Australia's health 2000

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Minister for Health and Aged Care
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 2000*, 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

J Reid

Professor Janice Reid
Chairperson of the Board
25 May 2000

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Contents

1 Introduction 1

2 The health of Australians 10

8 Changes in Australia's disease profile: a view of the twentieth century

Preface

Welcome to the seventh edition of *Australia's Health*, the two-yearly summary of information on health in Australia. *Australia's Health 2000* is a special edition because it summarises Australia's health record at the end of the twentieth century. Yet, like its predecessors, it provides a contemporary view of health and will be of maximum use over the next 2 years. As always, it contains a mass of factual and objective data to inform community discussion and policy debate on health issues. These include health status (including new information summarising the burden of disease and injury), service provision and performance.

Australia's Health 2000 follows a more ordered structure than in the past and includes some other special features. Chapter 3 focuses on health determinants, in line with the interest in population health planning from work being undertaken under the auspices of the National Public Health Partnership. Chapter 6 brings together information on health service strategies and performance, reflecting the interest of AHMAC in monitoring the performance of the overall health system. As chapter 7 points out, these are both areas where more information development is needed to complete the picture.

Chapter 8 examines changes in Australia's disease profile in the twentieth century. It draws on work by JHL Cumpston, the first and longest serving head of the Commonwealth Department of Health (from 1921 to 1945) and the most important figure in public health in Australia this century, and of HO Lancaster, who examined in detail the Australian mortality experience in the early part of the century. It also draws, directly and indirectly, on a range of contemporary sources illustrating the depth of knowledge of mortality in Australia right through the century.

The range of contributors is large and many have worked long and hard to produce this book. But special mention must go to Diana Hetzel for her work on chapter 8, to Geoff Sims for his coordinating effort, and to the editor Tony Wood (as in 1998).

The Institute hopes that *Australia's Health 2000* will find a place on many bookshelves for many years to come. On behalf of all the authors I wish readers an enjoyable and rewarding experience.

Richard Madden
Director

1 Introduction

The twentieth century has seen great changes in the health of Australians. There has been a 20-year gain in life expectancy at birth, and a dramatic fall in the toll of infectious disease, offset to an extent by an increase in chronic diseases associated with age. Although most Australians enjoy good health today, some groups in the population continue to suffer poor health, in particular Aboriginal and Torres Strait Islander peoples.

This report is the seventh in the series of biennial reports on health in Australia produced by the Australian Institute of Health and Welfare (AIHW). It is broadly structured along the lines of the conceptual framework for health shown in Figure 1.1. This shows health and wellbeing as the outcome of many causes modified by intervention activities that are supported by human and material resources.

This first chapter discusses what health is, what determines it, and the need for good information on the causes and patterns of health and illness in the community. It also includes an overview of the Australian health system. Chapter 2 reports on the health status of Australians and describes the major diseases and conditions that have an impact on their health. It includes results from the Institute's Australian Burden of Disease and Injury Study conducted in 1999. Chapter 3 focuses on the environmental and individual factors that determine health. Chapter 4 discusses the health of particular population groups. Chapter 5 examines the cost of health services, employment in the health industry and the provision and use of health services. Chapter 6 looks at strategies for improving the health of Australians and performance in health service delivery. Chapter 7 outlines requirements for health information for a better understanding of current and emerging health issues. Chapter 8 uses mortality data to document the changes in the disease profile of Australians during the twentieth century.

A wide range of statistical tables is included after chapter 8. These tables include data on population and fertility as well as health-related information. They include indicators that have been agreed for reporting under the National Health Priority Areas initiative of governments, covering cardiovascular health, cancer control, injury prevention and control, mental health, diabetes mellitus and asthma. Many of the tables provide time series information, as well as comparing Australia with other countries. Tables have also been included for some of the figures in the report, for the benefit of readers who may wish to examine the data in more detail.

Box 1.1: Australia at a glance

- *19 million people, including about 400,000 Indigenous persons (2% of total)*
- *Average life expectancy at birth 81 years for women, 76 for men*
- *Fertility rate below replacement level but at higher end for developed countries*
- *50,000 years of Aboriginal settlement, 212 of European and other*
- *6th largest land mass in world, almost same as USA (excluding Alaska)*
- *Lowest population density among developed countries – 2 persons per km^2*
- *Climate varied but mainly continental and dry*
- *Highly urbanised, most people living in south-east seaboard region*
- *Many cultural backgrounds, 23% of residents born overseas*
- *Christianity main religion (71%), no religion 17%, Buddhism 1.1%, Islam 1.1%*
- *76% of 15–19-year-olds are at school or other educational institution*
- *Per capita income high, gross domestic product (GDP) 8th among 17 OECD countries*
- *Manufacturing main contributor to GDP (13.2%)*
- *Unemployment under 7% in late 1999*
- *Health expenditure 8.3% of GDP in 1997–98*

1.1 Health and its determinants

What is health?

Health has several important aspects, and our notions of it continue to develop. This means it cannot be described simply; it needs a range of measures, and it is still difficult to measure fully.

The Macquarie Dictionary describes health as ‘the general condition of the body or mind with reference to soundness and vigour’ (Macquarie 1997). In 1946 the World Health Organization (WHO) defined health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ (WHO 1946).

The WHO description applies to an ideal standard of health and can be seen as a goal as much as a definition. However, it remains widely used and along with the Macquarie version it helps to convey the ideas that:

- health is an important part of wellbeing, of how people feel and function, and also contributes to social and economic wellbeing;
- health is not simply the absence of illness or injury and there are degrees of good health as well as of bad health;

- for example, the better the health, the better a person's energy, reserves, resilience and capacity to stay that way for a longer life; also, many damaging processes in the body occur long before symptoms arise; and
- health should be seen in a broad social context.

In short, healthy people feel and function well in body and mind and are in condition to keep doing so for as long as possible.

Information on health must try to take account of the many factors that improve or reduce health and wellbeing, the processes and features of disease, and the management of illness and disability. Concepts and measures of health vary with the interests of those using them, such as researchers, clinical health professionals, administrators, social scientists, health economists and policy makers. Biomedical concepts are concerned with the biological processes of health and ill health. Clinical and epidemiological approaches consider mainly causes, disease, disability, death, life expectancy and years of healthy life. The social sciences focus more on social, emotional and material wellbeing as well as the quality of life. Health economists and policy makers are interested in information about the efficient and cost-effective use of limited resources as well as in health outcomes.

Some of these concepts are difficult to measure because they are hard to define clearly or because the measurement is expensive or technically difficult. For these reasons, much of this report relies on traditional or clinical measures such as death, disease, disability, certain risk factors or life expectancy. These measures either are clear-cut or have been developed over many years, and some have arisen from the daily activities of the health system. Concepts such as 'wellbeing' and 'quality of life' are much more challenging.

What determines and influences health?

Many things determine and influence health. Ideas about the causes of good health and disease have developed significantly over the past two centuries. Although ill health was linked to industrial and urban living in the nineteenth century, the single-cause germ theory of disease came to dominate health sciences well into the twentieth century. However, in the twentieth century the rise of chronic diseases, such as cardiovascular disease and several cancers, led to a wider 'multicausal' view. Research on populations showed the importance of 'lifestyle' factors such as diet, physical activity and cigarette smoking. Disease and health came to be seen as the result of the interaction of human biology, lifestyle and environmental factors, modified by health care (Lalonde 1974). As a further step, there has been increasing attention on the health of groups, particularly inequalities between groups. This in turn has been linked to the broad social and economic influences on health and lifestyle.

Figure 1.1 (page 4) shows some current concepts in simplified form. Health, disease and disability can be seen as the result of a complex interplay of many factors described as individual or environmental. These causes and effects can be modified to various degrees by prevention and health promotion or by treatment and rehabilitation. Such interventions are supported by human and material resources, including essential information via research, monitoring and evaluation.

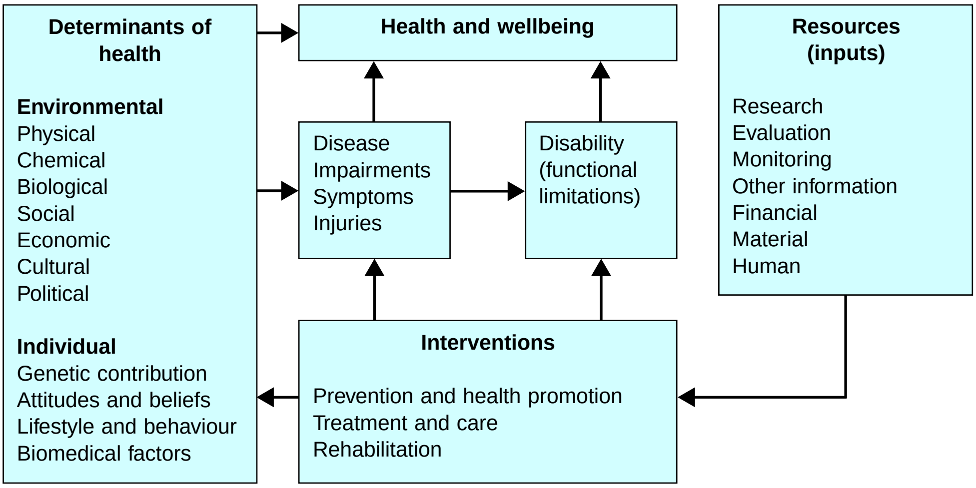

Figure 1.1: A conceptual framework for health

'Individual' factors shown in the box at the left of Figure 1.1 are those that can be measured in an individual—although they can also be applied to groups and often, as previously mentioned, reflect environmental influences. The environmental factors can be physical, as in landscape and climate; biological, as in vegetation, the food supply, infectious agents and other animal life; and socioeconomic, as in politics, culture, standards of living and the economy. Environmental factors in turn overlap one another in many ways and are also influenced by the actions of individuals.

The nature and scale of all these influences carry important implications for what and how much can be done to improve health. Broad socioeconomic influences can affect all people to some extent, but they often act to the further disadvantage of groups with lower education and income. The effects include people's health risks, knowledge, attitudes, opportunities and behaviour. In more detail they include:

- the varying exposure of individuals to risks;
- the understanding and attitudes of individuals in relation to prevention, and to ill health and its treatment;
- the willingness and ability of those individuals to look after their own health and also to obtain and follow professional help when needed; and
- the quality of that professional help and the ease of access to it.

These features will also vary according to factors such as age, sex, occupation and location. Other factors include marital status and social support or isolation. Age and sex are the largest single determinants of health but all factors have social and psychological aspects.

1.2 Implications for improving health

Despite Australia's generally good health and major improvements over the twentieth century, there is still great scope for further gains. This can be seen from the previous discussion and from information in later chapters of this book:

- large and rapid improvements have already been shown to occur and in some areas seem likely to continue—for example, falling death rates from heart attack and stroke, two of the greatest killers;
- awareness of the numerous biological, behavioural, social and economic factors that increase the risk of ill health that can be prevented or modified, and that are presently at high levels among many individuals and groups;
- the example of some countries that much lower levels of some diseases are possible, suggesting what Australia can aim to achieve, for example in the area of death rates from heart attack and several cancers;
- the relatively poor health (and therefore scope to improve) of those at a socioeconomic disadvantage, most notably Aboriginal and Torres Strait Islander peoples;
- growing recognition of the contribution to the burden of disease of morbidity as well as mortality, and the identification of major sources of morbidity such as depression; and
- constant advances in health research and technology, producing better diagnosis and treatment.

Health interventions can occur at many levels. These can range from clinical and preventive attention to individuals through to efforts to improve the physical, social and economic environment for special groups or the community as a whole. As well as seeking to reduce people's exposure to risks, some strategies aim to help individuals develop personal skills to exercise more control over their own health and environments and to make healthy choices.

Given the great range of influences on health, many major improvements require a strong partnership between public health and clinical care and also that the health sector work with other sectors to make the best use of limited resources. This further requires that other sectors take into account the possible health impact of their decisions. Improvements in health technology and an ageing and more health-conscious population have also led to growing demands on health and treatment services. Expectations are also increasing in other areas of people's lives, so there are competing interests both within the health sector and between it and other sectors.

Much of this further gain can be achieved under present social and economic conditions. Improvements have occurred among all the major Australian socioeconomic groups, even though there are continuing large inequalities between them in their levels of health. However, to achieve the full scope of improvement also requires significant social changes such as reducing educational and economic disadvantage. These changes can be seen as one of the great aims of society for reasons that include not only health (in its narrower sense), but also other benefits. They are already the subject of much action; they clearly extend far wider than the activities of the health sector and they require major and sustained effort from many areas of society.

The information on the great potential for improvement and how it might be achieved gives scope for a strategic approach in Australia towards sustainable gains. However, the major issues involved always require value judgments, and often include political processes because of competing interests. Along with limited resources, the situation involves choices, priority setting and trade-offs between the health sector and other sectors, between prevention and treatment services, and between the short term and longer term.

1.3 The role of health information

Valid and reliable health information is fundamental to developing effective health policies and programs, for general health-system development and to further the broad research and development effort (WHO 1996). The information needs to cover the patterns and trends of health and illness in Australia, the determinants of health and ill health, population health activities and clinical medical care (including primary health care). It is also required for a range of population groups.

Even where health care is delivered by private rather than by government providers, there are often public policy issues to do with funding (e.g. Medicare) or with managing the relationship between care systems. Health care management uses information about patients and their diagnoses or problems. It is also concerned with the nature of services provided and their cost, quality and effectiveness. Employment and training information supports health labour force planning. There is increasing focus on the interaction of care settings, particularly where different services are accessed by the same patient as part of a complete episode of care. The latter information is less well developed at present.

In the area of public health, information is required for:

- monitoring trends in the health and wellbeing of the community;
- similarly monitoring the determinants of that health and wellbeing;
- helping to determine priorities for public health interventions;
- identifying emerging issues that may require interventions;
- contributing to the design (or redesign) and management of interventions; and
- monitoring the effects of public health interventions.

Analysing disease prevalence and other data to estimate the burden of disease (reported in this edition of *Australia's Health* for the first time) and cost-effectiveness of interventions helps to shape decisions about priorities for interventions and for research, as does information about the equity of distribution of health and access to health services.

Increasing attention is being given to structuring and coordinating health information to support decision making. The National Health Information Agreement, made in 1993 between Commonwealth, State and Territory health agencies, the Australian Bureau of Statistics and the Australian Institute of Health and Welfare, now includes the Health

Insurance Commission. A major product of this agreement is the *National Health Data Dictionary* (AIHW 1999) which is updated annually to provide standards for national health information and to be a guide for health data gathering generally.

The agreement also provides mechanisms for extending the range of information available into areas of high priority. In this regard *The Aboriginal and Torres Strait Islander Health Information Plan…This Time Let's Make It Happen* (AHMAC & AIHW 1998) is an important example of a commitment to use health information to focus attention on important health needs.

The role of health information does not stop at informing decision makers in policy, administrative or service provider roles. Regular wide dissemination of new health information enables people to be informed about the issues behind public debate about health and health services and to make judgments about health and their own wellbeing.

1.4 The Australian health system

Individual Australians and families and health care professionals are partners in seeking good health and high-quality treatment. People's decisions about lifestyle, self-care, and seeking and acting on professional help, and their participation in the development of public policy at many levels, all contribute to shaping the Australian health system. Increasingly, detailed information is available to and accessed by individuals, especially via the Internet.

The Australian health system is complex, with many types and providers of services and a range of funding and regulatory mechanisms. Those who provide services include medical practitioners, other health professionals, hospitals, and other government and non-government agencies. Funding is provided by the Commonwealth (Federal) Government, State and Territory Governments, health insurers, individual Australians and a range of other sources.

The Commonwealth's funding includes two national subsidy schemes, Medicare and the Pharmaceutical Benefits Scheme. These schemes cover all Australians and subsidise their payments for medical services and for a high proportion of prescription medications bought from pharmacies. The Commonwealth and State Governments also jointly fund public hospital services so they are provided free of charge to patients. Between them, these three funding provisions aim to give all Australians, regardless of their personal circumstances, access to adequate health care at an affordable cost or no cost. These arrangements have become a central feature of Australia's health system during the last 25 years.

Many patients' 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, depending on the GP's billing arrangements. *Australia's Health* now reports on reasons for the attendances and actions arising from them. For specialised care, patients can be referred to specialist medical practitioners, other health professionals, hospitals or community-based healthcare organisations. These community-based services, some of which can also be accessed directly by patients, provide mental health, family planning and other specialised care and treatment, usually funded through Medicare or other government programs.

Australians also visit dentists and other private sector health professionals of their choice. Charges are met by the patients themselves, or with support of private health insurance, which Australians may purchase for these or hospital services.

Patients can access public hospitals through emergency departments, where they may present on their own initiative, or via the ambulance services, or after referral from a medical practitioner. Admitted patients are charged nothing for their treatment, food or accommodation, unless they choose private treatment. Emergency department and outpatient services are free.

Australians may also choose to be ‘private patients’ in hospital, if they use a private hospital, or choose to be treated as a private patient in a public hospital. Private patients can choose their own doctor, but the hospital’s services, which include accommodation and food, must be paid for by the patient, with or without the support of private health insurance, or through other arrangements such as compensation. Medicare subsidises the fees charged by doctors for services provided to private patients in hospitals, and private health insurance funds also contribute towards medical fees for insured patients. No-gap or known-gap arrangements are increasingly being agreed on between hospitals and insurers.

The health service system is regulated in various ways. Private hospitals are licensed by State and Territory Governments. Medical practitioners and other health professionals are registered for practice in each State and Territory. The Commonwealth’s regulatory roles include overseeing the safety and quality of pharmaceutical and therapeutic goods and appliances, and regulating the private health insurance industry.

In addition to the services outlined above, the Commonwealth, State and Territory Governments and local governments provide public health services, community health services and ambulance services. Public health services include activities to ensure food quality, immunisation services and other communicable disease control, public health education campaigns, environmental monitoring and control, and screening programs for diseases such as breast cancer.

Essential support to the health service system is given by many other agencies. Research and statistical agencies provide the information needed for prevention, detection, diagnosis, treatment, care and associated policy. Consumer and advocacy groups contribute to public discussion and policy. Professional associations for medical practitioners and other health professionals help set professional standards and clinical guidelines. Universities and hospitals undertake training of undergraduate and postgraduate health professionals. Voluntary agencies contribute in various ways, including raising funds for research, running education and health promotion programs, and coordinating voluntary care.

Although they are not seen as part of the health system, many other government and non-government organisations play a role because of their influence on health. Departments of transport and the environment, the media and the food industry are just a few examples.

