each year. Presented as an age-standardised number per 100,000 people.



- 21 per 100,000 in 2006 (4,700 people).
- Higher for males (27) than females (17).
- Indigenous rate 6 times non-Indigenous rate.
- Statistically significant increase in male rate between 2003 and 2006.

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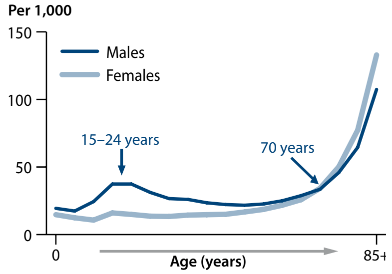
2010c

COAG

Hospitalisations for injury and poisoning. The number of hospitalisations with a principal diagnosis of injury and poisoning. Presented as an age-standardised rate (per 1,000 population).

- Almost 520,000 hospitalisations in 2007–08 — 24.1 per 1,000 population.
- The overall rate increased slightly between 2002–03 and 2007–08.
- Higher for males than females up to age 70.
- Indigenous hospitalisation rate twice non-Indigenous rate.



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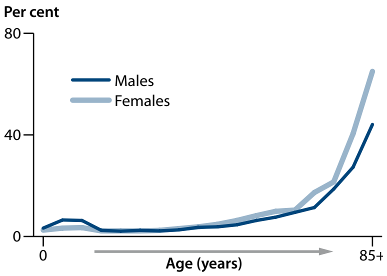
COAG

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).



- 1.2 million people—6.3% of the population (2003).
- 5.4% of males and 7.1% of females.
- Higher in children (especially boys) than teenagers or young adults.
- No change in underlying rate, but population ageing drove a 70% increase in the number of people with severe or profound core activity limitation between 1981 and 2003.

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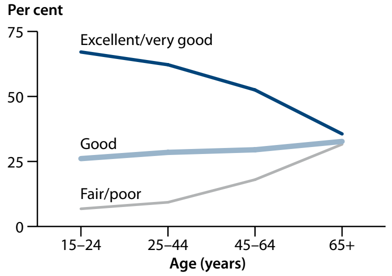
Self-assessed health status. The percentage of people aged 15 years or over who self-assess their health as excellent or very good.

- 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.



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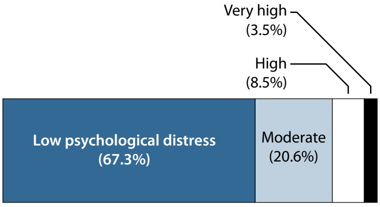
ABS 2009b

Psychological distress. Adults who have very high levels of psychological distress as measured using the Kessler 10 scale. Very high levels of psychological distress are considered an indication of possible need for mental health services. Presented as an age-standardised percentage.



- 3.5% of adults had very high levels of psychological distress in 2007–08.
- No change in overall proportion over time.
- More common in females (4.1%) than males (2.8%).
- Highest for people aged 45–54 years (4.4%).

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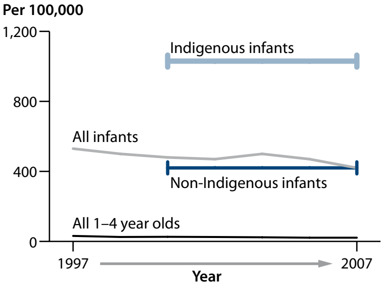
Infant/young child mortality rate (including the gap between Indigenous and non-Indigenous people). The number of deaths of infants (those aged less than 1 year) divided by the number of live births, and the number of deaths of young children (those aged 1–4 years) divided by the population of the same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

- Infant mortality was around 420 deaths per 100,000 live births in 2007—a 20% fall over a decade.
- Mortality rates for Indigenous infants (1,030 per 100,000 over the period 2003–2007) were much higher than the overall Australian rate, especially in the Northern Territory.
- The 2007 mortality rate for children aged 1–4 years was 21.2 per 100,000—about a third lower than in 1997.



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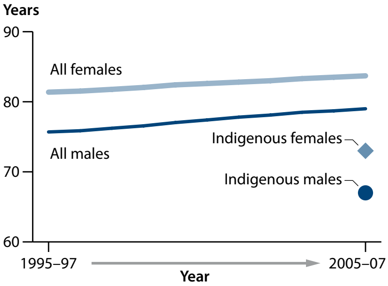
COAG

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 2006 and 2008 was 83.7 years; for boys it was 79.2 years.
- Male and female life expectancy continues to increase.
- The gap in life expectancies between Indigenous and non-Indigenous people is 12 years for males and 10 years for females.
- Significant changes in the methods used to calculate Indigenous life expectancy mean that trend data are not available.

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Discussion

At the highest level, health status can be considered in terms of mortality, morbidity, and functioning and wellbeing.

The most common single measure that incorporates mortality at all ages is a population's life expectancy. On this measure, Australia fares exceptionally well—our life expectancy is one of the highest in the world (a position we have held for some years (OECD 2009)) and, even in recent years, life expectancy has continued to increase. It is now well known that Australia's Aboriginal and Torres Strait Islander people have lower life expectancy than other Australians (a gap of 10–12 years).

Another key indicator in this area is the mortality rate for infants and young children. Australia's under-5 mortality rate has been declining; however, Indigenous Australians are still more likely than their peers to die in infancy or early childhood. Australia ranks 20th in the Organisation for Economic Co-operation and Development (OECD) countries in terms of infant mortality, with a rate similar to that of the United Kingdom and New Zealand, but considerably higher than many countries in Europe (OECD 2009).

The indicators in this section that relate to functioning and wellbeing are less easy to interpret or compare. A majority of Australians consider their health status to be very good or excellent—although this decreases with age—but around 6% need daily assistance due to disability and 3.5% report very high levels of psychological distress. There is no evidence to suggest any change in the levels for these indicators over time.

Some of the major causes of morbidity and mortality in Australia are heart disease, cancer, other chronic conditions and injury. The incidence of heart attacks has decreased dramatically over the last decade and the incidence of some common cancers has decreased (cervical) or stabilised (bowel, melanoma, lung, and breast) over this period. On the other hand, hospitalisation rates for injury (the major cause of morbidity and mortality in young people) have been increasing. Similarly, the incidence of chlamydia, one of several sexually transmissible infections with long-term health implications, has risen almost fourfold within 10 years.

Patterns within many indicators of health status (both acute and long-term) vary markedly between population groups, such as between Indigenous and non-Indigenous people, and between people living in different geographic regions or areas of different socioeconomic status. Identifying and reducing these discrepancies plays a role in continuing to improve Australia's health.

9.3 Determinants of health

This domain covers the factors that influence how good our health will be at the individual or population level. As described in Chapter 3, determinants can be environmental, socioeconomic, behavioural and biomedical. They can act more directly to cause disease or be further back in the causal chain and act through a number of intermediary causes such as socioeconomic or employment status. Individuals have a degree of control over some determinants (such as physical activity), but other determinants act mainly or entirely at a population level (such as water quality).

'Determinants of health' has four dimensions:

- *Environmental factors* are summarised with one indicator relating to individual environments (smoking in the home) and another relating to the population-wide environment (water quality).
- *Community and socioeconomic factors* are summarised with indicators of relative income, educational attainment for adults, and levels of health literacy.
- *Health behaviours* are summarised using 5 indicators that relate to the risk for many chronic diseases. (Obesity is included as a 'behaviour' because it relates to behaviours such as diet and physical activity.)
- *Biomedical factors* are determinants that represent bodily states that are risk factors for other conditions, for example high blood pressure or high blood cholesterol. At the time of writing, there were no indicators for this dimension, reflecting the lack of national data.

Table 9.2: Determinants of health—indicator values and trends

Indicator	Measure	Year(s)	Value[(a)]	Trend
	Environmental factors			
Children exposed to tobacco smoke in the home	Percentage of households with dependent children (aged 0–14 years) where adults report smoking inside the home	1995–2007	7.8	✓
Water quality	Percentage of households connected to mains or town water	2007–08	94	. .
	Community and socioeconomic factors			
People with low income	Percentage of people living in households with an equivalised disposable income less than 50% of the national median	2003–04 to 2007–08	13.4	✕
Proportion of babies born with low birthweight	Percentage of liveborn singleton babies born with a birthweight of less than 2,500 grams	1997–2007	4.7	~
Health literacy	Percentage of 15–74 year olds with health literacy at or above the minimum level regarded as necessary for understanding and using information relating to health issues	2006	41	. .
Educational attainment	Percentage of adults aged 25–64 years with a non-school qualification (diploma, certificate or degree)	1999–2009	62	✓

Indicator	Measure	Year(s)	Value[a]	Trend
	Health behaviours			
Proportion of adults who are daily smokers	Percentage of persons aged 18 years and over who smoke tobacco every day	2001 to 2007–08	19.1	✓
Proportion of adults at risk of long-term harm from alcohol	Percentage of persons aged 18 years and over with an alcohol consumption pattern that puts them at risk of long-term alcohol-related harm	2001 to 2007–08	14.8	..
Fruit and vegetable intake	Percentage of people aged 12 years and over eating sufficient serves each day of:			
	• fruit	2001 to 2007–08	51.3	✗
	• vegetables	2001 to 2007–08	8.5	✗
Physical inactivity	Percentage of adults who did less than 150 minutes of walking, moderate or vigorous physical activity in a week	2007–08	63	..
Proportion of adults overweight or obese	Percentage of adults classified as overweight or obese	2007–08	61[b]	✗[c]

(a) Value at most recent point.

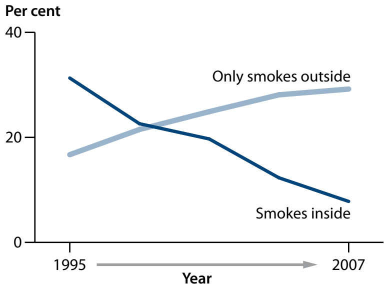
(b) Based on measured height and weight.

(c) Based on self-reported height and weight.

KEY ✓ favourable ✗ unfavourable ~ no change .. trend data unavailable/not clear

Children exposed to tobacco smoke in the home. The percentage of households with dependent children (aged 0–14 years) where adults report smoking inside the home.

- In 2007, 8% of households with children included a person who smoked inside the home.
- This proportion has fallen dramatically since 1995.
- Almost 1 in 3 households with children included a smoker who only smoked outside the home.



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AIHW 2008b

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 microbiological compliance with national water quality standards.
- In 2007–08, 82% of assessed utility providers recorded 100% compliance with national standards. Almost all utilities provided water that met microbiological requirements to more than 95% of the population served by the utility.

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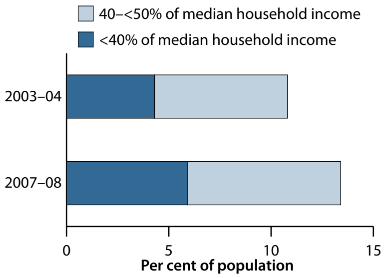
ABS 2009e
WSAA & NWC 2009

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 2007–08, the median equivalised disposable household income was $692 per week.
- Almost 2.8 million people lived in households with less than half this income ($346 per week); including 1.2 million people with a household income less than 40% of the median ($277 per week).
- The percentage of people living in low-income households increased from 10.8% in 2003–04 to 13.4% in 2007–08.



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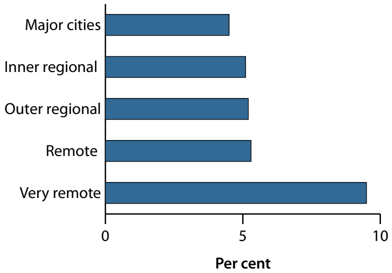
ABS
2010

Proportion of babies born with low birthweight. The percentage of live-born singleton babies with a birthweight of less than 2,500 grams.



- In 2007, 4.7% of singleton births (13,300 babies) were of low birthweight.
- The rate has not changed markedly over the last 10 years.
- Babies born to Indigenous mothers, and to mothers in very remote areas, were more than twice as likely as their city counterparts to be of low birthweight.

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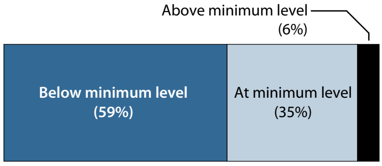
CRC
2010

COAG

Health literacy. The percentage of adults (aged 15–74 years) whose health literacy is at or above the minimum level regarded as necessary 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.

- In 2006, 35% of 15–74 year olds met the minimum level of health literacy and 6% exceeded the minimum (41% in total).
- 48% of 25–44 year olds met or exceeded the minimum level, compared with 17% of 65–74 year olds.
- Males and females had similar health literacy levels.



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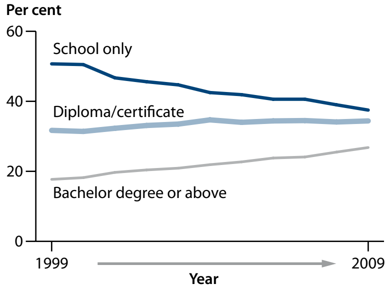
ABS
2008b

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



- More than 3 in 5 (62%) had a non-school qualification in 2009, including 1 in 4 with a degree.
- Particularly strong growth in population with a degree: from 18% to 27% over a decade.
- Highest qualification levels for younger people: 69% among 25–34 year olds, compared with 54% of 55–64 year olds.

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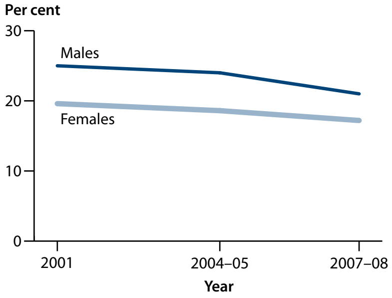
ABS 2009a

Proportion of adults who are daily smokers. Adults (18 years 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 males and 17% of females.
- The long-term downward trend in smoking rates, for both males and females, has continued in recent years.
- Among males, daily smoking is most common in the 25–34 years age group. For females, it is most common in the 40–49 years age group.



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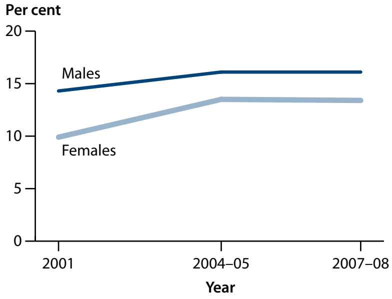
Proportion of adults at risk of long-term harm from alcohol. Persons aged 18 years or over whose alcohol consumption pattern puts them at risk of long-term alcohol-related harm according to 2001 National Health and Medical Research Council guidelines. Presented as an age-standardised percentage.