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2 The health of Australians

International comparisons show that Australians enjoy good health, and that the underlying health trends are broadly in step with health improvements occurring elsewhere, particularly in other developed countries (AIHW: de Looper & Bhatia 1998). However, there are significant interpopulation differences in health outcomes within Australia.

This chapter reports on the health status of Australians towards the end of the twentieth century, and the diseases and conditions affecting them.

There are five broad sections:

2.1 **Dimensions and components of health** describes health using indicators such as life expectancy, self-rated health status, fitness, sexual health, oral health and immunological health.

2.2 **Burden of disease and injury** outlines aspects of morbidity, disability and mortality in the Australian population. Results from the Australian Burden of Disease and Injury study have been included to describe the contributions made by various diseases and conditions to ill health, disability and premature mortality.

2.3 **National Health Priority Area (NHPA) diseases and conditions** reviews the burden of diseases and conditions that have been accorded priority status for action by Australian Health Ministers. The diseases and conditions covered are cardiovascular diseases, cancers, injuries, mental disorders, diabetes and asthma.

2.4 **Other major chronic diseases and conditions** details those chronic, non-communicable diseases that are not currently the focus of the NHPA initiative, but are large contributors to morbidity, disability and mortality in Australia. Some of these diseases and conditions are likely to emerge as major health and wellbeing concerns with the ageing of the population.

2.5 **Communicable diseases** provides data on various infectious diseases including gastrointestinal illness, HIV/AIDS, sexually transmitted diseases, blood-borne infection, vaccine-preventable diseases and other infections in Australia.

Determinants of health are not discussed in detail here, but are covered in chapter 3. Similarly, the health of various population subgroups in Australia is described in chapter 4.

2.1 Dimensions and components of health

The instinct for survival is the most basic of human traits, and therefore central to any discussion of health. However, a view of health in terms of freedom from disease, with a greater emphasis on body functions and structure, the ability to perform core activities and participate in society, is likely to provide further insight into variation in health outcomes. This section provides brief overviews of various aspects of health, its dimensions and components.

As well as providing an assessment of life expectancy, there is an overview of health status as rated by Australians themselves. The section also describes various components of health in a modern setting—physical fitness, sexual health, oral health and immunological health.

Life expectancy and longevity

Long life is a cherished goal for most people. For many Australians this goal is highly achievable. Most Australians can now expect to live an average of 80 years, a large proportion of these as healthy years.

Significant increases in life expectancy have occurred throughout the twentieth century. Reductions in infant and child mortality have been the most significant contributors to the increase in life expectancy at birth over the period (ABS 1998c). However, more recently, significant gains in life expectancy occurred following reductions in death rates among the elderly, especially for diseases of the circulatory system, such as heart disease and stroke. These trends have important consequences. Not only do they increase the proportion of the population reaching an advanced age, but they also influence the health, disease and disability patterns in a population.

Longevity is much more valuable if it is accompanied by freedom from suffering, pain or disability. The growing prevalence of chronic diseases and disabilities has brought into focus the need to seek a balance between the length and quality of life (WHO 1997).

Life expectancy in Australia

Most Australians can expect to live relatively long and healthy lives. An Australian boy born between 1996 and 1998 can expect to live, on average, 75.9 years, and a girl born in the same period can expect to live 81.5 years (ABS 1999a). These estimates assume that, over the lifetime of these individuals, the death rates at various ages will not deviate from the rates obtained in 1996–98. However, if the age-specific death rates decrease further, then the life expectancy achieved by these individuals will be more than that estimated from current life tables.

A corollary to the above observation is that at higher ages total life expectancies are greater than those obtained at birth. Surviving early years of life adds years to the balance of life expectancy (Insel & Roth 1988). For example, for males aged 65 in 1996–98, the expected number of remaining years of life is 16.3, a total life expectancy of 81.3 years. For females aged 65 in 1996–98, this figure is 20.0 years or a total of 85.0 years (ABS 1999a).

Life expectancy is not uniform across population groups. Some groups in the population, such as those who are socioeconomically disadvantaged and Aboriginal and Torres Strait Islander peoples, have lower life expectancy than the national average. The most socioeconomically disadvantaged in society, for example, are expected to live about 3 years less than those most advantaged (AIHW: Mathers et al. 1999a). But the greatest difference is in relation to the life expectancy for Aboriginal and Torres Strait Islander peoples. Indigenous persons born in 1996–98 are expected to live about 20 years less than the rest of the Australian population (ABS & AIHW 1999).

Life expectancy also shows regional variation. Based on 1996–98 data, life expectancy at birth in the Northern Territory was the lowest for both sexes, considerably lower than the overall Australian levels—5.3 years lower for males and 6.5 years lower for females (Table S11, page 371). These differences largely reflect the higher death rates in the Indigenous populations, which constitute a large proportion (29%) of the population in the Northern Territory (ABS 1999a). In other States of Australia, male life expectancy ranges from 75.1 years in Tasmania to 77.5 years in the Australian Capital Territory, and female life expectancy ranges from 80.4 years in Tasmania to 81.9 years in Western Australia.

Life expectancy for both males and females has increased considerably over the last 100 years. Since 1901, life expectancy at birth increased by 38% (from 55.2 years) for Australian males and by 39% (from 58.8 years) for Australian females. Trends in life expectancy are discussed in more detail in chapter 8.

International comparisons

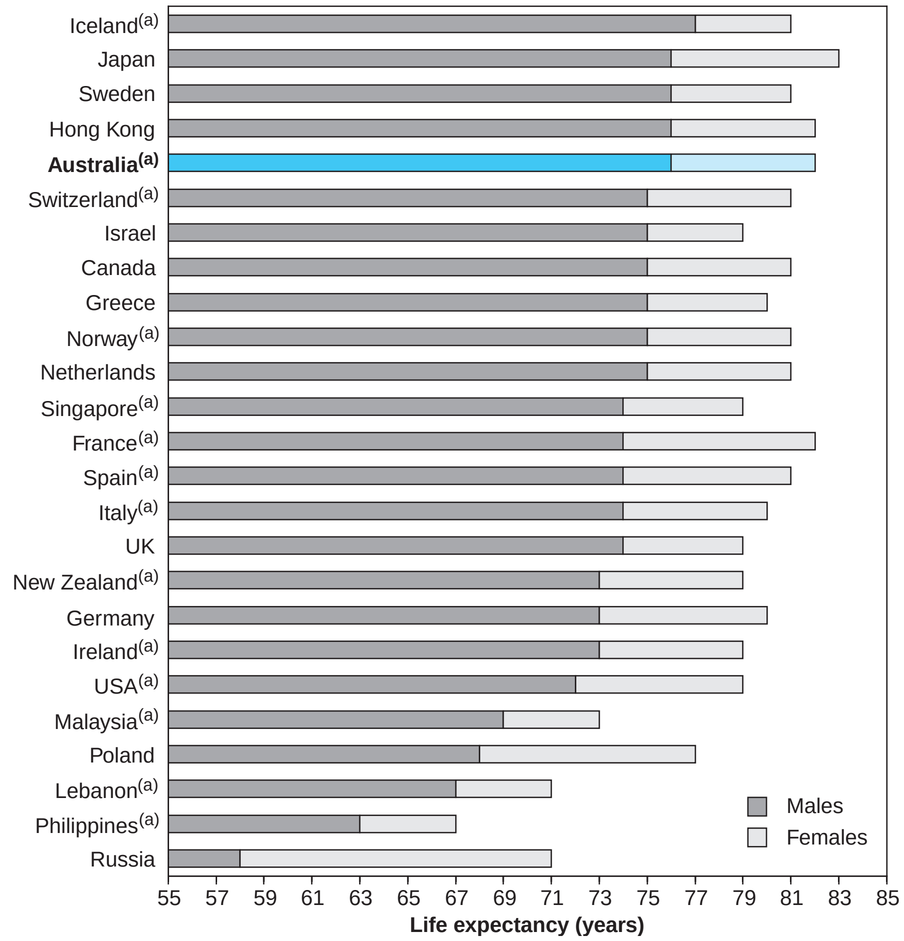
Australians enjoy some of the highest life expectancies in the world. In 1995, the highest male life expectancies at birth were recorded in Iceland (76.5 years) and Japan (76.4 years), and the highest female life expectancies were recorded in Japan (82.9 years) and France (82.6 years). Australian life expectancy at birth is similar to that estimated for countries such as Canada, Norway, Spain, New Zealand, the United Kingdom and the United States (Figure 2.1).

The countries compared in Figure 2.1 are all from more developed regions of the world. The life expectancies of less developed countries are considerably lower. Regions defined by the United Nations as being made up of less developed countries (i.e. countries outside Europe, North America, Australia, Japan and New Zealand) have an overall life expectancy of 64 years, compared with 75 years for developed regions. The African continent has the lowest life expectancy at birth of 52 years (Population Reference Bureau 1999).

Self-reported health

People's perception of their own health has been shown to be a powerful, independent predictor of their survival in several populations (see, for example, Mossey & Shapiro 1982, Kaplan & Camacho 1990, and Idler et al. 1990). Although some inconsistency between the results of different studies suggests that this is not equally true of all populations, Australian studies have demonstrated the link between self-reported health and subsequent health outcomes, at least for older Australians (McCallum et al. 1994).

This section discusses how Australians rate their own health and wellbeing, based on self-assessed health status and the physical and mental health component summary (PCS and MCS) scores derived from the SF-12 questionnaire (Ware et al. 1996—see Box 2.1, page 14). These summary scores were originally developed from the longer SF-36 health survey questionnaire and are intended to represent independent measures



(a) Philippines 1991; Ireland, Italy 1993; France, Iceland, Norway, Spain, USA 1994; Singapore 1996; Lebanon 1990–95; Malaysia 1990–96; New Zealand 1992–94; Switzerland 1994–95; Australia 1995–97.

Sources: ABS 1998c; UN 1998; WHO 1998.

Figure 2.1: Life expectancy at birth, selected countries, 1995

of mental and physical health, with higher scores indicating better health. There is some evidence that results relating to physical health may affect the MCS score and vice versa (see Box 2.1, page 14).

The results presented here are based on data from the 1997 National Survey of Mental Health and Wellbeing of adults (persons aged 18 years and over), conducted by the Australian Bureau of Statistics (ABS).

Box 2.1: SF-12 questionnaire and self-assessed health

The SF-12 questionnaire is a standard international instrument developed by the Medical Outcomes Trust, Boston, USA (Ware et al. 1998). It contains 12 questions that provide a generic measure of self-reported health status.

The responses to various questions can be combined into a physical component summary (PCS) score and a mental component summary (MCS) score. The PCS is taken as representing limitations in physical functioning, role limitations due to physical health problems, bodily pain and general health. The MCS focuses mainly on role limitations due to emotional problems, social functioning, mental health and vitality (Ware et al. 1996).

These summary scores were originally developed from the longer SF-36 health survey questionnaire (Ware et al. 1994). The SF-12 questionnaire was designed as a shorter form of the SF-36 questionnaire; nonetheless it closely reproduces the MCS and PCS scores. Each score has a mean value in the general population of around 50, with a higher score indicating better self-reported health and wellbeing.

There is some evidence that the state of physical health may affect the MCS scores and vice versa, probably because mental and physical health are to some extent interrelated (Simon et al. 1998). However, they still provide useful summaries of self-reported physical and mental health status (Ware et al. 1996).

Self-assessed health was recorded with a question that asked respondents to rate their health according to a 5-point Likert scale (excellent, very good, good, fair, poor).

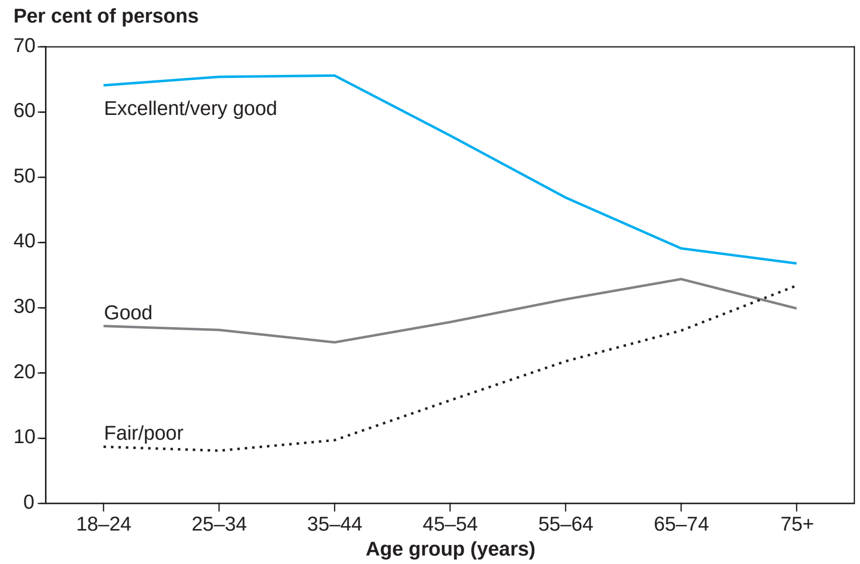
Self-assessed health status

Just over half (57%) of people aged 18 years and over reported their overall health as excellent or very good, and a further 28% reported that they were in good health. Proportions were similar for the two sexes. The remaining 15% rated their health as either fair or poor. In interpreting, these findings, note that some of those in poorer health were excluded from the survey—for example, people living in institutions such as hospitals and nursing homes were not included.

Self-assessed health status is strongly related to age. The proportions reporting excellent or very good, good, and fair or poor health remained relatively unchanged up to the age group 35–44 years. At ages over 44 years, the proportion reporting excellent or very good health declined with increasing age, from 66% at ages 35–44 to 37% at ages 75 and over, while the corresponding proportion reporting fair or poor health increased from 10% to 33% (Figure 2.2).

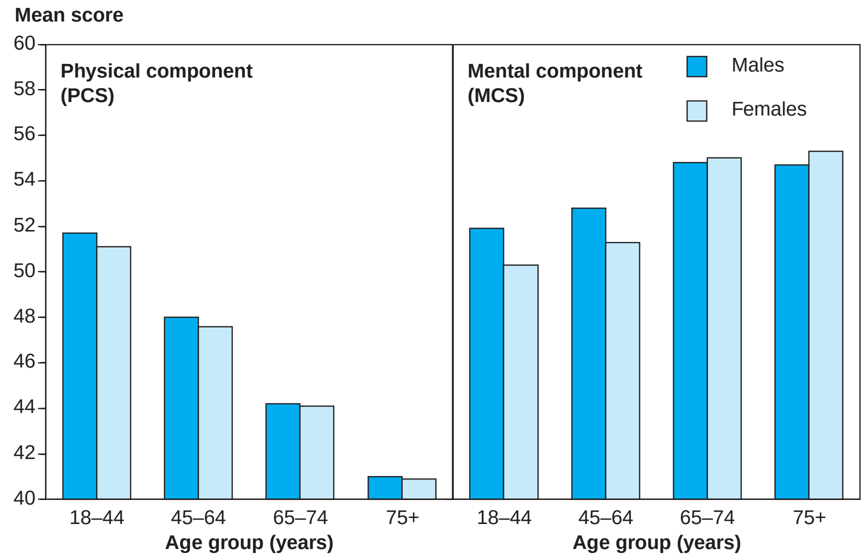
PCS and MCS scores

The PCS score declines steadily with age for both males and females, whereas the MCS score is higher at older ages than at younger ages (Figure 2.3). These patterns suggest that whereas self-assessed physical health declines with age, self-assessed mental health shows improvement. However, these findings should be interpreted with caution since respondents with cognitive problems such as dementia, which mainly occur at older ages, were excluded from completion of the SF-12 questionnaire.



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

Figure 2.2: Self-assessed health status by age, 1997



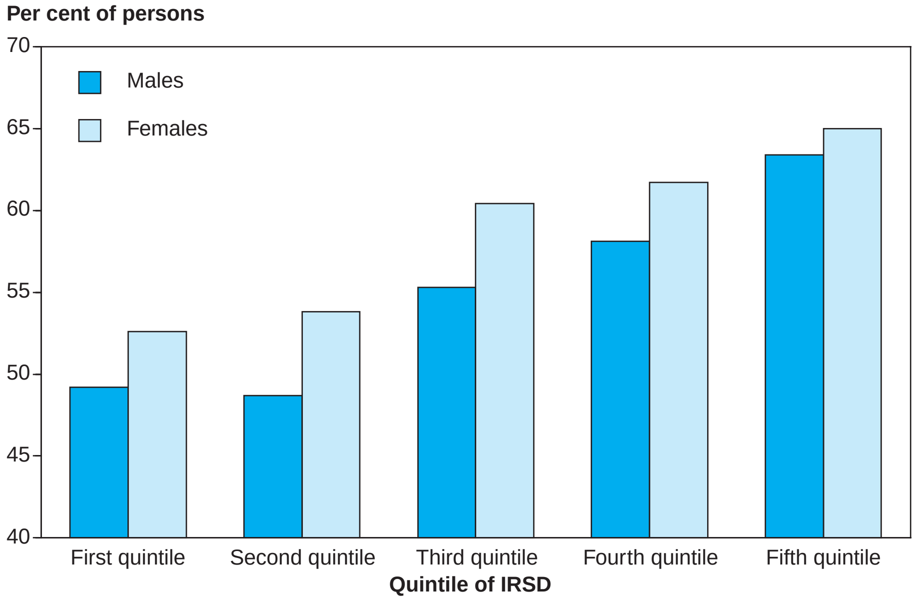
Source: AIHW analysis of National Survey of Mental Health and Wellbeing data.

Figure 2.3: Mean physical and mental component scores by age and sex, 1997

Variation in self-reported health status

The link between health status and socioeconomic status has been clearly demonstrated in studies both in Australia and overseas (Wilkinson & Marmot 1998), with lower socioeconomic status being associated with poorer health. The Australian Burden of Disease and Injury Study shows a clear gradient in the total mortality burden with socioeconomic disadvantage as defined by the ABS's Index of Relative Socioeconomic Disadvantage (IRSD) at the statistical local area level (AIHW: Mathers et al. 1999a). The study also shows a similar marked gradient in the disability burden of mental disorders.

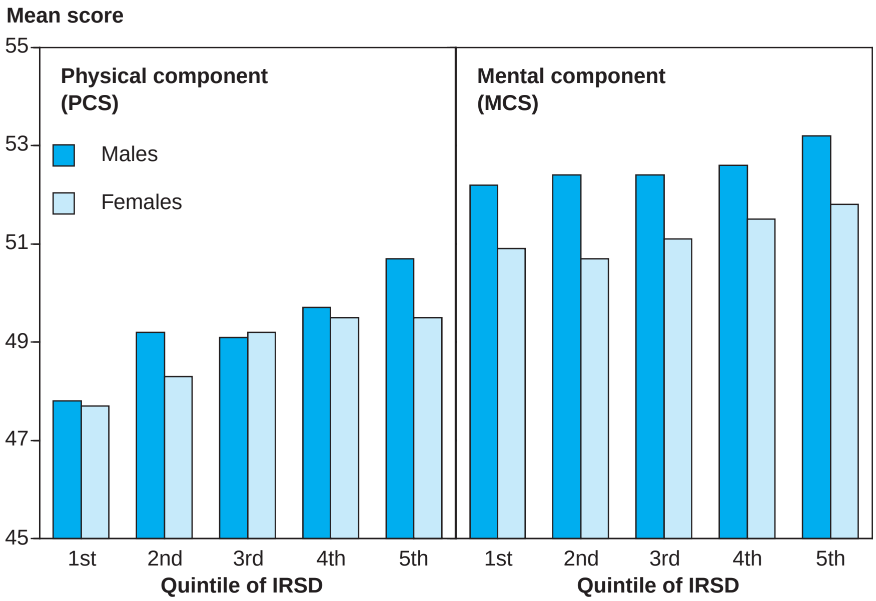
As expected, the proportion of people who reported their health as either excellent or very good shows a marked trend across the socioeconomic disadvantage quintiles. It rises from 49% for males and 53% for females in the first quintile (the most disadvantaged) to 63% for males and 65% for females in the fifth quintile (the least disadvantaged) (Figure 2.4). The pattern of poorer self-assessed health status with increasing disadvantage is also reflected in the mean PCS scores and to a lesser extent in the mean MCS scores (Figure 2.5).



Note: Age standardised to the Australian population at 30 June 1991.

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

Figure 2.4: Proportion of people reporting their health as excellent or very good by sex and socioeconomic status, 1997



Note: Age standardised to the Australian population at 30 June 1991.

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

Figure 2.5: Mean physical and mental component scores by sex and socioeconomic status, 1997

Fitness

Fitness can be broadly defined as the matching of an individual to his or her physical and social environment. Through a combination of heredity and modifiable lifestyle factors, an individual may acquire the attributes to carry out physical tasks with vigour and alertness, and without undue fatigue in a specified physical, social and psychological environment. This implies that fitness has both physical and mental components that are largely modifiable.

Traditionally, definitions of physical fitness have related only to the physical attributes that are necessary for optimal sport or work performance in terms of an individual's ability in an athletic competition, a performance test or occupation (Pate 1988; Gledhill 1990). Muscular strength, motor skills, power, endurance, body composition, body size, motivation and nutritional status are thus important components of performance-related fitness (Bouchard & Shephard 1994). In recent years, there has been an increasing interest in the health-related aspects of fitness (Bouchard et al. 1997).

Mental fitness involves stimulating the mind through education, work and leisure, and enables people to solve many of the challenges confronted throughout life (Gringold 1999).

Health-related fitness

Health-related fitness has been defined as a state characterised by (a) an ability to perform daily tasks with vigour and (b) traits and capacities associated with a low risk of development of diseases or conditions, where these diseases or conditions are related to a sedentary lifestyle (Bouchard & Shephard 1994).

The relationships between health-related fitness, participation in physical activity and health are complex. Not only does physical activity influence health, but health status also influences participation in physical activity and therefore level of fitness (Bouchard & Shephard 1994). Further, a person's natural (genetic) level of fitness will influence participation, and there is variation among people in their response to the same levels of physical activity (Bouchard et al. 1997). In the general population, both performance-related fitness and health-related fitness decline with increasing age, especially after about age 35 (Smith & Gilligan 1989).

Bouchard and Shephard (1994) have identified several components of health-related fitness: morphological, muscular, motor, cardiorespiratory and metabolic fitnesses (Box 2.2).

Box 2.2: Components of health-related fitness

Morphological component	***Muscular component***	***Motor component***	***Cardiorespiratory component***	***Metabolic component***
Body mass index	*Power*	*Agility*	*Aerobic power*	*Glucose tolerance*
Body composition	*Strength*	*Balance*	*Heart functions*	*Insulin sensitivity*
Subcutaneous fat distribution	*Endurance*	*Coordination*	*Lung functions*	*Blood cholesterol*
Abdominal visceral fat		*Speed*	*Blood pressure*	*Substrate oxidation characteristics*
Bone density				
Flexibility				

Sources: Bouchard & Shephard 1994; Bouchard et al. 1997.

Health-related fitness of Australians

Quantitative information on the health-related fitness of Australians is sporadic. A National Health and Fitness Survey was conducted in 1985 on Australian school children aged 7–15 years (Pyke 1987). More recently, a comparable survey was carried out among New South Wales school children (Booth et al. 1997). The latter study shows that about 25% of boys in Year 6, and around 30% of Year 8 and Year 10 boys, have low aerobic capacity.

Several components of health-related fitness were measured in adults from Adelaide in the Pilot Survey of the Fitness of Australians (DASET 1992). The survey found higher levels of cardiorespiratory fitness, better lung function, and better flexibility and muscle strength among those who were physically more active. Information on components of health-related fitness has also been collected in the Risk Factor Prevalence Surveys (conducted in 1980, 1985 and 1989) and the 1995 National Nutrition Survey.

Data on the participation of Australian adults in physical activity were collected by the ABS in 1998–99 (ABS 1999f). Although not a measure of fitness, around 15% of adult Australians reported that they had participated in aerobics or fitness activities sometime during the 12-month period prior to interview. Participation of Australians in physical activity for health benefits is discussed further in chapter 3.

Oral health

Oral health refers to the health of a number of different tissues in the mouth, including mucous membrane, connective tissue, blood vessels, nerves, muscles, bone, teeth and periodontal structures. It also covers immunological, physiological, sensory and digestive system aspects of human health. However, the term is used overwhelmingly in relation to two specialised tissues of the mouth, namely the teeth and the periodontal structures or gums.

Many different factors affect the oral health of a population and individual variation therein, prominent among which are age, exposure to fluorides, dietary patterns, preventive dental behaviours, smoking, alcohol consumption, stress, infection and immunity, access to and use of preventive and dental restorative services, and attitudes towards treatment preferences. The oral health of children in developed countries has improved dramatically over the last several decades. Factors such as changes in exposure to fluoride and disease control and management have contributed to this improvement (AIHW: de Looper & Bhatia 1998).

The preservation or loss of teeth and periodontal structures starts early in life, and is a life-long, cumulative process. Early improvements contribute to better outcomes later in life. The loss of all teeth, or edentulism, increases with age, but has been decreasing over time. The numbers of missing teeth in individuals with some natural teeth have also been decreasing. For the individual, the loss of natural teeth is usually associated with chewing difficulties, higher levels of discomfort during eating, personal embarrassment, social isolation and the need for assistance. Decayed teeth are also the cause of much morbidity and pain.

Measurement of oral health

Indicators of oral health may be designed in terms of personal hygiene, dental preservation and/or oral wellbeing, However, the outcomes are usually measured in terms of dental morbidity and mortality such as the number of decayed, missing or filled teeth (DMFT) or edentulism. Because of the highly pervasive nature of dental caries and periodontal (gum) disease, it is necessary to measure not only the prevalence but also the extent and severity of oral diseases.

An increasing proportion of Australian adults are retaining their natural teeth, with recent significant falls in both adult DMFT scores and edentulism, due mainly to effective preventive strategies and changes in disease management. However, both

DMFT scores and the proportion of the population that are edentulous are comparatively high for Australians when compared with other OECD countries (AIHW: de Looper & Bhatia 1998).

Child oral health

The oral health of primary and secondary school children in Australia continues to improve. Oral health in children is most often assessed by their dental decay experience (or extent), expressed as a count of the number of teeth currently decayed, teeth extracted as a result of having been decayed and teeth with fillings. The average number of decayed, missing or filled teeth (dmft) in the deciduous dentition ('baby' or primary teeth) for children aged between 5 and 10 years declined markedly between 1989 and 1996 (Table S26, page 390). Reductions were greatest for the youngest age groups. The average dmft of 5-year-old children reduced by 39.1%, from 2.07 to 1.26, while for 10-year-old children the dmft score fell by 21.8%, from 1.88 to 1.47.

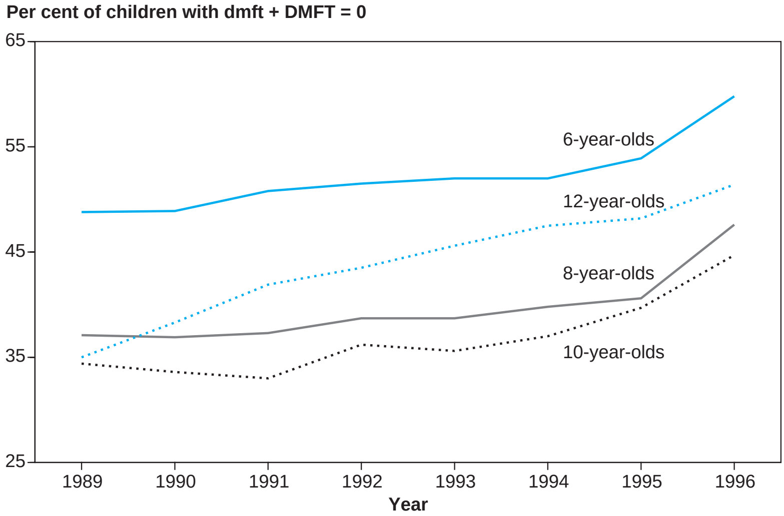
Disease experience in the permanent dentition ('adult' teeth) also declined between 1989 and 1996 (Table S27, page 390). By 1996, the DMFT score for 12-year-old children had reduced by 42.3%, from 1.56 to 0.90. This is a considerable improvement on the average score of 4.79 for 12-year-olds in 1977.

Appreciable differences in disease in the deciduous and permanent dentition exist across Australia's States and Territories, despite the general reduction in the level of disease (Table S28, page 391). The average dmft score for 6-year-old children in 1996 was lowest in New South Wales (0.94) and the Australian Capital Territory (0.89) and highest in Queensland (2.25). In the permanent dentition, average DMFT was lowest in South Australia (0.47) and the Australian Capital Territory (0.56) and again highest in Queensland (1.30). State and Territory differences may be a result of differences in patterns of exposure to preventive factors such as water fluoridation, delivery system organisation, the targeting of oral care and even the methodology used for collecting oral health information. It is notable that, of the major cities in Queensland, only Townsville has fluoridated drinking water (AIHW 1998a).

The changing pattern of children's oral health

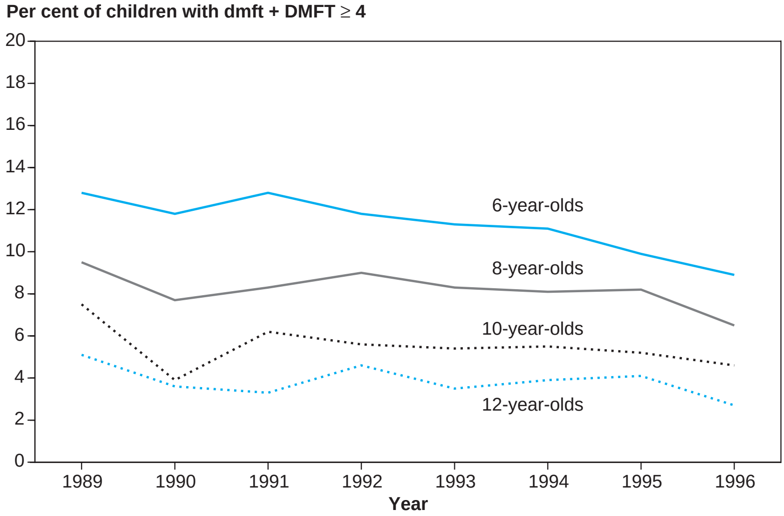
Over the last two decades, there has been a considerable increase in the proportion of children with no caries (tooth decay). Between 1989 and 1996, there was an increase in the percentage of 6-year-old children with no decayed, missing or filled teeth from 48.8% to 59.8%, and the percentage of 12-year-olds with no caries increased from 35.0% to 51.4% in the same period (Figure 2.6). These figures represent an increase of 20.5% and 46.9%, respectively, in the number of 6-year-olds and 12-year-olds without any dental caries at each age.

The burden of oral disease is increasingly concentrated in a minority of children. In particular, there remains a significant proportion of children who present with a considerable history of dental caries (Figure 2.7). The percentage of these high-risk children has decreased only slightly in recent years. For example, the proportion of 6-year-old children with four or more decayed, missing or filled teeth reduced by only 3.7% between 1989 and 1996.



Source: AIHW Dental Statistics and Research Unit Child Dental Health Surveys.

Figure 2.6: Proportion of children with no decayed, missing or filled teeth by age, 1989 to 1996



Source: AIHW Dental Statistics and Research Unit Child Dental Health Surveys.

Figure 2.7: Proportion of children with four or more decayed, missing or filled teeth by age, 1989 to 1996

Children with the largest burden of oral disease are more likely to be of lower socioeconomic status, reside in a rural area or be of Indigenous origin (Davies et al. 1997; Spencer et al. 1998; Gaughwin et al. 1999). In the Northern Territory in 1996, Indigenous 6-year-old children had three times the number of clinically detectable decayed teeth (2.10 on average) than non-Indigenous children (0.73 on average). Therefore, although the caries experience of the general population of children has improved significantly, there remain pockets of at-risk children who require further targeting through oral health initiatives (AIHW DSRU: Armfield et al. 1999).

Oral health of young adults

Gains in oral health made in childhood need to be carried into adult years to continue the improvement of oral health in the general population. Young adulthood may be a period of greater risk of oral diseases as it is a time of change when people move into new accommodation arrangements, relationships become established and economic independence is attained (Young 1996). These changes may alter patterns of preventive health behaviours and treatment service use by young adults. In addition, this age group is noted for its risk-taking behaviours.

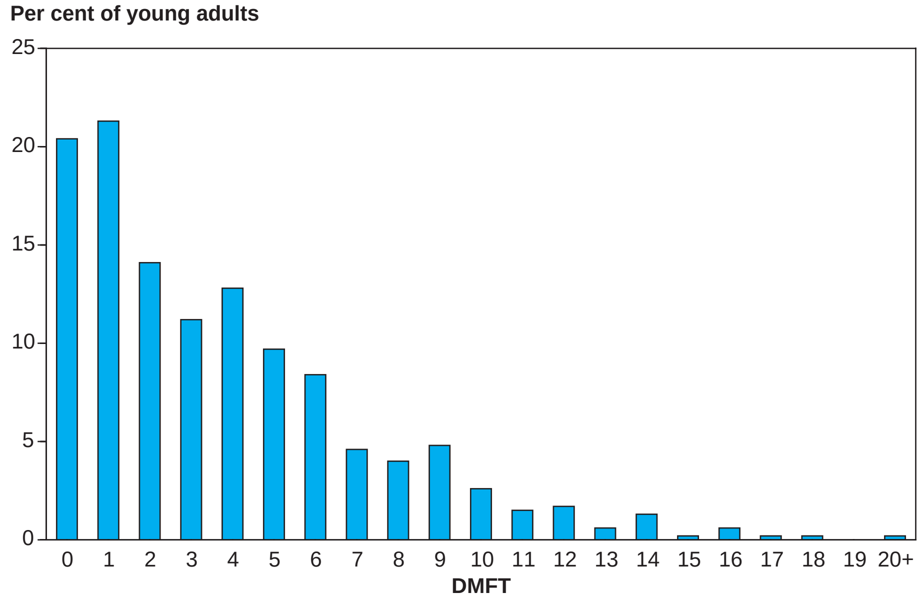
The Adult Dental Programs Survey (AIHW DSRU: Brennan et al. 1995) indicated that publicly funded patients in the 18–24 age group have the highest rates of oral surgery (15% of visits), an average of slightly more than two decayed teeth and the highest rates of temporary restorations (12% of visits), suggesting a strong presence of emergency treatment. Brennan (2000) also found that in private practice extraction rates for dental caries, infections of the tooth root or gum-related diseases were highest in patients aged 18–24 years.

A study in Adelaide in 1999 by Roberts-Thomson and Stewart examined 644 young adults who were selected from the electoral roll. Figure 2.8 shows the distribution of the number of decayed, missing and filled teeth (DMFT) due to dental caries from that study. More than one in five adults (22%) had no clinical evidence of caries. The distribution was positively skewed with a mean DMFT score of 3.66, and a median of 3.0 teeth with caries experience.

However, over 10% of these young adults had a DMFT score of 8 or more. Persons with the highest levels of tooth decay were more likely to be those who were disadvantaged such as concession card holders, those who use public dental clinics, and those who had not visited a dental professional in the previous 2 years.

The mean DMFT of 3.66 was made up of 75% filled teeth, 19% of teeth with untreated decay and 6% of teeth missing due to dental caries. About 29% of the young adults had untreated decayed teeth, with an additional 31% with signs of early decay. Those with untreated decay were more likely to be young adults who usually visit only for a problem, who have not made a dental visit in the last 2 years and who are regular smokers.

Note that the results presented here are from urban Adelaide with access to water fluoridation, and would therefore tend to be an underestimation of national figures. For the majority of young adults, the gains in oral health made in childhood are carried into later years. However, for a minority, oral diseases remain a significant problem.



Source: Adelaide Dental Study of Young Adults.