- In 2007–08, 15% of adults consumed alcohol at levels that put them at risk of long-term harm: 16% of males and 13% of females.
- While rates of risky alcohol consumption increased slightly from 2001 to 2004–05, the most recent data show no significant change.
- Males aged 25–29 years (21%) and females aged 65–69 years (18%) had the highest rates of risky alcohol consumption.

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Fruit and vegetable intake. The percentage of people aged 12 years or over eating sufficient serves of fruit and vegetables each day to obtain a health benefit.

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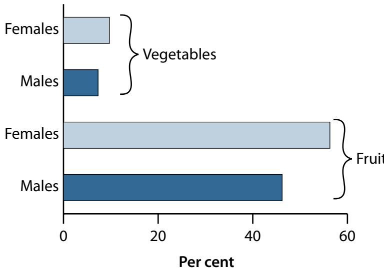
- ▶ About half of all people usually consume the recommended number (two or more) of serves of fruit daily.
- ▶ Fewer than 1 in 10 usually consume the recommended number (five or more) of serves of vegetables daily.
- ▶ More females than males usually eat the recommended number of serves of fruit or vegetables each day.



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.

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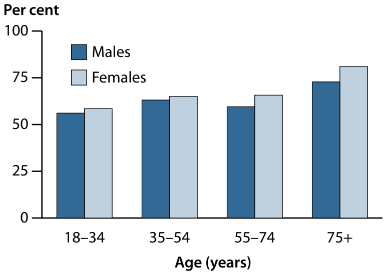

- ▶ In 2007–08, most adults (63%) did not do the recommended amount of physical activity.
- ▶ Physical inactivity increased with age—77% of people aged 75 years and over did not meet the guidelines, compared with 57% of people aged 18–34 years.
- ▶ Females were slightly more likely than males to be physically inactive.

Proportion of persons overweight or obese. The percentage of adults who are overweight (with a body mass index (BMI) over 25 but less than 30) or obese (with a BMI of 30 or more).

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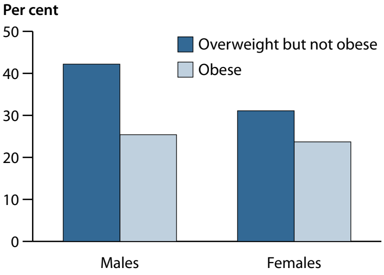
COAG

- ▶ In 2007–08, the majority of adults (61%) were either overweight or obese.
- ▶ Compared with 1995 (56%), the percentage of adults who were overweight or obese increased by 5 percentage points.
- ▶ Males (42%) were more likely than females (31%) to be overweight but not obese; similar proportions (24–25%) of males and females were obese.
- ▶ People aged 65–74 years were the age group most likely to be overweight or obese.



Discussion

Health behaviours, as well as having a substantial impact on health status, are often considered to be indicators of the effectiveness of public health activities. However, this is a somewhat simplistic view because personal preferences, and socioeconomic and cultural factors, as well as an individual's knowledge about health, can affect the choices people make. In this area, the results of Australia's public health activities appear to be mixed. On the healthy side, our smoking rates are among the lowest in the world and they continue on a long-term downward trend. Awareness of the effects of passive smoking may have also contributed to changes in smoking behaviour, such as reducing children's exposure to smoking in the home. However, the levels of several other significant risk factors for chronic illness and early death (low fruit and vegetable intake, physical inactivity, overweight and obesity, and risky alcohol consumption) have failed to improve or have become worse.

The proportion of babies born with low birthweight—a recognised risk factor for long-term health problems—is influenced by the health sector as well as by other factors, including those that are social and cultural. While Australia ranks in the middle third of OECD countries on this measure, there is significant variation between our population groups. For example, babies born to Indigenous mothers are more than twice as likely to be of low birthweight as babies born to other mothers.

Some determinants of health involve the health system interacting with other areas of government and wider social responsibility such as infrastructure, education and financial resources. While there is no simple measure of Australia's water quality, it is considered good by international standards. It is widely recognised that education and income influence people's health behaviours, access to health services and health outcomes. Education levels in Australia are rising; however, the proportion of Australians living on relatively low incomes has also risen. Of some concern is the fact that fewer than half of all adults have health literacy considered to be at the minimum level required to understand and use information relating to health issues arising in everyday life.

9.4 Health system performance

The health system may be viewed as a complex combination of services and interventions covering population health, primary care, acute care and continuing care. There is considerable overlap of services and functions between these service categories and increased focus on ensuring that transitions between these health services are well managed.

The indicators for the system performance domain attempt to cover these major service categories and provide some information about continuity of care. Some indicators relate to the desired outcomes of interventions in terms of health status or determinants of health (such as the survival rates of people diagnosed with cancer) and can be considered to reflect the quality of care given. Others are measures of the uptake of an intervention, such as immunisation rates and asthma action plans. Here, the assumption is that they are high-quality interventions, and the more people who receive them the better the health of the population in general.

The six dimensions that summarise 'Health system performance' are described below:

- *Effectiveness* focuses on whether there have been gains in health status or health determinants that suggest that interventions have been effective. It is assessed using six indicators that cover aspects of primary care, acute care, and continuing care.

- *Safety* is described with two indicators that measure aspects of safety in hospitals.
- *Responsiveness* is not singularly measured by any indicator in this set.
- *Continuity of care* is measured by three indicators that relate to the management of three common chronic diseases in the Australian population.
- *Accessibility* is assessed using seven indicators relating to primary care and other care, and also includes indicators about screening programs.
- *Efficiency and sustainability* of the health system relates to the system's capacity to provide care efficiently, now and into the future. The two indicators used relate to the efficiency of hospital services and the sustainability of the health workforce.

Table 9.3: Health system performance—indicator values and trends

Indicator	Measure	Year(s)	Value[(a)]	Trend
	Effectiveness			
Unsafe sharing of needles	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	2008	16	~
Immunisation rates for vaccines in the national schedule	Percentage of children aged 5 years who have been fully vaccinated, according to the National Immunisation Program Schedule	2008–09	82	. .
	Percentage of adults aged 65 years and over who have been vaccinated against influenza and pneumococcal disease	2006	59	. .
Selected potentially preventable hospitalisations	Admissions to hospitals that could have potentially been prevented through the provision of appropriate non-hospital health services, per 1,000 population	2002–03 to 2007–08	33.6	✕
Survival following heart attack	Percentage of people aged 40–90 years who survive an acute coronary heart disease event (heart attack)	1997–2007	63	✓
Survival of people diagnosed with cancer	Five-year relative survival percentages for people diagnosed with cancer	1982–86 to 1998–2004	61	✓
Potentially avoidable deaths	Number of deaths of persons aged less than 75 years categorised as potentially avoidable, per 100,000 population:			
	• preventable deaths	1996–2006	97	✓
	• treatable deaths	1996–2006	62	✓
	Safety			
Adverse events treated in hospitals	Number of adverse events treated in hospital per 100 hospitalisations	2002–03 to 2007–08	4.8	~
Falls resulting in patient harm in hospitals	Number of hospitalisations for falls occurring in health care settings and resulting in patient harm, per 1,000 hospitalisations	2007–08	2.2	. .
	Continuity of care			
Proportion of people with diabetes with a GP annual cycle of care	Percentage of people with diabetes who have received a Medicare Benefits Schedule annual cycle of care	2008–09	19.1	. .