Figure 2.8: Distribution of dental decay in young adults aged 20–24 years, 1999

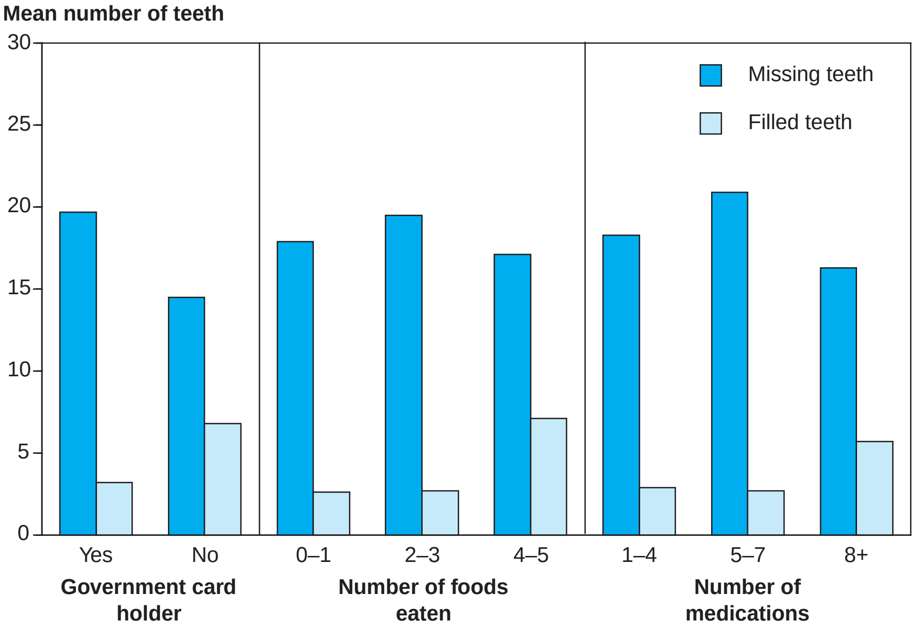
Oral health of nursing home residents

Demographic changes and changing patterns of oral health are resulting in larger numbers of older Australians who are increasingly dentate (have some of their own natural teeth). To provide a better understanding of their oral health, a baseline study of the oral health of nursing home residents was carried out in Adelaide in 1998 (Chalmers et al. 1999). The mean age of participating residents was 83.2 years. Oral inspections were completed for 224 residents.

Two-thirds (66%) of participating residents were edentulous. Edentulous residents had significant oral problems and treatment needs—they had lost a higher percentage of body weight, they could eat fewer foods, their last visit to a dentist was more likely to have been for a problem, and they were less likely to think they needed dental treatment. Denture-related conditions of the mouth were prevalent, such as inflammation of areas of the mouth covered by the denture (16.8%) and inflammation of the corners of the mouth (18.5%). Up to 20% of residents owned dentures that were not worn.

Dentate residents had an average of 11.9 teeth remaining, 18.9 missing teeth, and 1.1 retained roots (0.8 decayed and 0.3 sound retained roots). They had a mean of 1.1 decayed teeth and 3.8 filled teeth, for an average DMFT score of 23.7.

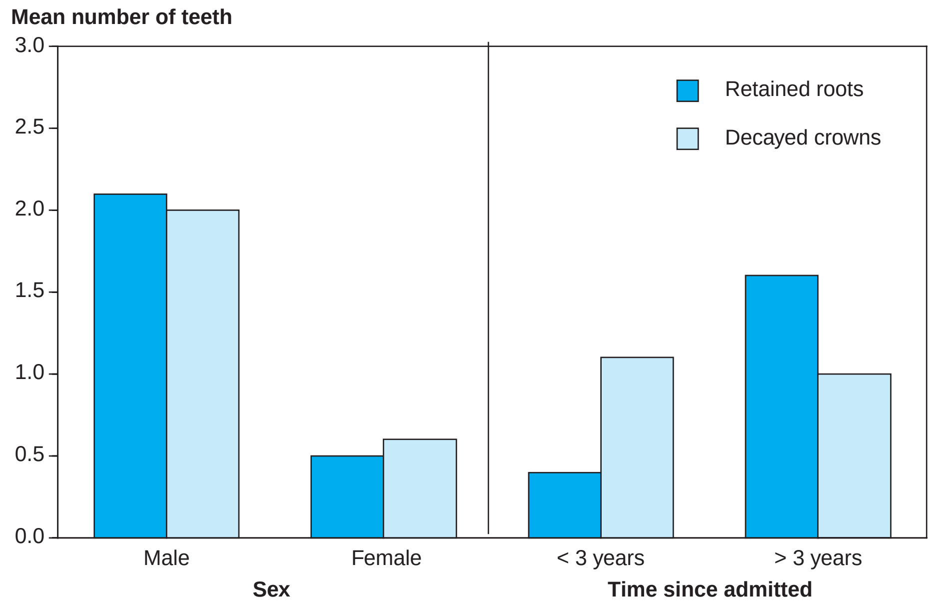
Residents with a government concession card had significantly more missing teeth. Residents without a government card, those taking 8 or more medications and those who could eat most foods had significantly more filled teeth (Figure 2.9). Residents who had been living at the nursing home for more than 3 years had significantly more retained roots. Males had significantly more retained roots and decayed crowns (Figure 2.10). Significantly more plaque/debris-covered surfaces were found in residents who could not eat many foods. Residents with severe cognitive impairment had more decayed teeth, more missing teeth, fewer filled teeth and many more plaque/debris-covered surfaces.



Source: Chalmers et al. 1999.

Figure 2.9: Nursing home residents: tooth status by residents' characteristics, 1998

The prevalence of caries in the crown of the tooth and in the root was high in residents of nursing homes. The mean number of decayed coronal surfaces (1.7) was greater than the number of decayed teeth (1.1), indicating that multiple surfaces were affected on some teeth. The mean number of filled coronal surfaces was 8.7, decayed root surfaces was 1.5, and filled root surfaces was 1.1. Males had significantly more decayed coronal and root surfaces; they also had more decayed root surfaces and significantly higher new caries in crowns and roots. Residents who could not eat many foods had more decayed coronal surfaces, less filled coronal and root surfaces and many more plaque/debris-covered surfaces. More severely cognitively impaired residents had much higher numbers of decayed coronal surfaces.



Source: Chalmers et al. 1999.

Figure 2.10: Nursing home residents: retained roots and decayed crowns by residents' characteristics, 1998

Plaque and tartar (calculus) accumulation was very high on residents' teeth and dentures. Over 25% of dentate and edentulous residents who wore dentures had staining/debris accumulation on more than one-third of the denture surface. Residents with significantly more plaque accumulation were those who could not eat many foods and those who had been admitted to the nursing home more than 12 months previously. Other residents with more plaque were those with a diagnosed dementia and/or severe cognitive impairment, concession card holders, males, younger residents, and the more functionally dependent. Tartar accumulation was high—63% of sites assessed for loss of periodontal attachment had tartar present on probing. Prevalence of mild to moderately deep gum pockets was common, but severe periodontal disease was evident only in a small percentage (4.4%) of residents.

Dentate residents had high treatment needs as determined by a dentist (Table 2.1, page 26). They required a mean of 2.9 surfaces for restoration per resident. Normative need for extractions was high—0.9 teeth per dentate resident. However, less than 25% of residents perceived a need for dental treatment.

Over 30% of dentate residents had unstable and/or unretentive upper dentures and 40% of edentulous residents had unstable and/or unretentive lower dentures. Over 20% of dentate residents had defects with their upper partial dentures. However, residents' perceived need for denture treatment was much lower than the normative

Table 2.1: Nursing home residents: dentate residents—treatment needs determined by dentist, 1998

Type of treatment	Mean number of teeth requiring treatment
Restorations	
For 1 surface	0.97
For 2 surfaces	0.41
For 3 surfaces	0.30
For 4 surfaces	0.04
Extractions	0.87
Preventive	0.33

Source: Chalmers et al. 1999.

need. For example, based on clinical criteria, 68% of residents who required a new full denture did not want it and 50% of residents who required a denture reline did not want it.

Sexual health

Sexuality is integral to physical and mental health. In addition to its reproductive function, it influences a broad range of attitudes and social values. Sexual health, therefore, refers not only to the health of reproductive organs but also to the psychological, emotional and relationship aspects of sexual behaviour.

Attitudes to sexuality, in particular to the reproductive purpose of sexual behaviour, have changed considerably over the last several decades. Two major factors contributing to this change are improved methods of, and greater access to, contraception. Social and economic factors have also influenced the association between sexual activity and reproduction.

For most people, sex is a positive and normal aspect of life. It is a means of reproduction, as well as providing intimacy in relationships. For others, who experience sexual dysfunction, sexual intimacy can be difficult and lead to emotional and relational problems. There is also the problem of sexually transmitted diseases (STDs) or unwanted pregnancy that can result from unsafe sex practices.

This section provides an overview of the sexual health of Australians, relating to reproduction and contraception, sexual health status, sexual dysfunction and STDs. The section on communicable diseases later in this chapter provides additional information on STDs. Chapter 3 describes sexual health practices in Australia and associated risk factors. The section on mothers and babies in chapter 4 covers the issues of pregnancy, multiple births, abortion and perinatal deaths in greater detail. Information on healthcare services in relation to sexual health in general, and reproduction in particular, is included in chapter 5.

Reproduction

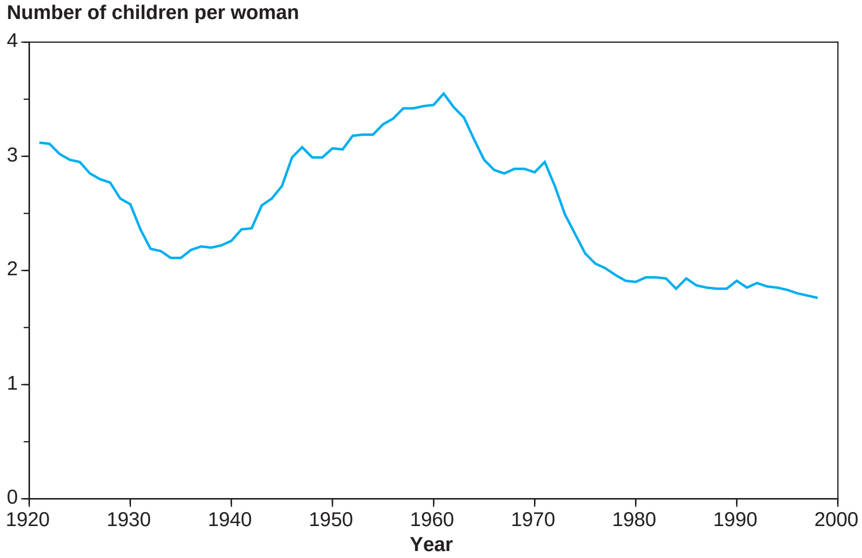
An important goal for many people is to have a family. However, the timing of starting a family and the size of the family has changed substantially over the last 100 years. A wide variety of contraceptive methods makes it possible for couples and individuals to plan the number and timing of children.

In 1998, around 246,000 women gave birth in Australia, with almost 250,000 live births registered (the difference takes into account multiple births). The outcome of some pregnancies is the birth of a stillborn child. A total of 1,336 stillbirths were registered in 1998 (ABS 1999c, 1999d). Crude birth rates have declined from 21.7 per 1,000 people in 1971 to 13.3 per 1,000 in 1998.

Medical assistance such as in-vitro fertilisation (IVF) and gamete intrafallopian transfer (GIFT) have made it possible for people with fertility problems to have children. In 1997, almost 3,500 births were the result of assisted conception. This was an increase of 9.3% over the number of assisted-conception births in 1996 (AIHW NPSU: Hurst et al. 1999).

Fertility

The average number of births per woman (the total fertility rate) has been declining in Australia since the peak in 1961 (3.6 babies per woman). This is likely to be due to the greater control women and men now have over reproduction. By 1998, the total fertility rate had dropped to 1.76, below the replacement level of 2.1 babies per woman (Figure 2.11).



Source: ABS Cat. No. 3301.0 (various years).

Figure 2.11: Total fertility rate, Australia, 1921 to 1998

As well, child-bearing is being delayed until later in life. Major declines in the fertility rate over the period 1978 to 1998 occurred among younger women. Births to teenage mothers decreased by 38% over the period, to a rate of 18 births per 1,000 women aged 15–19 years. Over the two decades the fertility rate for women aged 20–24 years declined by 48%, and for women aged 25–29 years by 23%. Conversely, between 1978 and 1998, the fertility rate for women aged 30–34 years increased by 46%, and for women aged 35–39 years by 94% (ABS 1999c).

Changes in fertility are a result of the interaction of many social and economic factors, as well as health factors. These issues are beyond the scope of this report, but are discussed in *Australia's Welfare 1997* (AIHW 1997).

Contraception

Contraception is recognised as a preventive health measure because it offers protection against unwanted pregnancy.

Contraception methods are many and varied, and can be classified as non-surgical or surgical. Non-surgical methods include withdrawal or periodic abstinence (rhythm or natural method), condoms, the contraceptive pill, diaphragm, spermicides, douche, and intra-uterine devices (IUD). Surgical methods are tubal ligation or hysterectomy in women and vasectomy in men. Although the number of vasectomies has remained steady over the past decade, the number of tubal ligations has dropped (Figure 2.12).

The 1995 National Health Survey found that almost 40% of women aged 18–49 years used the oral contraceptive pill, 19% used sterilisation and another 18% used condoms for contraception (ABS 1998d).

Not all contraception methods are infallible. Sterilisation has the lowest failure rate (0.3%), followed by modern reversible methods such as IUD (4.4%) and traditional methods such as periodic abstinence, withdrawal, diaphragm and condoms (16.4%) (Handelsman 1995).

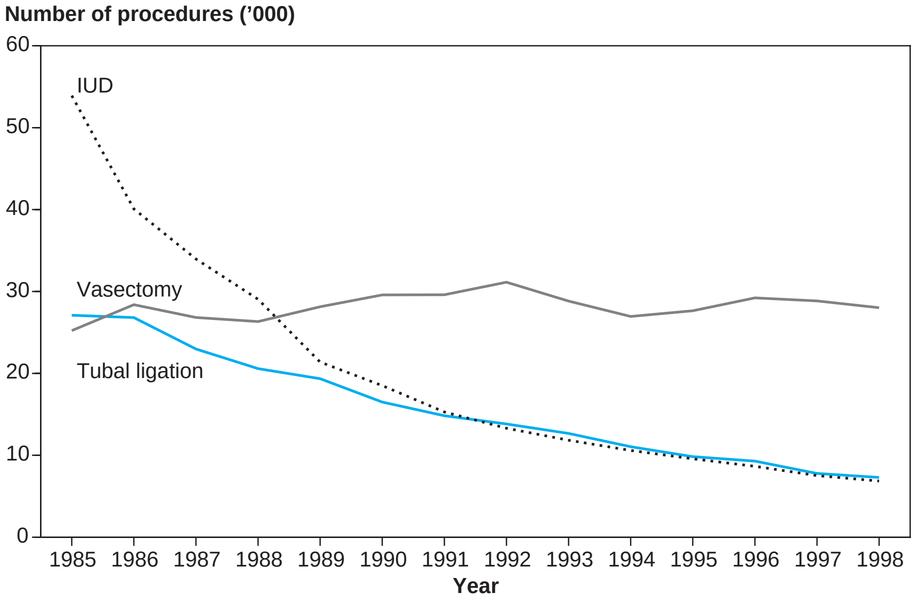
Sexual health status

Sexual health status refers to the health of reproductive organs and problems relating to pregnancy, the prevalence of sexual dysfunction and STDs.

Health of reproductive organs and pregnancy

In 1998–99, the Bettering the Evaluation And Care of Health (BEACH) survey found that female genital system problems accounted for 4.3% of the total number of health issues managed by general practitioners (GPs). Most of these visits were for genital check-ups or Pap smears (28%) and menopausal complaints (24%). Consultations relating to pregnancy and family planning accounted for 2.8% of all health issues managed. Such problems include pre/postnatal check-ups and consultations relating to oral contraception. Male genital system problems accounted for 1% of all health issues managed by GPs.

Statistics on hospital separations provide some information on morbidity related to reproductive organs (both male and female), as well as complications of pregnancy. There were 185,183 separations for diseases or disorders of the female pelvic organs and genital tract (3.3% of all separations), with an average length of stay of about 2 days, in



Source: Commonwealth Department of Health and Aged Care, unpublished data.

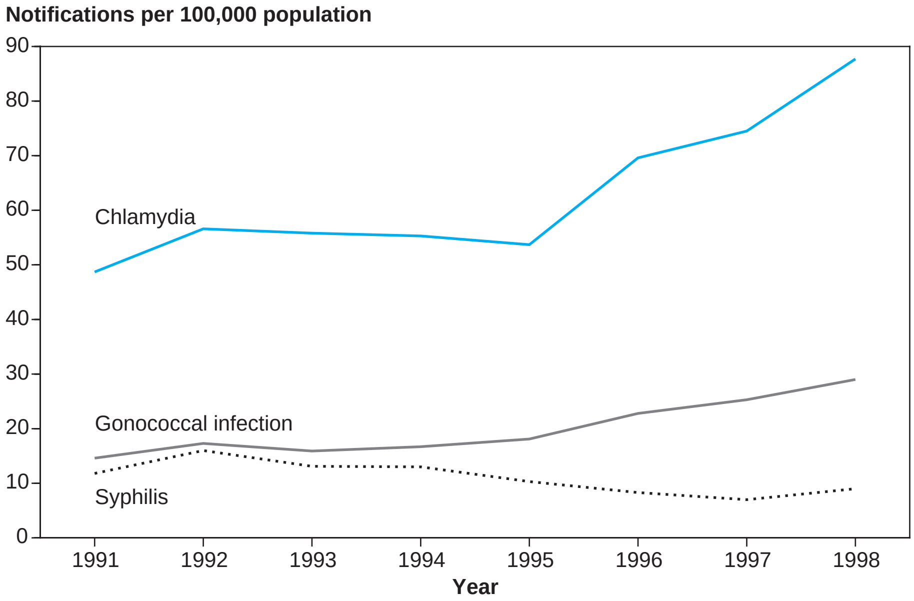
Figure 2.12: Contraceptive medical procedures, 1985 to 1998

1997–98. There were 213,378 separations related to labour and delivery, 135,589 separations due to complications of pregnancy, 9,154 for complications of the puerperium and 76,013 separations for pregnancy with an abortive outcome during that period. Diseases of male genital organs accounted for 45,166 separations and an average length of stay of about 3 days (AIHW 1999b).

Sexually transmitted diseases

Many STDs are notifiable on a national basis, which means that any diagnosis of the disease must be reported to the relevant State/Territory authorities. These reports are then provided to the Commonwealth through the National Notifiable Diseases Surveillance System (NNDSS). The diseases classified as sexually transmissible for surveillance in the NNDSS are chancroid, chlamydial infection, donovanosis, gonococcal infection, lymphogranuloma venereum and syphilis. Trends in the annual number of notifications for chlamydia, gonococcal infection and syphilis are shown in Figure 2.13, page 30. Trends in HIV infection and AIDS are discussed in section 2.5.

Chlamydia is the highest reported STD, and is among the top five notifiable diseases in Australia. In 1998, a total of 11,405 notifications were received for chlamydial infection, a rate of about 88 cases per 100,000 population. The highest prevalence was recorded in the age group 20–24 years, with 60% more notifications for females than males. The



Sources: Herceg et al. 1996; Thomson et al. 1999.