Indicator	Measure	Year(s)	Value[a]	Trend
Proportion of people with asthma who have a written asthma plan	Percentage of participants in the National Health Survey who reported having asthma, who said they had a written asthma plan.	2001 to 2007–08	19.8	..
Proportion of people with mental illness who have a GP care plan	Percentage of people with mental illness who have a GP mental health care plan	2008–09	16.7	..
Accessibility				
Bulk-billing for non-referred (GP) attendances	Percentage of non-referred (GP) attendances that were bulk-billed	2003–04 to 2008–09	78.3	✓
Potentially avoidable GP-type presentations to emergency departments	Attendances at public hospital emergency departments that could have potentially been avoided through the provision of appropriate non-hospital services in the community	2007–08	2 m	..
Waiting times for elective surgery	Median waiting time for elective surgery in public hospitals, in days	2002–03 to 2007–08	34	✗
Waiting times for emergency department care	Percentage of patients treated within national benchmarks for waiting times for each triage category in public hospital emergency departments	2003–04 to 2007–08	67	~
Cancer screening rates	Percentage of the target population participating in:			
	• BreastScreen program	1996–97 to 2007–2008	54.9	~
	• cervical screening	1996–97 to 2007–2008	61.2	~
	• National Bowel Cancer Screening Program	2008	35.9	..
Proportion of pregnancies with an antenatal visit in the first trimester	Proportion of pregnancies resulting in a birth, where an antenatal visit was reported in the first trimester		Not available	
Differential access to hospital procedures	Indigenous:non-Indigenous ratio of rates at which selected hospital procedures were performed, per 1,000 population:			
	• cataract extraction	2007–08	0.97	..
	• cystoscopy	2007–08	0.55	..
	• inguinal herniorrhaphy	2007–08	0.47	..
Efficiency and sustainability				
Net growth in health workforce	Percentage change from one time point to another in the full-time equivalent number of people employed as:			
	• medical practitioners	2005–2007	+ 10.0	..
	• nurses or midwives	2005–2007	+ 8.7	..
Cost per casemix-adjusted separation for acute care episodes	Average cost per casemix-adjusted separation for acute care public hospitals	2007–08	$4,215	..

(a) Value at most recent point.

KEY ✓ favourable ✗ unfavourable ~ no change .. trend data unavailable/not clear

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.

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NCHECR 2008

- 16% of injecting drug users reported sharing needles.
- The proportion has remained constant over the last 5 years measured.
- Recent receptive sharing is normally with either a regular sex partner or close friend.

Immunisation rates for vaccines in the national schedule. Children: the percentage of 5 year olds who have been fully vaccinated according to the National Immunisation Program Schedule (that is, they have received immunisations for diphtheria, tetanus, pertussis, hepatitis B, poliomyelitis, *Haemophilus influenzae* type B, measles, mumps and rubella). Adults: people aged 65 years or over who have been vaccinated for influenza and pneumococcal disease. Presented as an age-standardised percentage.

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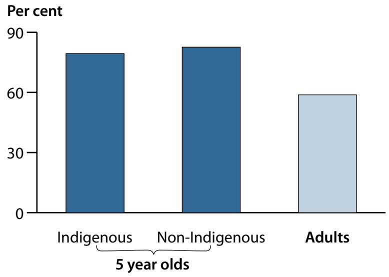

- In 2008–09, 82% of 5 year olds were fully vaccinated.
- Indigenous children (79%) were less likely than non-Indigenous children (83%) to be fully vaccinated.
- In 2006, about 59% of adults aged 65 years and over reported they were vaccinated against pneumococcal disease and influenza.

Potentially preventable hospitalisations. Admissions to hospitals that could have potentially been prevented by providing appropriate non-hospital health services. Admissions that are potentially preventable include those that are for vaccine-preventable diseases (for example measles), acute conditions (for example ear, nose and throat infections) and chronic conditions (for example diabetes).

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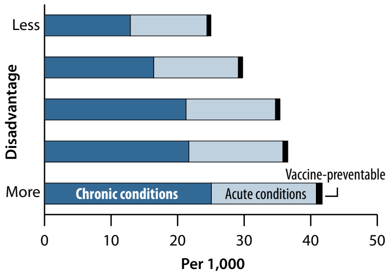
COAG

- In 2007–08, there were 33.6 potentially preventable admissions per 1,000 people.
- More than half were due to chronic conditions
- The overall rate increased from 30.5 per 1,000 people in 2002–03.
- Rates increase with increasing remoteness and socioeconomic disadvantage.



Survival following heart attack. People aged 40–90 years who survive an acute coronary heart disease event (heart attack). Presented as an age-standardised percentage.

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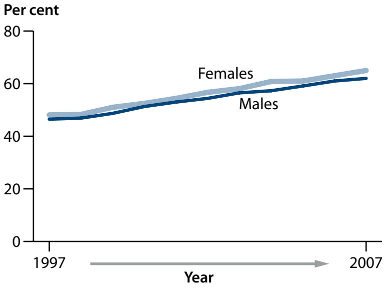

- ▶ Survival rates are similar for males and females.
- ▶ In 2007, over 3 in 5 (63%) of people who had a heart attack survived, compared with less than half (47%) in 1997.
- ▶ Part of this trend may be due to an increase in the diagnosis of milder forms of acute coronary events, as diagnostic techniques have become increasingly sensitive over time.

Survival of people diagnosed with cancer. The percentage of people diagnosed with cancer who survive for 5 years after diagnosis, compared with similar people in the general population.

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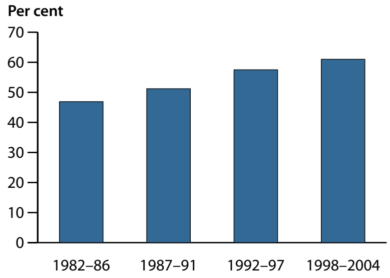
AIHW & AACR 2008

COAG

- ▶ The 5-year relative survival rate for all cancers diagnosed between 1998 and 2004 was 61%.
- ▶ Relative survival rates have increased since the early 1980s for both males and females.
- ▶ Rates were higher for females (64%) than males (58%).
- ▶ Relative survival rates were lower than average for people living in relatively disadvantaged areas, and people living in regional and remote areas.



Potentially avoidable deaths. The number of deaths each year of people aged under 75 years 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 a number per 100,000 population.

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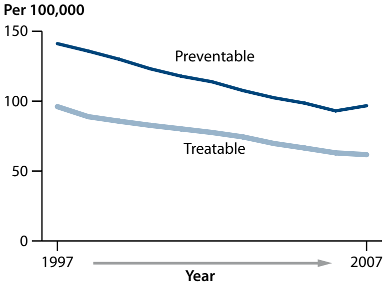
COAG



- ▶ In 2007, there were 161.5 potentially avoidable deaths per 100,000 people: 60% were classified as preventable and 40% as treatable.
- ▶ Equates to more than 31,000 potentially avoidable deaths.
- ▶ Preventable death rates fell by 40% between 1997 and 2007 (from 141 to 97 deaths per 100,000).
- ▶ Treatable death rates fell by 34% between 1997 and 2006 (from 94 to 62 deaths per 100,000).

Adverse events treated in hospitals. The number of hospital separations involving an adverse event. Presented as a number per 100 hospitalisations.

- 4.8 adverse events per 100 hospitalisations in 2007–08.
- The rate has not changed markedly since 2002–03.
- Adverse events as defined in hospital data collections include infections, falls resulting in injuries, and medication and medical device problems. They are only a subset of adverse events identifiable using hospital data.
- Not all adverse events are necessarily preventable. Surgical procedures causing abnormal reactions and complications are the most common non-preventable events.

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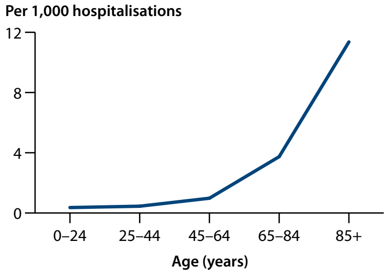
AIHW 2009b

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 per 1,000 hospitalisations.



- 2.2 per 1,000 hospitalisations in 2007–08.
- In total, there were 17,300 hospitalisations where a fall occurring in a hospital was treated.
- The rate ranges from 0.4 per 1,000 hospitalisations for children and young people to 11.3 per 1,000 hospitalisations for patients aged 85 years and over.
- Falls that occurred in a health-care setting other than a hospital (such as a clinic) may be included.

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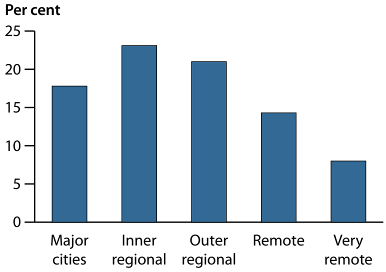
Proportion of people with diabetes who have a GP annual cycle of care. The percentage of people with diabetes who received a Medicare Benefits Schedule annual cycle of care.

- Almost 1 in 5 (19.1%) in 2008–09.
- Only 8% for those living in very remote areas.
- It is not known if or how uptake differs between people with Type 1 and Type 2 diabetes.



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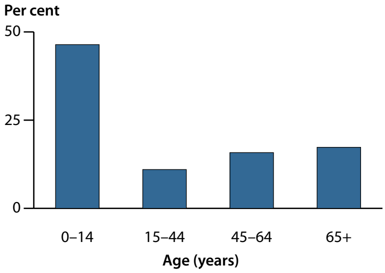
COAG

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. Presented as an age-standardised percentage.



- 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 than those of other ages to have a written asthma plan (46%).

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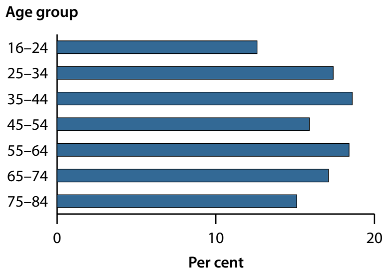
Proportion of people with mental illness who have a GP care plan. The number of people aged 16–84 years with a GP mental health care plan, as a percentage of the estimated number of people aged 16–84 years with mental illness.

- In 2008–09, the number of people with a GP mental health care plan accounted for around 1 in 6 (16.7%) people with mental illness.
- Uptake was lowest among young people aged 16–24 years (12.6%).
- People living in the most disadvantaged fifth of Australian areas were less likely to have a plan (13.9%) than people living in other areas (16.4–17.0%).



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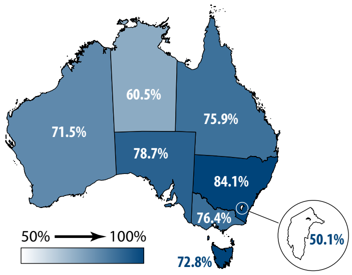
COAG

Bulk-billing for non-referred (GP) attendances. The percentage of non-referred (GP) attendances that were bulk-billed.



- 78% of attendances bulk-billed in 2008–09.
- Lowest national rate observed in 2003–04 (68%); increases have been seen each year since.
- Varies across states and territories, from 50% in ACT to 84% in NSW.

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pages 438–439

Medi-care 2009

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.

- Over 2 million GP-type presentations in emergency departments (2007–08).
- These accounted for more than 40% of recorded emergency department visits.
- This figure is based on Peer Group A and B hospitals only, so does not include GP-type presentations to smaller hospital emergency departments.

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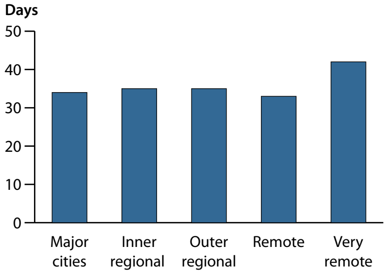
COAG

Waiting times for elective surgery. The median waiting times for elective surgery in public hospitals.

- Median waiting time across all procedures is 34 days.
- Waiting times vary considerably between procedures. The longest median waiting time is for total knee replacements (156 days); the shortest is for coronary artery bypass grafts (14 days).
- Waiting time is longest for people living in very remote areas; shortest for people living in the least disadvantaged fifth of Australian areas.



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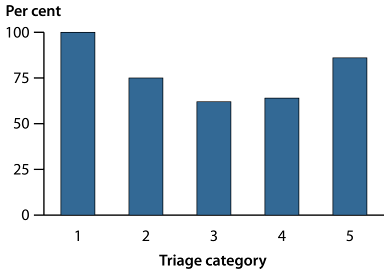
Waiting time for emergency department care. The percentage of patients who are treated within national benchmarks for waiting times for each triage category in Peer Group A and B public hospital emergency departments.



- 67% of all patients treated on time (2007–08).
- No change since 2003–04.
- 100% for triage category 1 (resuscitation).
- Lowest for triage category 3 (urgent).
- Overall median waiting time is 26 minutes.

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COAG

Cancer screening rates (breast, cervical, bowel). The percentages of the target populations who have participated in one of the three national cancer screening programs.

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- 54.9 % of females aged 50–69 years participated in BreastScreen programs (2007–2008).
- 61.2% of females aged 20–69 years participated in the National Cervical Screening Program (2007–2008).
- 35.9% of invited 50, 55 and 60 year olds participated in National Bowel Screening Program (NBSP) (2008).
- Cervical and breast screening rates have remained relatively stable; the NBSP is a new program.

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.

CRC 2010

COAG

- 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, over 50% of females had at least one visit in the first trimester.

Differential access to hospital procedures. The number of hospitalisations involving selected procedures per 1,000 population, for Indigenous people compared with non-Indigenous people. Presented as a ratio of age-standardised rates (Indigenous:non-Indigenous).

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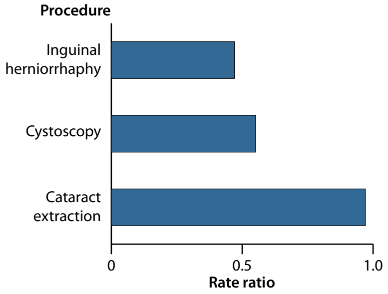
COAG

- In 2007–08, Indigenous people were about 50% as likely to have a inguinal herniorrhaphy (repair of the inguinal hernia) than non-Indigenous people.
- Indigenous people were 55% as likely to have a cystoscopy (bladder examination).
- Indigenous people were almost as likely to have cataract extractions as non-Indigenous people.



Net growth in health workforce. The change over time in the full-time equivalent number of people employed in selected health workforce professions, presented as a percentage of the initial workforce size.

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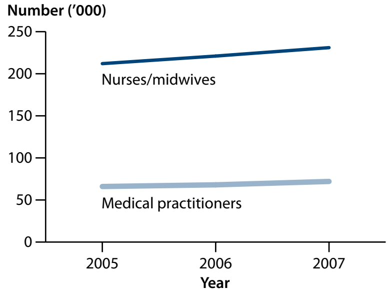
COAG



- There were around 72,400 medical practitioners and 230,800 nurses and midwives in 2007.
- The medical workforce grew by 2.7% from 2005 to 2006, and 7.2% from 2006 to 2007—overall, by 10.0% from 2005 to 2007.
- The number of medical practitioners has been growing each year since 2003.
- The nursing and midwifery workforce grew by 8.7% between 2005 and 2007.
- Net growth in both professions exceeded the population growth rate.