Figure 2.13: Trends in STD notifications, 1991 to 1998

incidence of chlamydia has been increasing over time, with an 80% increase in the rate between 1991 and 1998. However, this increase may reflect increased rates of testing and notification rather than any actual rise in prevalence.

Notifications of gonococcal infection have also increased over this period. In 1998, there were 5,428 notifications of gonococcal infection to NNDSS. The notification rate of 29 per 100,000 was higher than in recent years but still far below the rates recorded in the 1970s and early 1980s (Thomson et al. 1999). Notification rates were the highest among the age groups 15–19 and 20–24 years, and there were 50% more notifications for males than for females.

A total of 1,689 notifications of syphilis were received in 1998, a rate of 9 per 100,000 population. This is a 29% increase in the rate compared with 1997, and a reversal of the underlying trend since 1992.

Other important diseases that are commonly or usually spread by sexual contact include genital herpes, genital warts, trichomaniasis and parasitic infestations such as pubic lice. However, these diseases are not subject to national notification. No information on their incidence is available.

Knowledge

Knowledge about the importance of contraception and protection against STDs is perhaps most important for young adults, because this is the stage when most people become sexually active and some have children. However, note that although having the knowledge is necessary, it does not ensure that an individual will engage in safer sexual practices.

Information on the knowledge that young people have about STDs is available from a nationally representative sample survey of 3,550 students (Year 10 and Year 12) conducted in 1997 by the Centre for the Study of Sexually Transmissible Diseases at La Trobe University. Earlier, in 1992, the National Centre in HIV Social Research had conducted a survey on the issue. The 1997 study found that there has been a shift over the 5 years towards safer sexual practices, with significantly more young people using condoms and having sex with fewer partners than in 1992. The survey also found that condoms were the most common method, but substantial numbers of students were using the pill, with some falsely believing that the pill also protects them against STDs (Lindsay et al. 1997).

Education programs have been successful to the extent that young people are highly informed about the transmission of HIV/AIDS. However, knowledge about other STDs and blood-borne viruses is low. A most disturbing observation is that many students do not see themselves at risk of becoming infected with an STD. A substantial minority of young people continue to engage in high-risk practices such as having unprotected sex with casual partners; it is estimated that 4% never use condoms with casual partners and 28% use them only sometimes (Lindsay et al. 1997).

Immunological health

The immunological health of an individual depends on the body's ability to recognise and effectively counter infection. People cannot survive without a functioning immune system. The immunological mechanisms also contribute to or control a range of other health outcomes. Several primary prevention strategies take advantage of these mechanisms to improve immunological health, both at an individual level and at a population level.

Of the many defences that the human body has against infections, the most basic are those that prevent the entry of micro-organisms into the body. These include the skin and mucous membranes, and the secretions they produce which contain antimicrobial proteins. Despite this, some micro-organisms manage to enter the body either directly through wounds, sexual intercourse, breastfeeding, the placenta and blood transfusion, or indirectly through contaminated food and water, infected insects and animal contact.

Following contact with an infectious micro-organism, the immune system protects the body with an array of defences (see Box 2.3, page 32). The immunity developed following recovery from an infection is known as naturally acquired immunity. This is also known as active immunity, because it depends on an active response by the body's own immune system.

Box 2.3: Development of immunity

The body protects itself against the entry of microscopic organisms with the skin, and with chemicals exuded by the skin and by mucous membranes. If an infectious agent gets past these barriers, it then encounters two cooperative defence mechanisms, non-specific and specific immunity.

Non-specific immunity

Non-specific immunity depends mainly on white cells such as neutrophils and macrophages which are involved in phagocytosis (cell eating), and on natural killer cells which are particularly important in the defence against viruses. The body also possesses a variety of proteins capable of antimicrobial activity such as complements and interferons which assist in the defence process.

Non-specific immune responses often involve an inflammation. An injury to tissue causes chemical signals resulting in an increased flow of blood to the area and increased permeability of the blood vessels, thus allowing phagocytes to leave the blood and enter the infected area. The area around the injury becomes inflamed (hot and red). The pus that is often seen in an infected injury is mainly dead cells and fluid leaked from small blood vessels. An inflammatory response can involve the whole body. In severe infections injured cells emit chemicals which cause the body to produce large numbers of white blood cells. Some white blood cells produce pyrogens, molecules that raise the body's temperature. A moderate fever inhibits the growth of some infectious organisms and speeds up the phagocytic processes described above. However, a very high fever may cause complications.

Specific immunity

The immune system learns how to distinguish between self and non-self early in its development. Each kind of micro-organism, be it a virus, a bacterium, a fungus or a parasite, contains macromolecules known as antigens. The body responds to these antigens in two ways.

The first way is by what is called cellular immunity, in which white blood cells known as T lymphocytes destroy organisms carrying that particular antigen. The second way is by humoral immunity, in which white blood cells known as B lymphocytes produce antibodies. These antibodies bind to the antigen, and neutralise or inactivate the infectious micro-organism. This mechanism also makes it easier for phagocytes (see above) to ingest them. Antibodies defend the body against toxins and free bacteria and viruses found in body fluids, whereas T lymphocytes defend the body against bacteria and viruses living inside human cells as well as against fungi and parasites (Campbell 1993).

Each antigen stimulates the production of a unique, appropriate immune response. In addition, the immune system has a great diversity of lymphocytes and this enables it to respond rapidly to many different types of micro-organisms. Furthermore, as people grow older and over the years become exposed to a wider range of infectious micro-organisms, the immune system develops memory. If the body encounters the same infectious organism again, it is able to produce a quicker and stronger immune response to that antigen. The individual will then suffer only a mild illness or have no symptoms at all. A person who experienced an infection with a certain pathogen but shows no clinical symptoms on renewed exposure to this pathogen is said to be naturally immune to that infection.

Disease protection

The health outcome of an infection is influenced by many factors. These include the ability of the micro-organism to produce disease among those exposed, the level of severity of the disease it causes, the actual number of micro-organisms the person is exposed to, and the level of natural or induced immunity in the host (Beaglehole et al. 1998). An infection does not necessarily lead to illness. The great majority of micro-organisms to which people are exposed cause only mild symptoms or discomfort. There is, however, a minority of organisms, such as those causing measles or cholera, which can lead to severe illness and death if introduced into the body.

The problem with natural immunity as a protection strategy against certain infections is that some or many people will die of the disease caused by the infection. Only those who survive the illness (mild or severe) would have acquired natural immunity. Immunity, however, can be acquired artificially by the use of vaccines made from killed, weakened or only small parts of the microbes that cause infection (Box 2.4, page 34). In this way, a person can become immune to disease-causing micro-organisms without having to suffer illness.

Vaccination, however, is not without its risks. Although rare, some people may have a severe reaction to a vaccination. However, at a population level, the risks of severe and debilitating illness or death from the disease itself if people are not vaccinated are much higher than the risk of an adverse reaction to a vaccine. For example, it is known from experience that 1 in 25 children infected with measles will develop pneumonia and 1 in 2,000 will develop encephalitis (brain inflammation) (NHMRC 1997b). Of the children who develop encephalitis, 10% will die and 40% will suffer permanent brain damage. In addition, about 1 in 25,000 will develop subacute sclerosing panencephalitis (SSPE, brain degeneration), a rare late complication of measles infection that is fatal (Elliott et al. 1999). But for every million children vaccinated against measles, only one child may develop encephalitis as an adverse reaction to the vaccination (NHMRC 1997b).

Immunity in the form of antibodies can also be transferred from one individual to another, and this mechanism is known as passive immunity. This occurs naturally when antibodies pass through the placenta from the mother to the foetus. Although these antibodies last only for a few months, they nevertheless protect the infant against diseases that the mother has been exposed to and possesses antibodies against. This source of antibodies, together with antibodies in breast milk, is important in protecting the infant from infections during the early months of life.

Herd immunity

If a large proportion of individuals in the population is immune to a particular infectious disease, then the general level of immunity in the population becomes sufficiently high to minimise the spread of infections. Even if a small proportion of the population is not immune—i.e. they remain susceptible to the disease—their risk of infection is much reduced because they are less likely to be exposed to the organism and less able to pass it on to others. This outcome is called herd immunity.

Box 2.4: Vaccination

Vaccines are either whole preparations of the infectious or toxic agents that have been killed or modified (attenuated) so that they will not cause the disease, or antigen preparations from an infectious agent that have been purified (subunit vaccines). The immune system may respond to this modified material resulting in immunological memory of that particular organism. This immunity will protect the body on a subsequent encounter with that infectious agent. Active immunisation has contributed to the control of nine major infectious diseases which previously killed large numbers of children and adults: smallpox (completely eradicated), diphtheria, tetanus, yellow fever, pertussis (whooping cough), polio, measles, mumps and rubella (Moxon 1990).

A way of urgently but temporarily protecting against disease is through passive immunisation. Antibodies can be transferred artificially from an individual or animal that has been already vaccinated against the disease to a person who is in danger after being infected. Tetanus in humans can be treated in this way because the infection can develop rapidly and protection from a normal vaccination would take too long. The protection produced by passive immunisation is immediate but lasts only a few weeks.

The protection offered by a vaccine (vaccine efficacy) is measured in clinical trials where one group is given the real vaccine and another group (the control group) is left unvaccinated. Vaccine efficacy is the percentage reduction of the incidence of the disease among the vaccinated compared with the unvaccinated or control group (Giesecke 1994). The term 'vaccinated' refers to those who are injected with the vaccine, whereas 'immunised' refers to those in whom the vaccine actually brought about an immune response (NHMRC 1997b).

It has been possible to develop effective vaccines against many important microbial diseases. Difficulties are encountered in the development of vaccines against several diseases caused by parasites. Some of the obstacles are due to the complex life cycles of protozoan parasites, and others are related to evasion mechanisms of the infectious microbes. These include genetic variability of the organism and variability in the structure of its antigens that would be targets of immune response mechanisms (influenza and HIV). In addition, some parasites mimic host tissues to evade destruction by the immune system.

If everyone or almost everyone in a population is immune or protected against disease, it is possible to eradicate the disease completely. For example, as a result of a large and extensive campaign of vaccination throughout the world, the infectious agent causing smallpox was completely eradicated. An immunisation coverage of 90% to 95% is, however, required to interrupt transmission of highly infectious diseases (Lister et al. 1999).

Herd immunity can be lost if an increasing proportion of the population does not become immune. If a large pool of unprotected individuals exists, they can transmit the infection and an outbreak or epidemic can occur as a result. Since some people either cannot be vaccinated because of their medical condition or decline immunisation perhaps because of their beliefs, it is important that as many people as possible are vaccinated so that the herd immunity is maintained (Box 2.5).

Box 2.5: Immunisation strategies

A knowledge of vaccine potency (efficacy), the duration of its effectiveness, factors influencing the spread of infectious agents within a population and herd immunity all influence immunisation strategies used against different diseases. Strategic issues include the proportion of the population to be vaccinated and the age at which they should be vaccinated. In general, the higher the infectivity of a micro-organism (reproductive potential), the greater the degree of coverage needed to generate and maintain herd immunity.

Other factors taken into account in developing immunisation strategies include the costs and benefits of immunising people and an assessment of the risks if a person becomes infected. For example, diphtheria and pertussis (whooping cough) cause high mortality and serious consequences and only people vaccinated against them are protected. Vaccines against diphtheria and pertussis are safe, highly effective and produce long-lasting immunity. Thus the immunisation strategy for the two diseases is that everyone should be immunised.

In contrast, vaccines against cholera offer only short-term and incomplete protection. Cholera is a serious disease, but in healthy people is rarely fatal, although it can kill children and old people. Cholera is spread by poor sanitation and water supply, uncommon problems in Australia. Cholera immunisation is therefore not routinely recommended in Australia.

Many other diseases present risk to only certain individuals or groups in the population. In Australia, these include meningococcal disease, pneumonia, influenza, hepatitis A, Q fever and tuberculosis (NHMRC 1997b). Vaccination is recommended only for aged people, healthcare workers, people with malfunctioning immune systems and those chronically ill, i.e. people at increased risk of becoming infected or of suffering severe illness if they do.

Other vaccines are used to protect travellers against diseases that they are only likely to come into contact with outside of Australia. These include vaccines against cholera, Japanese encephalitis, typhoid, yellow fever, rabies and bat lyssavirus infections. When Australian travellers are protected against infection, the Australian resident population is also protected because vaccinated travellers are less likely to bring the infections back into the country where they could spread further.

Vaccines used in the standard schedule of immunisation in Australia are diphtheria, tetanus, pertussis, measles, mumps and rubella, polio, Haemophilus influenzae *type B (Hib) and hepatitis B (NHMRC 1997b). All these vaccines are highly effective (range 84% to 100%) (Hall 1998).*

Monitoring immunisation levels

The herd immunity of a population can be monitored in several different ways. The most useful indicator is an assay for antibody levels. This type of information is not currently collected in Australia nationally. Another indicator of herd immunity is the extent of the immunisation coverage. Although Australia has had a childhood immunisation program since the 1920s, information on coverage was less than satisfactory until the establishment of the National Notifiable Disease Surveillance Scheme (NNDSS) in 1991 and the Australian Childhood Immunisation Register (ACIR) in 1996 (Lister et al. 1999).

Before the establishment of ACIR, which collects information directly from providers, the ABS collected information on immunisation coverage by asking parents whether their children had been vaccinated. The most recent ABS data suggest that only 52% of children aged 0–6 years are fully immunised for their age, excluding *Haemophilus influenzae* type B (Hib), 46% are partially immunised and the remaining 2% are either not immunised or their immunisation status is unknown (ABS 1996a). Vaccination coverage also varied by type of vaccine, age, State, socioeconomic status and country of origin.

Reliable ACIR data will not be available until 2001 but preliminary analysis indicates that the ABS surveys probably overestimate the degree of vaccination coverage (McIntyre et al. 1998).

Allergies, auto-immunity and immunodeficiency

High-quality immunological health requires fine regulation of the body's immune system. In certain circumstances, however, the immune system may overreact to certain antigens giving rise to allergies such as asthma. In other cases, and for reasons not yet well understood, the immune system may fail to recognise the difference between the body and the foreign agent, i.e. self and non-self, and react against the body cells leading to a variety of auto-immune diseases. Examples include Type 1 diabetes and rheumatoid arthritis. Lack of effective immune functioning also results from a variety of immunodeficiencies such as AIDS.

There is a growing body of evidence that physical and emotional stress, including depression, can reduce natural immunity (Olff 1999). This can happen either through direct transmission of signals from the nervous system to the immune system, or through hormones produced during stress and during pregnancy which can adversely affect the immune system. It would appear that a sense of wellbeing and security, including good mental health, mediated through the immune system, has beneficial effects for health in general.

Allergies

Allergic reactions can occur to such things as wasp and bee venom, particular drugs, certain foods, plants, dust mites and pets or other animals. These substances are called allergens. For example, hay fever occurs when the immune system reacts to pollen allergens and becomes sensitised. Later exposure to the same allergen will cause a rapid and vigorous immune response that includes the release of histamines and other chemicals. The body's reaction to histamines causes the symptoms of the allergy, sneezing, a runny nose and tears. If a reaction occurs in the tissues of the respiratory tract, it can cause smooth muscle contraction leading to breathing difficulties (Kay & Lessof 1992).

Allergies are also believed to be involved in the development of asthma, an increasingly serious disease in Australia (Robertson et al. 1991). It is possible that allergens play an important role in the sensitisation and persistence of T cell subsets responsible for causing and maintaining the asthmatic condition. These cells occur in the lungs, and continued exposure to allergens results in an immune response that causes the obstruction of airflow in the lungs during an asthma attack (Kay 1997).

The rapid increase in asthma in developed countries has led some experts to suggest that the absence of infections in childhood, due to improved hygiene and effective childhood immunisation, is responsible for the persistence of an early life, immature immune response. This is particularly the case in genetically susceptible individuals (Abramson & Walters 2000).

Auto-immunity

The failure of the immune system to distinguish between self and non-self leads to a variety of auto-immune diseases, including:

- systemic lupus erythmatosus, in which people develop immunity against nucleic acids released by the breakdown of normal cells (Bach & Koutouzov 1997);
- rheumatoid arthritis, a crippling disease in which the immune system attacks the cartilage and bone of joints;
- Type 1 diabetes, which results from the destruction of the insulin-producing cells of the pancreas;
- rheumatic fever, where antibodies against streptococcus also react with heart muscle, damaging heart valves; and
- multiple sclerosis, believed to be caused by auto-immune responses to certain components of the nervous system.

The incidence, prevalence, morbidity and mortality associated with auto-immune diseases are difficult to establish. These diseases may share a common aetiology, but are expressed in a diverse range of illnesses and outcomes. A wide range of information is collected on epidemiological aspects of these diseases, but the degree to which they are classified as auto-immune in administrative collections varies. No consistent categorisation of auto-immune diseases occurs, and this may underestimate their burden on the community.

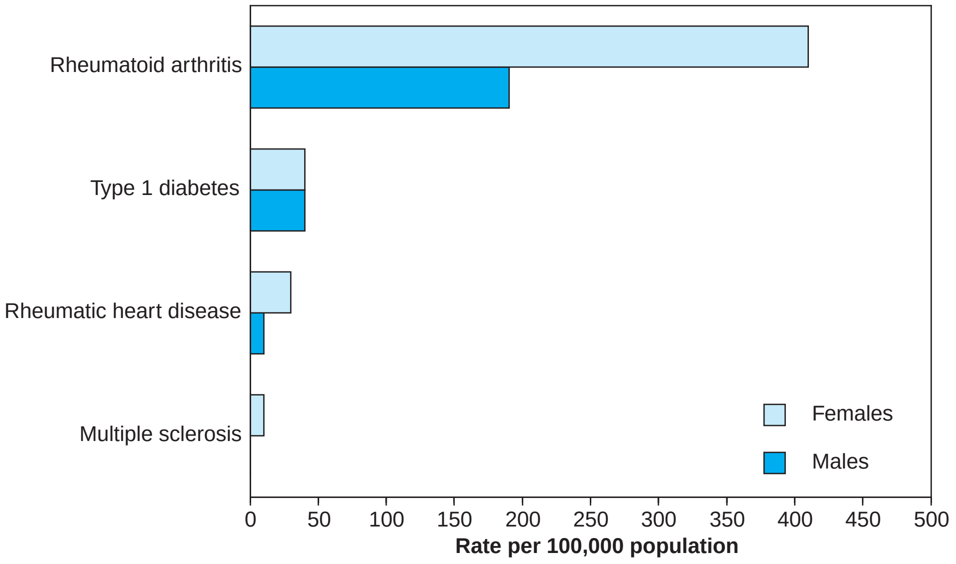
Auto-immune diseases are responsible for significant illness, disability and activity restriction in Australia. A major impact of these diseases is disability rather than premature mortality. With the exception of Type 1 diabetes, auto-immune diseases are more highly prevalent among females than males (Figure 2.14, page 38), and this difference is reflected in hospital separation and mortality statistics (Table 2.2).