Cost per casemix-adjusted separation for acute and non-acute care episodes. The average cost per separation for acute and non-acute care in public hospitals, adjusted for different hospital casemixes.

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COAG

- Average cost per separation in 2007–08 was $4,215.
- Average cost was slightly higher in principal referral and specialist women's and children's hospitals ($4,215) than in large hospitals ($4,125) or medium hospitals ($4,129).

Discussion

Assessing the performance of the health system is very complex, and involves judgments about the interrelated dimensions of effectiveness, safety, continuity of care, accessibility, and efficiency and sustainability. Existing data sources best cover the effectiveness dimension where there are favourable trends in survival following coronary events and cancer and in potentially avoidable deaths. In contrast, there are unfavourable trends in the number of potentially preventable hospitalisations and in elective surgery waiting times. There are no changes over time in the level of other indicators for which data are available.

For over half the indicators in this domain there are no data to assess trends. For example, data covering the accessibility dimension are limited to specific programs and health service areas, therefore cannot be used for comparisons over time.

Data are also limited for making international comparisons about health system performance, generally because such comparisons need to account for differing health policies, structures and governance. With this in mind, Australia is ranked the fifth lowest among OECD countries for the proportions of females in the target age groups who have been screened for breast or cervical cancer (OECD 2009).

Australia's ability to provide health services depends on the health system's efficiency and sustainability. While there are many aspects to these dimensions, this section has focused on two: the health workforce and the cost of delivering hospital care. When compared with other OECD countries, Australia's workforce levels of medical practitioners and nurses are not high, ranking 20th out of 30 for rates of practising physicians (per 1,000 population) and 14th for practising nurses; however, both workforces have recently increased beyond population growth. The only indicator of cost is limited to hospital care.

9.5 Conclusion

The health status of Australians is generally high by international standards. Mortality is reducing and levels of certain illnesses and diseases have decreased. Survival rates for those diagnosed with life-threatening diseases are also improving. As shown here and in Chapter 2, Australia's levels of health generally compare favourably with those of other OECD countries. Our life expectancy is one of the highest in the world, and overall mortality from cancer remains ranked in the best 10 (OECD 2009). But Australia's infant mortality rate compares less well, with a high death rate for Indigenous babies.

Determinants of health show a more mixed picture, with smoking-related indicators having improved but rates of overweight and obesity increasing. For the performance domain, the 20 indicators also present an overall picture that is mixed. This is in large part due to difficulties in establishing trends using available data and the inclusion here of a number of recently developed indicators.

One clear pattern within all three domains, however, is the discrepancies between population groups, raising the question of whether Australia's health system performs equally well for all people. Those living in areas outside capital cities do not enjoy the same levels of good health as their city counterparts, have higher rates of several risk factors and may have problems accessing some health services. Similarly, there are strong inequalities between the health status and determinants of Indigenous and non-Indigenous Australians, and between low and high socioeconomic groups.

Finally, the questions remain as to whether it is possible to measure the performance of a complex health system in a fair and accurate way, and if so, can a suite of indicators do this.

By its nature, a relatively small group of indicators such as this set has to be highly selective, running the risk of being unbalanced or missing some important aspects of health and health care. Also, the topics and accuracy of the indicators are limited by the current availability of data—not only data to determine which topics can be covered but also ancillary data to support the more complex analyses that may be necessary for discerning reliable trends. Even with a pared-down set of indicators such as this set, it can be seen that many of the basic data are still lacking.

A simple count of the favourable or indeterminate results among the performance indicators presented here may suggest that the performance of the health system and whether we can assess it are open questions. On the one hand, the trends presented here for the effectiveness dimension strongly suggest that the health system is making major and continuing advances in treating illness and preventing deaths from some of our most major diseases. On the other hand, dimensions such as safety, continuity, accessibility and sustainability are of great importance to patients, health service providers and governments. Improved data in these areas will help to provide a more complete picture of the performance of Australia's health system in the future.

More light will be shed on this issue as more data are accumulated, and indicators and indicator sets are refined. Meanwhile, the indicators presented here can help in monitoring the gains and in highlighting areas where improvements can be achieved.

References

ABS (Australian Bureau of Statistics) 2008a. Deaths, 2007. ABS cat. no. 3302.0. Canberra: ABS.

ABS 2008b. Adult Literacy and Life Skills Survey, summary results, Australia, 2006 (Reissue). ABS cat. no. 4228.0. Canberra: ABS.

ABS 2009a. Education and work, Australia, May 2009. ABS cat. no. 6227.0. Canberra: ABS.

ABS 2009b. National Health Survey 2007–08 Confidentialised Unit Record File. ABS cat. no. 4324.055.001. Canberra: ABS.

ABS 2009c. Experimental life tables for Aboriginal and Torres Strait Islander Australians, Australia 2005–07. ABS cat. no. 3302.0.55.003. Canberra: ABS.

ABS 2009d. National Health Survey: summary of results 2007–08 (Reissue). ABS cat. no. 4364.0. Canberra: ABS.

ABS 2009e. Housing mobility and conditions, Australia 2007–08. ABS cat. no. 4130.0.55.002 Canberra: ABS.

ABS 2010. Unpublished analysis of 2003–04, 2005–06 and 2007–08 Surveys of Income and Housing provided to AIHW by ABS.

AIHW (Australian Institute of Health and Welfare) 2008a. Disability in Australia: trends in prevalence, education, employment and community living. Bulletin no. 61. Cat. no. AUS 103 Canberra: AIHW.

AIHW 2008b. Australia's health 2008. Cat. no. AUS 99. Canberra: AIHW.

AIHW 2009a. Changes to the national health performance framework. Viewed 1 April 2010. <http://www.aihw.gov.au/indicators/index.cfm>.

AIHW 2009b. Australian hospital statistics 2007–08. Health services series no. 33. Cat. no. HSE 71. Canberra: AIHW.

AIHW 2009c. National Mortality Database 1964–2007. Canberra: AIHW.

AIHW 2009d. Unpublished analysis of the AIHW National Morbidity Database.

AIHW 2010a. Cancer incidence data cubes. Canberra: AIHW. Viewed 30 September 2009, <http://www.aihw.gov.au/cancer/data/>.

AIHW 2010b. Unpublished analysis of the AIHW Mortality Database and AIHW Morbidity Database.

AIHW 2010c. Unpublished analysis of ANZDATA, the AIHW Mortality Database, and the National Death Index.

AIHW & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW.

COAG (Council of Australian Governments) 2008. National Healthcare Agreement: Intergovernmental Agreement on Federal Financial Relations. Canberra: COAG. Viewed 1 April 2010, <http//www.coag.gov.au/intergov_agreements/federal_financial_relations/index.cfm>.

CRC (COAG Reform Council) 2010. National Healthcare Agreement: Baseline performance report for 2008–09. COAG Reform Council: Sydney.

DOHA (Department of Health and Ageing) 2010. National Notifiable Diseases Surveillance System. Canberra: DoHA. Viewed 20 January 2010, <http://www9.health.gov.au/cda/Source/CDA-index.cfm>.

Medicare 2009. Medicare Australia – Statistics – Monthly-Quarterly Standard Reports 2007–08. Canberra: Medicare Australia. Viewed 25 March 2010, <https://www.medicareaustralia.gov.au/statistics/mth_qtr_std_report.shtml>.

NCHECR (National Centre in HIV Epidemiology and Clinical Research) 2008. HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia annual surveillance report 2008. Sydney: NCHECR, The University of New South Wales.

NHPC (National Health Performance Committee) 2001. National Health Performance Framework report. Brisbane: Queensland Health.

NHPC 2004. National report on health sector performance indicators 2003: Cat. no. HWI 78. Canberra: AIHW.

OECD (Organisation for Economic Co-operation and Development)2009. Health at a glance 2009: OECD Indicators. Paris: OECD.

Water Services Association of Australia and the National Water Commission (WSAA & NWC) 2009. National performance report 2007–2008, urban water utilities. Canberra: National Water Commission.

Methods and conventions

Details of methods used in particular sections of the report are included in the text and boxes, and in footnotes to figures and tables. Some general methods and conventions are described here.

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.

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 three 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 European and/or World Standard Populations have been used. These three 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 of age-standardisation, 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 typically 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 were expected, suggesting rates in the two populations are similar. An SMR/SPR greater than 1 indicates more cases were observed than were 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 European and World Standard Populations

Age group (years)	Australia, 30 June 2001	European Standard	World Standard
0	253,031	1,600	2,400
1–4	1,029,326	6,400	9,600
5–9	1,351,664	7,000	10,000
10–14	1,353,177	7,000	9,000
15–19	1,352,745	7,000	9,000
20–24	1,302,412	7,000	8,000
25–29	1,407,081	7,000	8,000
30–34	1,466,615	7,000	6,000
35–39	1,492,204	7,000	6,000
40–44	1,479,257	7,000	6,000
45–49	1,358,594	7,000	6,000
50–54	1,300,777	7,000	5,000
55–59	1,008,799	6,000	4,000
60–64	822,024	5,000	4,000
65–69	682,513	4,000	3,000
70–74	638,380	3,000	2,000
75–79	519,356	2,000	1,000
80–84	330,050	1,000	500
85 and over	265,235	1,000	500
Total	**19,413,240**	**100,000**	**100,000**

Sources: ABS 2003; WHO 1996.

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 International Classification of Diseases (WHO 1992). Diseases treated in hospitals and the procedures performed during a hospital stay are classified using the 4th edition of the International statistical classification of diseases and related health problems, 10th revision, Australian Modification (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 one year. When there are two or more calendar years in the period, the first and final years are written in full. For example, 2008–2009 is a two calendar-year span and 2007–2009 covers three calendar years.

Periods based on financial years (1 July to 30 June, as with hospital statistics) are written with a second number which is abbreviated: for example, 2006–07 for one financial year, 2006–08 for two and 2006–09 for three. A longer span of financial years is written as 'In the 10-year period from 1998–09 to 2007–08…'.

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, 2001–02 would be a 'year' or 12-month period.

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.

Symbols

$	Australian dollars, unless otherwise specified
—	nil or rounded to zero
%	per cent
g	gram
kg	kilogram
'000	thousands
m	million
mm Hg	millimetres of mercury
mmol/L	millimoles per litre
n.a.	not available
. .	not applicable
. .	(for Chapter 9 only) trend data unavailable/not clear
nec	not elsewhere classified
n.p.	not published by the data source
>	more than
<	less than
≥	more than or equal to
≤	less than or equal to
*	value subject to sampling variability too high for most practical purposes and/or the relative standard error is 25% to 50%
**	value subject to sampling variability too high for most practical purposes and/or the relative standard error is more than 50%
🖱	supplementary table available online

References

ABS (Australian Bureau of Statistics) 2003. Australian demographic statistics, September quarter 2002. ABS cat. no. 3101.0. Canberra: ABS.

NCCH (National Centre for Classification in Health) 2004. The international statistical classification of diseases and related health problems, 10th revision, Australian modification (ICD-10-AM). 4th edition. Sydney: University of Sydney.

WHO (World Health Organization) 1992. International statistical classification of diseases and related health problems, 10th revision, volumes 1 and 2. Geneva: WHO.

WHO 1996. World health statistics annual, 1995. Geneva: WHO.

Abbreviations

ABS	Australian Bureau of Statistics
ACCMIS	Aged and Community Care Management Information System
ACFI	Aged Care Funding Instrument
ACHI	Australian Classification of Health Interventions
ADF	Australian Defence Force
AHCA	Australian Health Care Agreement
AHMAC	Australian Health Ministers’ Advisory Council
AIDS	acquired immune deficiency syndrome
AIHW	Australian Institute of Health and Welfare
ANCNPAS	Australian National Children’s Nutrition and Physical Activity Survey
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
AODTS-NMDS	Alcohol and Other Drug Treatment Services National Minimum Data Set
AR-DRG	Australian Refined Diagnosis Related Group
ARF	acute rheumatic fever
ART	assisted reproduction technology
AUDIT	Alcohol Use Disorders Identification Test
AusDiab	Australian Diabetes, Obesity and Lifestyle Study
BEACH	Bettering the Evaluation and Care of Health
BMI	body mass index
CABG	coronary artery bypass grafting
CHAP	Comprehensive Health Assessment Program
CHD	coronary heart disease
CI	confidence interval
CKD	chronic kidney disease
COAG	Council of Australian Governments
COPD	chronic obstructive pulmonary disease
CURF	confidentialised unit record file
CVD	cardiovascular disease
DALY	disability-adjusted life year
DoHA	Australian Government Department of Health and Ageing
DVA	Australian Government Department of Veterans’ Affairs
eGFR	estimated glomerular filtration rate
ESKD	end-stage kidney disease
FOBT	faecal occult blood test

FTE	full-time equivalent
GDP	gross domestic product
GFR	glomerular filtration rate
GIFT	gamete intra-fallopian transfer
GP	general practitioner
HCV	hepatitis C virus
HDL	high-density lipoprotein
Hib	*Haemophilus influenzae* type b
HIV	human immunodeficiency virus
HPV	human papillomavirus
HSMR	hospital standardised mortality ratio
ICD	International Classification of Diseases
ICD-10	International Classification of Diseases, 10th revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Pro blems, Tenth Revision, Australian Modification
ICSI	intra-cytoplasmic sperm injection
ICU	intensive care unit
IFG	impaired fasting glucose
IGT	impaired glucose tolerance
IPD	invasive pneumococcal disease
IRSD	Index of Relative Socio-economic Disadvantage
ISAAC	International Study of Asthma and Allergies in Childhood
IVF	in-vitro fertilisation
K10	Kessler Psychological Distress Scale–10
LDL	low-density lipoprotein
MRCA	*Military Rehabilitation and Compensation Act 2004*
NATSIHS	National Aboriginal and Torres Strait Islander Health Survey
NCSCH	National Cancer Statistics Clearing House
NDR	National Diabetes Register
NDSS	National Diabetes Services Scheme
NEHIPC	National E-Health and Information Principal Committee
NHIA	National Health Information Agreement
NHISSC	National Health Information Standards and Statistics Committee
NHMRC	National Health and Medical Research Council
NHPA	National Health Priority Area
NHPC	National Health Performance Committee
NHPF	National Health Performance Framework