Table 2.2: Hospital separations (1997–98) and deaths (1998) for selected diseases and conditions with large auto-immune components

		Hospital separations		Mortality	
Condition	**ICD-9 code(s)**	**Males**	**Females**	**Males**	**Females**
Type 1 diabetes*	250	5,974	5,628	—	—
Rheumatic heart disease	390–398	764	1,308	87	171
Rheumatoid arthritis	714	1,603	4,080	29	106
Multiple sclerosis	340	771	2,224	31	63
Systemic lupus	710.0	208	873	10	44

* Type 1 diabetes is not coded separately in mortality collections.

Sources: AIHW National Morbidity Database and AIHW National Mortality Database.



Sources: AIHW National Morbidity Database; AIHW: Mathers et al. 1999a.

Figure 2.14: Prevalence of selected auto-immune conditions, 1996

Immunodeficiency

Immunodeficiency arises through a variety of mechanisms. Some people are born with defective immune systems. In other cases, cancerous cells may suppress or damage the immune system. Some micro-organisms attack the immune system itself, leaving it unable to protect the body against other micro-organisms. A good example of the latter is infection with HIV, which causes weakness of the immune system leading to AIDS. When damage to the immune system reaches a certain point, cellular immunity collapses and opportunistic infections and diseases such as Kaposi's sarcoma and pneumocystis pneumonia can kill the host.

2.2 Burden of disease and injury

The burden of disease refers to the impact on 'healthy' life of illness, injury, disability and premature mortality. Illnesses and conditions present in Australia are described, including estimates of their incidence and prevalence, using a range of data sources. The section on mortality describes trends in death rates by cause of death and identifies the contributions made by major diseases. A further section presents the results of the Australian Burden of Disease and Injury Study which combined information from various aspects of disease and injury into a single measure, disability-adjusted life years (DALYs).

Mortality

This section describes the patterns of mortality in the Australian population in terms of rate and cause of death, by age and sex. Trends in death rates over the period 1921 to 1998 are also described. Mortality differentials by socioeconomic status, country of birth, ethnicity and remoteness are discussed in chapter 4.

Box 2.6: Comparing death rates

Statistics relating to deaths are easily presented as crude death rates, i.e. the number of deaths in a year divided by the number of individuals in the corresponding population. For example, the crude death rate in Australia in 1998 was 680 deaths per 100,000 population.

However, since the risk of dying varies greatly with age and sex, even minor variations in the age and sex structure of a population may affect crude death rates. This makes comparisons between different populations and analysis of time trends in the same population erroneous. One way around this difficulty is to compare age-specific death rates, i.e. mortality at particular ages for each sex, but this entails a separate comparison or analysis for each age group. Interpopulation or temporal variations in age structure, however, can be adjusted by a simple statistical procedure called age standardisation.

In this report, unless otherwise specified, death rates have been directly age standardised to the Australian population as at 30 June 1991 (ABS 1993b). Both AIHW and ABS have agreed to adopt this as the national standard until population estimates for 30 June 2001 become available. The population at 30 June 1991 was the standard used in the 1996 and 1998 editions of Australia's Health, *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 cannot be directly compared with those in the 1992 and 1994 editions.*

The major causes of death are typically coded according to the International Classification of Diseases (ICD) system, Version 9 (WHO 1977). The ICD-9 classification categorises diseases into sixteen broad groupings or chapters on the basis of type of condition or body system. Causes of death can be further disaggregated either on the basis of similar disease aetiology (e.g. infectious diseases or cancers), or into specific disease entities (e.g. tuberculosis, breast cancer or AIDS).

Mortality patterns

In 1998, there were 127,194 deaths recorded in Australia, consisting of 67,066 male deaths (758 per 100,000) and 60,128 female deaths (468 per 100,000). Deaths of persons aged 70 years and over accounted for 70% of all deaths, 20% occurred at ages 50–69 years, 8% at ages 20–49 years, and 2% at ages less than 20 years.

Major causes of death by life stage

The major causes of death in various age groups in 1998 were as follows:

- The main underlying causes of deaths in infants (those aged less than 1 year) were congenital anomalies, respiratory conditions and sudden infant death syndrome (SIDS) (also see section 4.1).

- In children aged between 1 and 14 years, motor vehicle traffic accidents, congenital abnormalities, leukaemia and drowning were the most frequent underlying causes of death.
- Among those aged 15–24 years, deaths from motor vehicle accidents, suicide and drug dependence were the most common.
- Suicide, motor vehicle accidents, ischaemic heart disease (IHD), deaths due to the use and abuse of drugs of dependence, and breast cancer (in females) were the major causes of death among those aged 25–44 years.
- Among those aged 50 years and over, the most common causes of death were generally the same as for the total population—IHD, cerebrovascular disease or stroke, lung cancer, bowel cancer, cancer of the breast (females) and chronic obstructive pulmonary disease (COPD).

Trends in major causes of death, 1921 to 1998

In 1998, seven major causes of death stood out when ranked by the number of deaths. These were: IHD, cerebrovascular disease or stroke, lung cancer, colorectal cancer, COPD, and breast and prostate cancers (Table 2.3). Trends in death rates for these major underlying causes over the period 1921 to 1998 are shown in Figures 2.15 and 2.16, page 41.

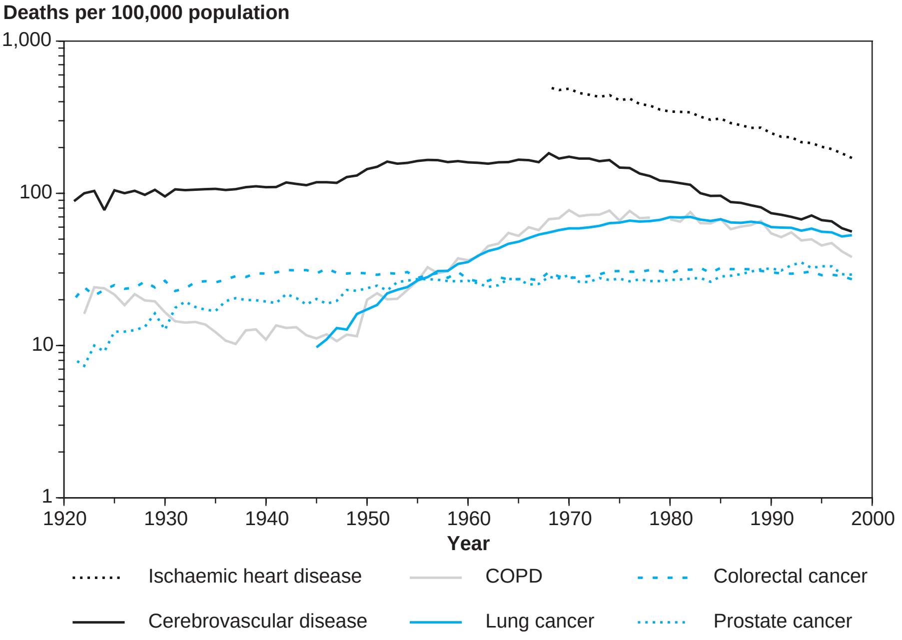
Table 2.3: Leading causes of death by number of deaths and sex, 1998

Males			Females		
Cause of death		No.	Cause of death		No.
1	Ischaemic heart disease (410–414)	15,021	1	Ischaemic heart disease (410–414)	12,801
2	Lung cancer (162)	4,821	2	Cerebrovascular disease (430–438)	7,170
3	Cerebrovascular disease (430–438)	4,812	3	Dementia and related disorders (290, 294.1, 331)(a)	2,579
4	Chronic obstructive pulmonary disease (416.0, .8, .9, 490–492, 495–496)	3,325	4	Breast cancer (174)	2,542
5	Colorectal cancer (153, 154)	2,579	5	Colorectal cancer (153, 154)	2,165
6	Prostate cancer (185)	2,530	6	Lung cancer (162)	2,053
7	Suicide (950–959)	2,150	7	Chronic obstructive pulmonary disease (416.0, .8, .9, 490–492, 495–496)	2,026
8	Cancer of lymphatic tissue (200–208)	1,870	8	Cancer of lymphatic tissue (200–208)	1,600
9	Diabetes (250)	1,424	9	Diabetes (250)	1,327
10	Dementia and related disorders (290, 294.1, 331)(a)	1,294	10	Pneumonia (480–486)(a)	937

(a) Data are for 1996, as data for 1997 and 1998 are not comparable with previous years following the introduction of automatic coding by the Australian Bureau of Statistics in 1997.

Note: Codes refer to the International Classification of Diseases, 9th revision (ICD-9).

Source: AIHW National Mortality Database.



Notes

1. The time series for ischaemic heart disease begins in 1968 due to coding changes between the ICD-8 and previous versions of the ICD.
2. The time series for chronic obstructive pulmonary disease (COPD) breaks at 1979 due to coding changes between the ICD-9 and previous versions of the ICD.

Source: AIHW National Mortality Database.

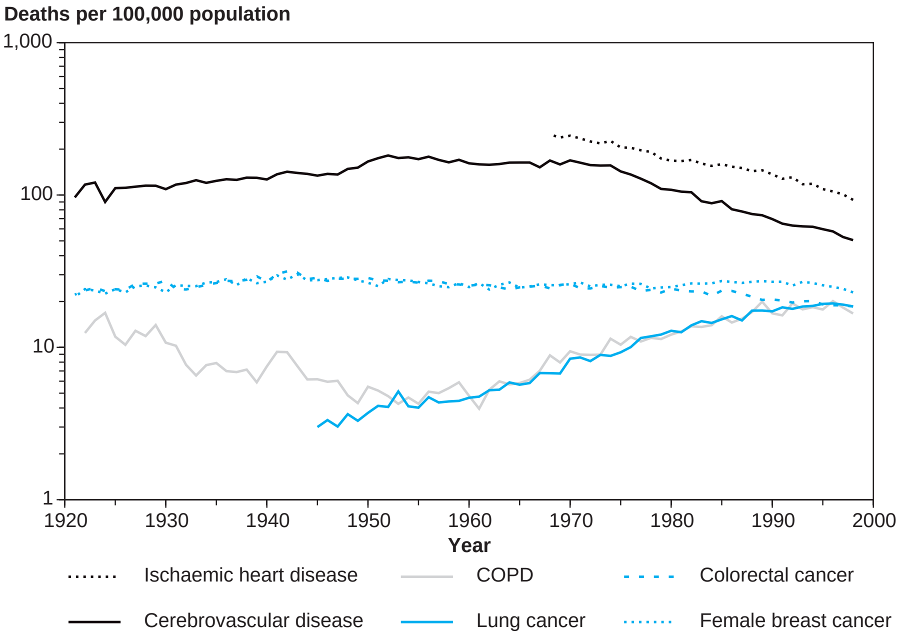
Figure 2.15: Trends in major causes of death, males, 1921 to 1998

Ischaemic heart disease is the biggest cause of death in Australia. In 1998, there were 171 deaths per 100,000 males and 93 deaths per 100,000 females with IHD as the underlying cause of death.

IHD death rates climbed steadily from 1940 to 1968 (AIHW: d'Espaignet 1993). Since then, the rates have declined steadily, by 3.6% in males and 3.0% in females per annum. The decline has been steeper over the past 5 years (1994 to 1998), with death rates declining annually by 5.4% in males and 5.5% in females.

The reduction in IHD death rates is believed to be due mainly to prevention, notably:

- reduction in the prevalence of smoking
- control of blood pressure
- reduction of saturated fats in the diet
- improved management of the disease including the use of anti-hypertensive drugs and medical interventions.



Notes

1. The time series for ischaemic heart disease begins in 1968 due to coding changes between the ICD-8 and previous versions of the ICD.
2. The time series for chronic obstructive pulmonary disease (COPD) breaks at 1979 due to coding changes between the ICD-9 and previous versions of the ICD.

Source: AIHW National Mortality Database.

Figure 2.16: Trends in major causes of death, females, 1921 to 1998

Cerebrovascular disease or stroke is the second biggest underlying cause of death, with 56 deaths per 100,000 males and 51 deaths per 100,000 females in 1998.

Death rates for stroke increased over the first half of the century, but began to slow down between 1950 and 1970. The rate peaked in the early 1950s in females, and in the late 1960s in males. Since 1970, death rates for stroke have declined annually by over 4.6% in males and 4.9% in females. As with IHD, changes in lifestyle and improvements in the management of the disease are considered to have contributed to the decline in these death rates.

Lung cancer is the leading cause of cancer deaths in Australia, with 53 deaths per 100,000 males and 19 deaths per 100,000 females in 1998.

Between 1940 (when lung cancer was identified as a specific cause of death) and 1982, the death rate for lung cancer in males increased steadily. The rate has since declined, 1.7% annually, with a more rapid decline over the 5-year period commencing in 1993. The death rate for lung cancer in females also increased during 1940 to 1967, but at a rate lower than that in males. But, unlike males, the overall death rate for lung cancer in females has continued to rise, more steeply in the period 1967 to 1993. However, since 1993, the death rate for lung cancer in females has been relatively stable, albeit decreasing slowly at a rate of 0.3% per annum.

The main risk factor for lung cancer is tobacco smoking, which is considered to be responsible for over 85% of lung cancer deaths (DHFS & AIHW 1998a). Lung cancer can take up to 20 years to develop, and given this timelag, the overall trend in lung cancer death rates in Australia follows the trend in tobacco smoking 20 years earlier. There has been a definite decline in the prevalence of tobacco smoking since the mid-1970s (AIHW: Waters & Bennett 1995). This decline has been more substantial in males than in females, but the underlying trend may now be plateauing (Hill et al. 1998).

Colorectal cancer is the second most common cause of cancer deaths, with rates of 29 per 100,000 males and 20 per 100,000 females in 1998.

Colorectal cancer death rates have fluctuated over the last several decades. The rates increased slightly, in both sexes, from 1921 until the early 1940s. However, the death rate in males decreased from 1940 until the mid-1960s, before increasing again until the early 1980s. During the period 1942 to 1998, the death rate decreased by 0.8% per annum for males, and by 0.7% per annum for females. However, since 1993, the death rate for colorectal cancer has been decreasing at faster rates, 2.5% per annum in males and 1.8% in females.

The decrease in colorectal cancer death rates has resulted from a combination of factors: reductions in disease risk through improved diet (less fat, more cereals and vegetables, reduced alcohol consumption), more timely diagnosis (faecal occult blood tests and colonoscopy) and improved clinical management (Ireland & Giles 1993).

Breast cancer is the fourth leading cause of cancer deaths, and the most common cause of cancer deaths among females. In 1998, there were about 23 deaths per 100,000 females.

The death rate for breast cancer peaked in the early 1940s, having increased slowly since 1921. Between 1940 and 1950 the rate decreased, but between the 1950s and mid-1980s it remained relatively stable. From 1985 to 1998, the overall rate declined by 1.0% per annum. Since 1993, the decline has been more pronounced, at 3.3% per annum. The death rate for breast cancer is expected to continue declining over the next 10 to 20 years.

Prostate cancer is a major cause of death in older men, with 83% of the prostate cancer deaths occurring in males over the age of 70. In 1998, the death rate for prostate cancer was 29 per 100,000 males.

Since 1921, the death rate for prostate cancer has been increasing slowly. The early 1990s saw a high rise in the death rate for prostate cancer, with some of this increase attributed to improved diagnosis. However, over the past 5 years to 1998 the rate has been decreasing by 4.5% per annum.

Chronic obstructive pulmonary disease is a major cause of death, reflecting long-term damage to the respiratory system. Chronic bronchitis and emphysema are the two main diseases included in this group, usually caused by, or related to, smoking. In 1998, there were about 38 deaths per 100,000 males and 17 deaths per 100,000 females with COPD as the underlying cause.

Death rates for COPD have followed a pattern similar to those for deaths from lung cancer in both males and females. COPD death rates in males increased steadily from the early 1950s, peaking in 1970. In the period 1970 to 1998, the male death rate declined by 1.9% per annum, and since 1993 the decline has been 6.0% per annum. In females, the overall COPD death rate increased between 1960 and 1998, at almost 4.5% per annum. Since 1996, however, there has been little decline in the COPD death rate among females.

Multiple causes of death

Use of mortality data in understanding disease processes has been limited until recently by having information on only the single underlying cause of death. However, since 1997 the ABS has been coding multiple causes of death information from death certificates. In 1998, more than one cause of death was listed on 71.5% of death certificates. In more than a half of these deaths, at least three causes of death were listed.

This additional information is potentially very useful for understanding, through disease-association and co-morbidity studies, the role of various factors contributing to death. For example, of the 15,024 male deaths in 1998 with IHD as the stated underlying cause of death, IHD was recorded as the sole cause of death in only 13% of cases. Heart failure was listed as an additional cause of death in 16.5% of cases with IHD as the underlying cause of death and hypertensive disease in 14.1% of cases. Another common cause of death associated with IHD deaths was diabetes (9.1%). There were similar associations for IHD deaths in females (Table 2.4).

Table 2.4: Additional causes of death associated with ischaemic heart disease as the underlying cause of death, 1998

		Males		Females	
Cause of death	**Additional cause of death**	**Number**	**Per cent**	**Number**	**Per cent**
Reported alone		1,958	13.03	1,239	9.68
Reported with	Cancer	1,035	6.89	538	4.20
	Diabetes	1,366	9.09	1,130	8.83
	Hypertensive disease	2,117	14.09	2,342	18.30
	Heart failure	2,480	16.51	2,927	22.87
	Cerebrovascular disease	1,097	7.30	1,184	9.25
	Diseases of blood vessels	1,543	10.27	1,234	9.64
	Pneumonia and influenza	573	3.81	541	4.23
	Chronic obstructive pulmonary disease	1,716	11.42	1,037	8.10
	Nephritis	1,018	6.78	798	6.23
Total deaths		**15,024**		**12,801**	

Source: ABS 1999a.

Illness, morbidity and health conditions

This section provides a brief overview of the incidence and prevalence of the most common illnesses (morbidity) and health conditions in Australia. Information from several different sources, including population surveys, GP visits and hospital separations, can be used to generate a profile of the extent of illness in the community. The prevalence of illness in the population, as determined by the National Health

Surveys (NHS), is briefly described below. Profiles of illness and morbidity, based on general practitioner (GP) visits and hospital separations, are described in chapter 5. For more details on actions taken in response to ill health, based on 1995 NHS data, see *Australia's Health 1998*.

The scale of the problem

About 85% of Australians report having an illness or condition either as a recent illness in the previous 2 weeks or as a long-term condition. Three out of four persons also take some form of health action in relation to their health in any 2-week period, with about 60% taking some form of medication other than vitamins and minerals and approximately one out of five consulting a doctor (ABS 1997b). In addition, some 9% of the employed population report taking days off work due to illness, most commonly for respiratory illnesses such as influenza, in any 2-week period (ABS 1997b).

These figures may suggest that a large proportion of the Australian population does not enjoy 'full health' at all times. However, while many chronic or more serious conditions are reported, these figures also include minor and temporary conditions, as well as conditions under control.

Recent and long-term conditions

According to the 1995 NHS, 65% of males and 73% of females reported experiencing one or more recent illnesses. Diseases of the respiratory system were the most common recent illnesses, reported by 22% of the population in 1995. The most frequently reported respiratory conditions were asthma, the common cold and influenza. Other commonly reported recent illnesses were headaches (13%), diseases of the circulatory system (12%), and diseases of the digestive system (11%).

Around three-quarters of the population (73% of males, 76% of females) reported having one or more long-term health conditions (conditions experienced for 6 months or more). Sight conditions were the most common long-term conditions reported; for example, 21% were far-sighted, 20% were short-sighted, and 14% had other sight disorders of refraction and accommodation. Other commonly reported long-term conditions were arthritis (15%), hay fever (14%), asthma (11%) and hypertension (10%).

Disease incidence and prevalence

The Australian Burden of Disease and Injury Study has produced comprehensive estimates of incidence, prevalence and average duration for a large number of diseases and injuries and their disabling effects for Australians in 1996 (AIHW: Mathers et al. 1999a). The estimates synthesise the available information from the most appropriate sources for each condition.

Table 2.5 (page 46) contains estimates of the total number of prevalent cases of the most common diseases and injuries in Australia for 1996. Dental caries (tooth decay) was estimated to be the most common health problem in Australia, with an average of almost one decayed tooth per person at any one point of time. The next most common problem was hearing loss; nearly 17% of the population are estimated to have hearing loss of a level sufficient to cause problems in conversations with more than one person. Edentulism or total tooth loss (nearly 8% of the population) and asthma (with a prevalence of nearly 7%) were the other major problems.

Table 2.5: Most prevalent health conditions, 1996

		Prevalence[b]			
	Condition[a]	**Persons**	**Males**	**Females**	**Prevalence (%)**
1	Dental caries[c]	19,014,000	9,567,000	9,447,000	—
2	Hearing loss	3,088,300	2,245,800	842,500	16.9
3	Edentulism	1,396,700	392,400	1,004,300	7.6
4	Asthma	1,206,100	533,900	672,200	6.6
5	Periodontal disease[d]	1,027,200	494,700	532,500	5.6
6	Iron-deficiency anaemia	769,400	275,800	493,600	4.2
7	Alcohol dependence & harmful use	727,800	538,500	189,300	4.0
8	Osteoarthritis	625,000	241,500	383,500	3.4
9	Chronic back pain	585,800	300,500	285,300	3.2
10	Depression[e]	538,000	163,900	374,100	2.9
11	Type 2 diabetes	469,400	247,400	222,000	2.6
12	Slipped disc[f]	340,100	214,000	126,100	1.9
13	Urinary incontinence[g]	307,200	50,200	257,000	1.7
14	Chronic obstructive pulmonary disease	296,600	177,100	119,500	1.6
15	Social phobia[h]	291,100	130,000	161,100	1.6
16	Generalised anxiety disorder[h]	285,600	106,100	179,500	1.6
17	Fires/burns/scalds[i]	231,200	154,000	77,200	1.3
18	Benign prostatic hypertrophy[j]	195,400	195,400	—	1.1
19	Peptic ulcer disease	174,100	78,700	95,400	1.0
20	Attention-deficit disorder	173,200	125,200	48,000	0.9
21	Cannabis dependence/abuse	171,000	128,700	42,300	0.9
22	Cataracts	168,800	48,400	120,400	0.9
23	Angina pectoris	168,100	90,500	77,600	0.9
24	Osteoporosis	155,200	29,100	126,100	0.8
25	Bipolar affective disorder	133,400	67,900	65,500	0.7

(a) Prevalence has not been estimated for infectious diseases (apart from HIV/AIDS) or for cancers, congenital anomalies and maternal conditions related to pregnancy and childbirth. These diseases are not included in the rankings, but would not appear in the top 25 prevalent conditions.

(b) Prevalent cases of disease or injury, except where otherwise specified. Some prevalence estimates are derived from modelling of incidence and duration and assume a stationary population with no trends in incidence rates or average duration. All prevalence estimates rounded to nearest 100.

(c) Prevalence estimates relate to total decayed teeth (excluding missing and filled teeth), not to people with decayed teeth.

(d) Periodontal disease with pockets 6 mm or more deep.

(e) Prevalence estimates relate to people with dysthymia or experiencing a major depressive episode in the 12-month period of 1996.

(f) Prevalence refers to number of people with chronic conditions.

(g) Moderate and severe urinary incontinence (leaking urine occurring ‘often’) not due to neurological disorders, stroke, prostate problems or other diseases or injury.

(h) People experiencing symptomatic episodes in the 12-month period of 1996.

(i) Prevalence estimates include only people with long-term effects of injuries.

(j) Symptomatic benign prostate enlargement resulting in treatment.

Source: Australian Burden of Disease and Injury Study.

Table 2.6: Most common new health conditions, 1996

	Condition[a]	Incidence[b]			Incidence per
		Persons	Males	Females	1,000 population
1	Upper respiratory tract infections	43,399,200	20,794,600	22,604,600	2,370
2	Dental caries[c]	10,877,800	5,432,300	5,445,500	594
3	Chronic back pain	6,035,300	3,141,100	2,894,200	330
4	Diarrhoeal diseases	3,754,200	1,863,400	1,890,800	205
5	Lower respiratory tract infections	3,480,200	1,589,100	1,891,100	190
6	Otitis media	1,018,500	478,200	540,300	56
7	Periodontal disease[d]	399,700	195,300	204,400	22
8	Depression[e]	376,700	115,400	261,300	21
9	Falls[f]	359,141	175,070	184,071	20
10	Non-melanoma skin cancers	282,825	167,751	115,074	15
11	Alcohol dependence & harmful use	161,482	120,162	41,320	9
12	Peptic ulcer disease	156,045	73,199	82,846	9
13	Slipped disc[g]	143,489	83,769	59,720	8
14	Hearing loss	111,484	70,212	41,272	6
15	Menstrual problems[h]	106,952	—	106,952	6
16	Road traffic accidents[f]	88,139	54,711	33,428	5
17	Diverticulitis[i]	77,117	34,676	42,441	4
18	Separation anxiety disorder	73,199	37,505	35,694	4
19	Sports injuries[f]	70,732	52,157	18,575	4
20	Asthma	69,434	32,048	37,386	4
21	Gall bladder and bile duct disease[i]	66,132	21,309	44,823	4
22	Stroke	57,244	26,488	30,756	3
23	Benign prostatic hypertrophy[j]	53,752	53,752	—	3
24	Interpersonal violence[f]	47,585	36,343	11,242	3
25	Angina pectoris	44,548	28,468	16,080	2

(a) Incidence of iron-deficiency anaemia has not been estimated.

(b) Incident (new) cases of disease or injury occurring in Australia in 1996, except where otherwise specified. Some incidence estimates are derived from modelling of prevalence, case-fatality and remission rates and assume a stationary population with no trends in incidence, remission and case-fatality rates. Incidence estimates rounded to nearest 100.

(c) Incidence estimates relate to decayed teeth (excluding missing and filled teeth), not to people with decayed teeth.

(d) Periodontal disease with pockets 6 mm or more deep.

(e) Incidence estimates relate to number of major depressive episodes in the 12-month period of 1996, together with number of new cases of dysthymia (not resulting in a major depressive episode in 1996).

(f) New cases of injury requiring hospitalisation or attendance at a hospital emergency department.

(g) Total episodes of intervertebral disc disorders in 1996.

(h) Based on self-reported episodes of menstrual problems in the 1995 National Health Survey.

(i) Incidence estimated from hospitalisation data for Australia.

(j) Symptomatic benign prostate enlargement resulting in treatment.

Source: Australian Burden of Disease and Injury Study.

Table 2.6 contains estimates of the total number of new cases of the most common diseases and injuries occurring in Australia in 1996. The condition with the highest incidence was upper respiratory tract infection (colds, acute sinusitis, tonsillitis, etc.).

This was followed by dental caries and then chronic back pain, with an estimated 6 million new episodes per year. There were around 3.8 million new episodes of diarrhoeal disease per year, or around one for every five Australians.

Disability

Disability is defined by the ABS as the presence of one or more of 17 'restrictions, limitations or impairments' (Box 2.7). According to the ABS Survey of Disability, Ageing and Carers, about 3.6 million people reported disability in 1998, a prevalence rate of 19.3% (Table 2.7). Almost 80% of people with a disability, or over 2.8 million people, reported core activity restrictions in 1998 (ABS 1999b). The extent of disability is described in *Australia's Welfare 1999* (AIHW 1999a).

Expected years of life with disability and core activity restriction

Based on 1998 mortality data, the life expectancy is 75.9 years for Australian males and 81.5 years for Australian females. Only 57.5 (76%) and 63.3 (78%) of those years are expected to be disability-free. In terms of profound and severe core activity restriction, it is estimated that 5.2 male life years and 7.6 female life years will be affected (AIHW unpublished data).

Table 2.7: Prevalence of disability (numbers and rates), by disability status, severity of core activity restriction and sex, 1998

	Profound core activity restriction	Severe core activity restriction	Moderate core activity restriction	Mild core activity restriction	Schooling or employment restriction only	Total with specific restrictions	Without specific restrictions	Total with disability
					Number ('000)			
Males	218.8	286.6	338.6	534.3	188.4	1,566.7	254.4	1,821.1
Females	318.9	311.6	321.7	497.5	139.5	1,589.2	200.0	1,789.2
Persons	537.7	598.2	660.3	1,031.8	327.9	3,155.9	454.4	3,610.3
					Percentage			
Males	2.4	3.1	3.6	5.8	2.3	16.9	2.7	19.6
Females	3.4	3.3	3.4	5.3	1.7	16.9	2.2	19.1
Persons	2.9	3.2	3.5	5.5	2.0	16.9	2.4	19.3

Sources: ABS 1999b:14; AIHW 1999a.

Australian Burden of Disease and Injury Study

So far, this chapter has looked at mortality, morbidity and disability in Australia, using death rates, indicators of disease incidence and prevalence, and core activity restrictions, each presented separately. This section presents a means of bringing these isolated indicators together to present a summary view of the 'burden of disease'.

The Global Burden of Disease Study has developed a new summary measure of population health, the disability-adjusted life year or DALY, that combines information on the impact of premature death and of disability and other non-fatal health outcomes (Murray & Lopez 1996) (see Box 2.8, page 50). This measure was used to provide a comprehensive assessment of the global burden of disease and injury for the World

Bank (World Bank 1993), and to provide a basis for global priority-setting for health research (Ad Hoc Committee on Health Research Relating to Future Intervention Options 1996). The method has subsequently been adopted by the World Health Organization as a tool to assist global health planning.

Box 2.7: Defining disability

According to the 1998 Survey of Disability, Ageing and Carers (ABS 1999b), a person is classified as having a disability if he or she reports any of the following limitations, restrictions or impairments that have lasted or are likely to last for 6 months or more:

- *loss of sight, not corrected by glasses or contact lenses*
- *loss of hearing, with difficulty communicating or use of aids*
- *loss of speech*
- *chronic or recurring pain that restricts everyday activities*
- *shortness of breath or breathing difficulties that restrict everyday activities*
- *blackouts, fits, or loss of consciousness*
- *difficulty learning or understanding*
- *incomplete use of arms or fingers*
- *difficulty gripping or holding things*
- *incomplete use of feet or legs*
- *a nervous or emotional condition that restricts everyday activities*
- *restriction in physical activities or physical work*
- *disfigurement or deformity*
- *head injury, stroke or any other brain damage with long-term effects that restrict everyday activities*
- *needing help or supervision because of a mental illness or condition*
- *treatment or medication for any other long-term condition or ailment and still restricted*
- *any other long-term condition that restricts everyday activities.*

The 1998 survey identified five 'specific restrictions': restrictions in the three 'core' activities of daily living (self-care, mobility and communication), and restrictions in schooling and employment.

Severity of core activity restriction was classified into four levels: mild (no difficulty performing a core activity but using aids or equipment), moderate (not needing assistance, but having difficulty), severe (sometimes needing assistance to perform a core activity) and profound (unable to perform a core activity or always needing assistance).

Box 2.8: Disability-adjusted life year (DALY)

The DALY is a summary measure of population health that combines information on mortality and non-fatal health outcomes. It was originally developed as part of the 1990 World Health Organization and World Bank Global Burden of Disease Study and has been adapted by the Australian Institute of Health and Welfare for the Australian context. In common with most summary health measures, the DALY uses time as a common 'currency'. It is a measure of the years of healthy life lost due to illness or injury – one DALY is one lost year of 'healthy' life.

DALYs are calculated as the sum of years of life lost due to premature mortality (YLL) and the equivalent years of 'healthy' life lost due to poor health or disability (YLD). YLL are calculated for each death as the average life expectancy of a person of the same age as the person who died. Thus, unlike most measures of potential years of life lost, YLL do not exclude deaths above a specified age or years of life lost above that age. The YLL quoted in this report are based on the projected average life expectancies for Australians alive in 1996.

YLD are calculated for a given condition by estimating the number of new cases of that condition in a specified time. For each new case, the YLD is obtained by multiplying the average duration of the condition (to remission or death) by a severity weight that quantifies the equivalent loss of healthy years of life due to living with the condition. The DALY value is then the sum of the YLL and the YLD.

The severity weights are derived to quantify societal preferences for health states. There are no comprehensive Australian measurements of such weights. The YLD quoted in this report are based on weights from a combination of sources. Where possible, the weights are taken from a Dutch study of selected diseases of public health importance (Stouthard et al. 1997). Where the Dutch weights are not available, the weights are taken from the 1990 Global Burden of Disease Study. Where these are not available, provisional weights were estimated using regression analysis based on the Dutch study results. The weights used in this study should be regarded as provisional pending the development of internationally accepted standard weights or suitable Australian weights.

An annual discount rate of 3% is applied in calculating both the YLL and YLD. With this discount rate, a year of healthy life gained in 10 years time is worth 24% less than one gained now. For example, a male infant death would result in 81 YLL without discounting, because this is the average male life expectancy at that age. The same death would result in 30 YLL with discounting. All YLL, YLD and DALY figures presented in this report are based on new cases of disease and injury and deaths occurring in the calendar year 1996 and include discounting.

The AIHW has carried out a comprehensive study of the burden of disease in Australia for the reference year 1996. This study adapted the DALY measure for the Australian context and calculated the disease burden for a comprehensive set of 176 disease and injury categories.

This section provides an overview of the burden of disease and injury in Australia using this statistic. More detailed results are given in two AIHW reports on the Australian Burden of Disease and Injury Study (AIHW: Mathers et al. 1999a, 1999b).

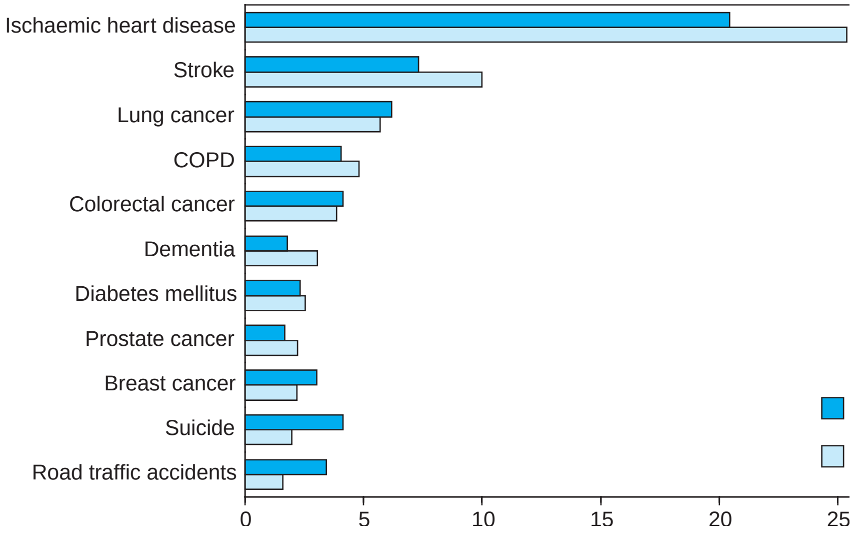
The burden of disease associated with each of the National Health Priority Areas is described in section 2.3. The disease and injury burden in Australia attributable to major risk factors is described in chapter 3. Socioeconomic differentials and sex differentials in disease and injury burden are described in chapter 4.

The burden of premature mortality—YLL

In 1996, premature mortality was responsible for 1.35 million years of life lost (YLL) (discounted at 3% per annum) in Australia. Males lost 26% more years of life than females. If male YLL are calculated using the cohort life expectancies for females (so that there is no male–female difference in years of life lost due to a death at a given age), then the male excess mortality burden is 43%.

Cardiovascular diseases, cancers and injury were responsible for 72% of the total YLL in both males and females. In people aged 75 years and over, cardiovascular diseases accounted for more than half the YLL, whereas cancers were a more important cause than cardiovascular diseases for all ages below 75. Injuries were the main cause of lost years of life in young adults and children aged 5–14 years, and neonatal conditions the main cause in children aged under 5.

Ischaemic heart disease (IHD) was by far the largest cause of YLL in Australia in 1996 (see Figure 2.17). IHD was followed by stroke and breast cancer in females, and by lung cancer and suicide in males. Heroin overdose deaths were in the top 20 causes of YLL for males, resulting in almost as many years of life lost as HIV/AIDS or leukaemia.



Source: Australian Burden of Disease and Injury Study.

Figure 2.17: Distribution of mortality burden (YLL) and deaths for leading causes, 1996

Because YLL give greater weight to deaths at younger ages, causes such as breast cancer, suicide and road traffic accidents claim a higher proportion of the premature mortality burden than of the total number of deaths (Figure 2.17).