NHS	National Health Survey
NICU	neonatal intensive care unit
NIPS	National Immunisation Program Schedule
NMSC	non-melanoma skin cancer
NPHDC	National Prisoner Health Data Collection
NSMHWB	National Survey of Mental Health and Wellbeing
OECD	Organisation for Economic Co-operation and Development
OGTT	oral glucose tolerance test
Pap	Papanicolaou (cervical smear test)
PBS	Pharmaceutical Benefits Scheme
PCI	percutaneous coronary intervention
PYLL	potential years of life lost
RFDS	Royal Flying Doctor Service
RHD	rheumatic heart disease
RPBS	Repatriation Pharmaceutical Benefits Scheme
RSI	relative stay index
SAB	*Staphylococcus aureus* bacteraemia
SCN	special care nursery
SDAC	Survey of Disability, Ageing and Carers
SEIFA	Socio-Economic Indexes for Areas
SES	socioeconomic status
SIDS	sudden infant death syndrome
SMR	standardised mortality ratio
SRCA	*Safety, Rehabilitation and Compensation Act 1988*
STI	sexually transmissible infection (sometimes referred to as sexually transmitted infection)
TB	tuberculosis
TFR	total fertility rate
URTI	upper respiratory tract infection
UV	ultraviolet
VEA	Veterans' Entitlements Act 1986
WHO	World Health Organization
YLD	years lost due to disability
YLL	years of life lost (due to premature mortality)

Places

ACT	Australian Capital Territory
Aust	Australia
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
Qld	Queensland
SA	South Australia
Tas	Tasmania
UK	United Kingdom
USA	United States of America
Vic	Victoria
WA	Western Australia

Glossary

Aboriginal A person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the community in which he or she lives.

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.

admission Admission to hospital. In this report, the number of *separations* has been taken as the number of admissions, hence an admission rate is the same as a separation rate.

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 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).

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*.

AR-DRGs See *diagnosis related groups*.

arrhythmia A disturbed rhythm of the heart beat—either 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*.

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 heart beat. It arises because the heart's collecting chambers (atria) stop beating rhythmically and quiver uselessly (fibrillate).

auto-immune diseases Diseases such as *rheumatoid arthritis* and *Type 1 diabetes*, in which the immune system reacts against body tissues and damages them.

available beds 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*.

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. It is calculated by dividing the person's weight (in kilograms) by their height (in metres) squared; that is, kg ÷ m^2. For both men and women, underweight is a BMI below 18.5, acceptable weight is from 18.5 to less than 25, overweight is 25 and above (includes obese), and obese is 30 and over.

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.

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 expenditure 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 it 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 violence that produced 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 years.

child mortality rate The number of deaths in a given period among children aged 1–14 years per 100,000 children of the same age.

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, that 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 The heart and the blood vessels, comprising the system that circulates blood around the body to supply oxygen and nutrients to all body tissues and to carry away waste products from them. 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 alcohol abuse 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 whereby the inside of the large bowel (colon) is viewed using a long flexible tube (*colonoscope*) inserted through the anus.

colorectal cancer Cancer of the colon (the lower part of the intestine, usually 1.5 to 2 metres) or of the rectum (the final 15 cm 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 worsens the patient's condition and makes 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, obesity and so forth. 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 expenditure 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.

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 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 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 indexed to 100,000.

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.

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 it can 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'.

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*.

diagnosis related groups (DRGs) A widely used type of *casemix* classification system. In the case of Australian acute hospitals, AR-DRGs (Australian Refined Diagnosis Related Groups) classify admissions into groups with similar clinical conditions (related diagnoses) and similar resource usage. This allows the activity and performance of hospitals to be compared on a common basis. See also *casemix*.

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*.

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*.

enterohaemorrhagic *E. coli* infection A disease marked by diarrhoea that can be mild or severe and bloody, and sometimes also by haemolytic uraemic syndrome (sudden kidney failure and anaemia in children) and other symptoms. It is caused by some types of *Escherichia coli* bacteria and is usually foodborne.

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.

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 See *FOBT*.

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 Faecal occult blood test: 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 years, and free test results are later sent to the participants and to the general practitioner they have nominated.

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 a 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 whereby the inside of the stomach is viewed using a flexible tube passed down into it 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*.

gestational diabetes *Diabetes* which 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*.

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. See also *public health*.

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 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*.

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 Disease occurring 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*.

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 and is accepted as such by the community with which he or she is associated.

infant A child aged less than 1 year.

infant mortality rate The number of deaths among children aged less than 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*.

influenza ('flu') An acute contagious viral respiratory infection marked by fevers, muscle aches, headache, cough and sore throat.

insulin Hormone that is produced by the pancreas and regulates the body's energy sources, most notably the sugar glucose.

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. In this report, causes of death classified before 1979 under previous revisions have been reclassified to ICD-10 by the AIHW. 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.

ischaemia Reduced or blocked blood supply. See also *ischaemic heart disease*.

ischaemic heart disease *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. It is only used for people aged 18 years 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 example 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*.

Major Diagnostic Categories (MDCs) A high level of groupings of patients used in the *AR-DRG* classification. See also *diagnosis related groups*.

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*.

metastasis The spread of a cancer from its original site to other parts of the body.

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, as in the surveillance of infectious diseases and their epidemics. Monitoring can also be applied to individuals, as in 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.

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 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 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 (NHL) 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. Used interchangeably 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 years or over.

ophthalmology A medical specialty dealing with eye diseases.

Organisation for Economic Co-operation and Development (OECD) An organisation of 30 developed countries, including Australia.

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 are not of Aboriginal or Torres Strait Islander descent, or whose status is not known. Used interchangeably 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 one in twenty times or less often.

palliative care 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.

parasuicide The deliberate or ambivalent act of self-damage which is potentially life-threatening, but does not result in death.

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 lifesaving 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.

Pharmaceutical Benefits Scheme (PBS) A national, government-funded scheme that subsidises the cost of a wide range of pharmaceutical drugs, and that covers all Australians to help them afford standard medications.

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 so-called 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 around 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.

post-traumatic stress disorder (PSD) 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 Deaths below the age of 75 years 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.

prescription drugs Pharmaceutical drugs available only on the prescription of a registered medical practitioner and available only from pharmacies.

prevalence The number or proportion (of cases, instances, and so forth) present 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.

principal diagnosis The diagnosis listed in hospital records to describe the problem that was chiefly responsible for the patient's episode of care in hospital.

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) Another poorly defined 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 Cancer of the prostate, the male organ that sits next to the urinary bladder and contributes to the semen (sperm fluid).

psychiatric hospitals Establishments devoted mainly to the treatment and care of admitted patients with mental illness.

psychosis A broad grouping for a more severe degree of mental disturbance, often involving fixed, false beliefs known as delusions.

public health Term variously referring to the level of health in the population, to actions that improve that level or to related study. Activities aimed at benefiting a population tend to emphasis 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 antismoking education campaigns, and screening for diseases such as cancer of the breast and cervix.

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, 50th and 75th 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.

real expenditure Expenditure expressed in terms which have been adjusted for inflation (for example, in 1989–90 dollars). This enables comparisons to be made between expenditures in different years.

record linkage See *data linkage*.

recurrent expenditure Expenditure on goods and services that are used up during the year—for example, salaries. It may be contrasted with *capital expenditure.*

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 years. 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, as when many doctors routinely measure blood pressure in all patients consulting them.

Section 100 drugs See *highly specialised drugs*.

separation The formal process by which a hospital records the completion of an episode of treatment and/or care for an admitted patient.

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.

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 only once in 20 times or less often.

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.

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 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 years 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 years.

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