Trends in mortality burden, 1981 to 1996

There have been substantial declines in the mortality burden of cardiovascular diseases, road traffic accidents, low birthweight, and stomach cancer, for both males and females, over the last two decades. Overall, the age-adjusted mortality burden in Australia has declined by 27% in the 15 years between 1981 and 1996 alone.

The burden of smoking-related diseases has decreased in males but increased substantially in females. Between 1981 and 1996, the per person mortality burden for lung cancer and chronic obstructive pulmonary disease (COPD) decreased by 15% and 16% respectively for males, but increased by 62% and 70% respectively for females.

The largest increases in YLL have occurred for HIV/AIDS, suicide and prostate cancer in males, for senile dementias and heroin dependence and abuse in both sexes, and for lung cancer and COPD in females. HIV/AIDS mortality peaked in 1989, and has dropped dramatically since. The large apparent increase in YLL for dementia is likely to be partly due to changes in coding practice that have led to increased identification of dementia as an underlying cause of death.

Leading causes of the disability burden—YLD

The non-fatal component of the disease burden presents a substantially different picture from that provided by traditional mortality statistics. Figure 2.18 shows the contributions for the major disease groups and injury to the total non-fatal burden of disease and injury in Australia in 1996.

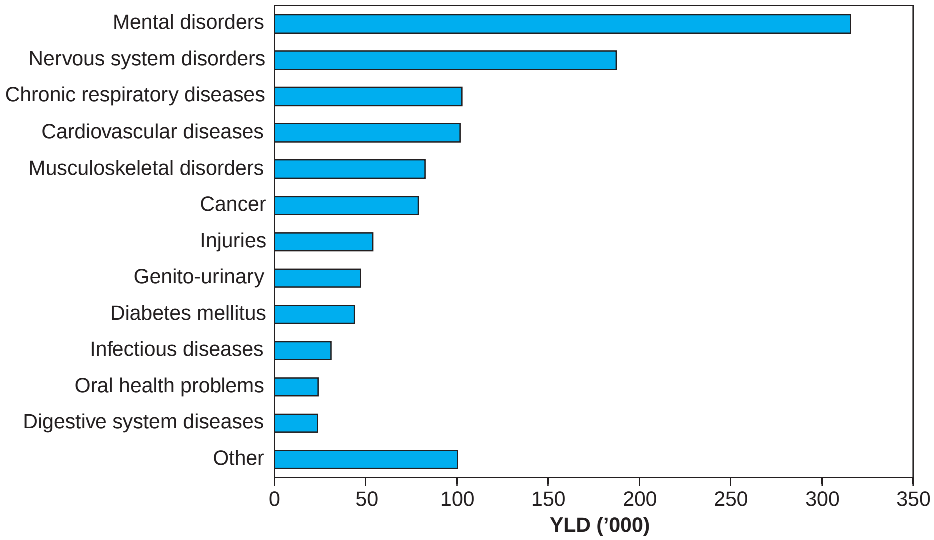
Mental disorders were the leading cause of years of ‘healthy’ life lost due to disability (YLD) in 1996, accounting for nearly 30% of the total YLD in Australia. Nervous system disorders were responsible for 16% of YLD. The latter category was dominated by dementia and hearing loss.

In contrast to the mortality burden (YLL), the size of the overall disability burden (YLD) was almost identical for males and females. The YLD for nervous system disorders, mental disorders and musculoskeletal disorders were all higher for females than for males. The male burden was higher for cardiovascular diseases, diabetes, chronic respiratory diseases and cancers.

Depression was the leading cause of YLD in Australia, causing 8% of the total YLD in 1996. Hearing loss and alcohol dependence and harmful use were the second and third leading contributors to the YLD for males. Dementia and osteoarthritis were the second and third leading contributors for females (AIHW: Mathers et al. 1999a).

Total burden of disease and injury—DALYs

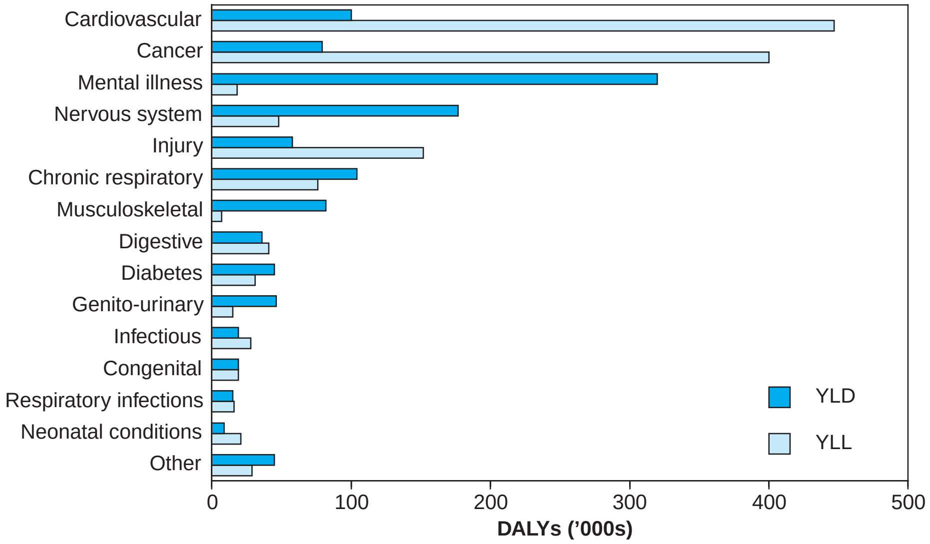
The total burden of disease and injury in Australia in 1996 was estimated to be 2.5 million DALYs. The male burden (in total DALYs) was 13% higher than the female burden. Non-fatal outcomes (YLD) were responsible for 43% of the male burden and 49% of the female burden.



Note: Acute respiratory infections are included with the infectious diseases category in this figure.

Source: Australian Burden of Disease and Injury Study.

Figure 2.18: Non-fatal burden of disease (YLD) for major disease groups, 1996



Source: Australian Burden of Disease and Injury Study.

Figure 2.19: Burden of disease (YLL, YLD and total DALYs) for major disease groups, 1996

Figure 2.19 shows the YLL and YLD contributions to total DALYs for the major disease groups and injury. Inclusion of non-fatal health outcomes provides a substantially different picture from that provided separately by traditional mortality or disability statistics: mental disorders were the third leading cause of overall burden (14% of total) after cardiovascular diseases (20%) and cancers (19%). Central nervous system and chronic respiratory conditions were almost as large a contributor to total burden as injuries.

The 15 leading causes of the burden of disease in Australia are shown in Table 2.8. Together, these 15 causes accounted for about 50% of the 1996 total disease burden in Australia. Among these top 15 causes are 4 non-fatal or low-fatality diseases: depression, asthma, osteoarthritis and hearing loss. The burdens of mental illnesses such as depression and alcohol dependence, and of non-fatal diseases such as osteoarthritis and hearing loss, have been seriously underestimated by traditional approaches that take into account only deaths and not disability.

Table 2.8: The 15 leading causes of burden of disease, 1996

		Per cent of DALYs
1	Ischaemic heart disease	12.4
2	Stroke	5.4
3	Chronic obstructive pulmonary disease[(a)]	3.7
4	Depression	3.7
5	Lung cancer	3.6
6	Dementia	3.5
7	Diabetes mellitus	3.0
8	Colorectal cancer	2.7
9	Asthma	2.6
10	Osteoarthritis	2.2
11	Suicide and self-inflicted injuries	2.2
12	Road traffic accidents	2.2
13	Breast cancer	2.2
14	Hearing loss	1.9
15	Alcohol dependence and harmful use	1.8

(a) Chronic bronchitis and emphysema.

Source: AIHW: Mathers et al. 1999a.

The leading causes of death differ between the sexes. IHD and stroke are the two leading causes of burden of disease in both sexes. Depression, dementia and breast cancer are the next three leading causes in females; in contrast, lung cancer, COPD and suicide are respectively the third, fourth and fifth leading causes of burden of disease among males (AIHW: Mathers et al. 1999a).

The figures in Table 2.8 take into account only the actual condition with which someone has been diagnosed. However, some conditions are also risk factors for other conditions. For example, people with diabetes are also at higher risk of cardiovascular disease. The data in Table 2.8 can be modified to take into account a broader attributable burden in the following way:

- If the burden of suicide and self-inflicted injury attributable to depression is included with the disability burden of depression, the total burden of depression rises to 4.9%, making it the third leading cause of burden of disease in Australia, after IHD and stroke.
- If the burden of cardiovascular diseases attributable to diabetes is included with diabetes, its total attributable burden rises to 4.9%, making it the equal third leading cause of disease burden with depression.
- If the burden of diseases and injuries caused by alcohol use is included with its direct burden in terms of mental health, the attributable burden of alcohol use rises to 2.2%.

2.3 NHPA diseases and conditions

The preceding section outlined the contribution of various diseases and conditions to the burden of disease in Australia. About 70% of the total burden has been attributed to cardiovascular problems, cancers, injuries, mental problems, diabetes mellitus and asthma, identified by Australian Health Ministers for priority action under the National Health Priority Areas (NHPA) initiative.

The NHPA initiative is a collaborative effort involving Commonwealth, State and Territory governments. It seeks to focus public attention and health policy on those areas that are known to contribute significantly to the burden of disease in Australia, and for which there is potential for health gain. The NHPA initiative recognises that in order to reduce the burden of disease, strategies need to be holistic, and to encompass the continuum of care from prevention through to treatment and management (AIHW & DHFS 1997).

This section gives an overview of the six NHPAs, providing information on their incidence, prevalence, risk factors, illness, complications, disability and mortality. A set of indicators has been developed for each priority area to monitor progress towards national health targets. The AIHW has undertaken to report progress in each of the priority areas biennially in *Australia's Health*. The latest information for each of the NHPA indicators is contained in Tables S52–57, pages 415–425. Further information on the framework within which NHPA indicators have been developed can be found in chapter 6.

Cardiovascular disease

Cardiovascular disease comprises all diseases and conditions involving the heart and blood vessels including coronary heart disease, stroke, peripheral vascular disease and heart failure. The main underlying problem in cardiovascular disease is atherosclerosis, a process that clogs blood vessels with deposits of fat, cholesterol and other substances. It is most serious when it affects the blood supply to the heart (causing angina, heart attack or sudden death) or to the brain (which can lead to a stroke).

Cardiovascular disease is Australia's greatest health problem. It kills more people than any other disease (accounting for 40% of all deaths) and its health and economic burden exceeds that of any other disease. In 1993–94, cardiovascular disease accounted for the largest proportion of health system costs in Australia, $3.7 billion or 12% of total health system costs (AIHW: Mathers & Penm 1999a). Cardiovascular disease accounted for 22% of disease burden in Australia in 1996, 33.1% of premature mortality (YLL) and 8.8% of years of equivalent 'healthy' life lost through disease, impairment and disability (YLD) (AIHW: Mathers et al. 1999a).

Based on the National Health Survey, an estimated 2.8 million Australians, or 16% of the population, had cardiovascular conditions in 1995. High blood pressure was the most common condition for both males and females (AIHW 1999c).

Much of the death, disability and illness caused by cardiovascular disease is preventable. Many Australians remain at higher risk of the disease through smoking, being physically inactive, eating a diet high in saturated fats and/or being overweight. Many Australians have blood pressure and/or blood cholesterol above recommended levels; there has been little improvement in physical activity participation, and the proportion of overweight and obese Australians is on the increase.

Incidence

Coronary heart disease

There are no national data on the incidence of coronary heart disease in Australia. However, the Universities of Newcastle and Western Australia and the Queensland Department of Health have developed a method to estimate the rate of coronary events among people aged 35–69. Using this method, it is estimated that there were 19,910 coronary events (mainly heart attacks) among people aged 35–69 in 1995–96. Non-fatal heart attacks represented almost two-thirds (12,955 cases) of these events. Non-fatal heart attacks were three times more common among males than females in the 35–69 age group. Over the period 1984 to 1993, rates of non-fatal heart attacks fell by about 3% per year (AIHW 1998a).

Stroke

Each year, around 40,000 Australians have a stroke, with 70% of these first-ever strokes. Stroke is the cause of nearly 25% of all chronic disability in Australia (NHMRC 1997c). It is more common among older Australians, with around 50% of all strokes occurring in those aged 75 and over. The incidence of stroke is higher in males than in females under the age of 85. For 45-year-olds, the risk of having a stroke before age 85 is 1 in 4 for males and 1 in 5 for females (AIHW 1999c).

Rheumatic fever and rheumatic heart disease

Although this disease is rare among the Australian population overall, its prevalence among Indigenous Australians is one of the highest in the world. The high rates of rheumatic fever among Indigenous peoples are likely to reflect high levels of exposure to group A streptococci, with overcrowding and poor living conditions as major risk factors (Carapetis & Currie 1998).

A register of people with known or suspected rheumatic fever and rheumatic heart disease has been established in the Top End of the Northern Territory. In 1998, there were 19 cases of acute rheumatic fever among Aboriginal children aged 5–14 in the Top End of the Northern Territory (216 per 100,000), whereas among non-Indigenous children in the area there were 2 cases (12.8 per 100,000). Over the last decade or so, there has been little change in the incidence of acute rheumatic fever among Aboriginal children (AIHW 1999c).

Rheumatic heart disease is the damage done to the heart muscle and heart valves by an attack of acute rheumatic fever. In 1998, Aboriginal people accounted for 95% of all cases of rheumatic heart disease in the Top End of the Northern Territory (426 cases), with a prevalence rate of 1,180 per 100,000. In contrast, there were 25 cases (24 per 100,000) among non-Indigenous Australians living in the Top End (AIHW 1999c).

Health services

General practice

A survey of general practice activity found that in 1998–99 cardiovascular problems represented 11% of all problems managed by general practitioners (GPs) (AIHW GPSCU: Britt et al. 1999). Hypertension was the most common cardiovascular problem managed and was the most frequent problem seen in general practice overall, accounting for 5.7% of all problems. Other common cardiovascular problems managed were cardiac check-up (0.9% of problems), coronary heart disease without angina (0.8%) and heart failure (0.6%). Lipid disorder, although not strictly a cardiovascular problem, rated high as well, accounting for 1.7% of problems managed.

Several classes of antihypertensive drugs and blood-lipid reducers were among the top 30 drug groups prescribed by GPs, reflecting the large number of hypertensive and lipid disorder problems managed. Lipids accounted for the highest number of chemistry pathology tests ordered, and represented 9.4% of all pathology tests ordered by GPs.

Comparison of 1998–99 results with those of a similar study conducted in 1990–91 showed that although hypertension remained the most common problem managed by GPs, the rate per 100 encounters fell from 9.5 to 8.4. In contrast, the management rate for lipid disorders increased in frequency from 1.8 to 2.5 per 100 encounters, probably because of raised awareness among both GPs and the public of the need to measure and control cholesterol level (Sullivan 2000).

Hospitalisation

In 1997–98, cardiovascular disease accounted for 434,748 hospital separations from all public acute and private hospitals in Australia. Of these, 37% were attributed to coronary heart disease, 12% to stroke, 10% to heart failure, 10% to cardiac dysrhythmias, 8% to haemorrhoids, 5% to varicose veins of lower extremities and 3% to peripheral vascular disease.

Across all age groups, males were more likely to be hospitalised for cardiovascular disease than females. The sex differential was particularly marked for coronary heart disease and peripheral vascular disease, where males were twice as likely to be hospitalised for these diseases than females. Hospitalisations associated with stroke and heart failure were similar for the two sexes, but for hypertensive disease and rheumatic fever and rheumatic heart disease, females were significantly more likely to be hospitalised than males (Table 2.9).

Hospitalisation for cardiovascular disease increases rapidly with age (Table 2.9). Although those aged 55 years and over represent only 21% of the total population, they accounted for about three-quarters of hospital separations for cardiovascular disease. In the case of stroke, peripheral vascular disease and heart failure, over 89% of hospitalisations were of those aged 55 years and over.

The average length of stay in hospital for cardiovascular disease declined from 7.6 days in 1993–94 to 5.7 days in 1997–98. Over this period, there was an increase in the proportion of same-day patients, particularly for coronary heart disease (67%), largely reflecting the much greater use of investigations in recent years. On average, those hospitalised for stroke in 1997–98 tended to stay the longest (10.3 days), followed by heart failure (8.4 days), peripheral vascular disease (8.2 days), rheumatic fever and rheumatic heart disease (7.5 days), and hypertensive disease (4.7 days). Those hospitalised for coronary heart disease tended to stay for a shorter period (on average 4.6 days) than those hospitalised for other major cardiovascular diseases, diabetes, most cancers and mental disorders. The average length of stay for non-cardiovascular diseases was 3.9 days.

Table 2.9: Hospital separations[(a)] for cardiovascular diseases, 1997–98

	Age group (years)					
Sex by disease (ICD-9-CM code)	**<15**	**15–34**	**35–54**	**55–74**	**75+**	**All ages**
Males						
Coronary heart disease (410–414)	0.3	24.3	865.5	4,240.0	5,615.0	1,131.2
Stroke (430–438)	5.6	16.5	101.8	889.2	2,981.9	291.3
Peripheral vascular disease (441–444)	0.6	3.7	25.4	351.5	924.6	99.5
Heart failure (428)	2.8	5.0	47.8	596.7	2,980.3	226.7
Hypertensive disease (401–405)	4.5	7.0	31.2	84.9	172.4	32.0
Rheumatic fever and rheumatic heart disease (390–398)	3.3	3.2	6.3	22.6	31.8	8.2
All cardiovascular diseases (390–459)	**63.3**	**303.4**	**1,890.8**	**8,562.7**	**17,112.5**	**2,647.3**
Females						
Coronary heart disease (410–414)	0.4	7.9	242.4	1,840.3	3,572.0	586.7
Stroke (430–438)	4.9	16.1	80.1	554.8	2,384.7	267.0
Peripheral vascular disease (441–444)	0.1	3.9	14.0	129.6	371.9	49.1
Heart failure (428)	3.3	1.7	23.1	364.4	2,452.6	220.8
Hypertensive disease (401–405)	2.8	7.6	36.6	129.6	273.1	50.8
Rheumatic fever and rheumatic heart disease (390–398)	3.9	5.6	10.2	41.7	33.1	14.0
All cardiovascular diseases (390–459)	**46.5**	**288.3**	**1,220.4**	**4,938.3**	**12,517.0**	**2,009.1**

(a) Age-specific separations per 100,000 population.

Source: AIHW National Hospital Morbidity Database.

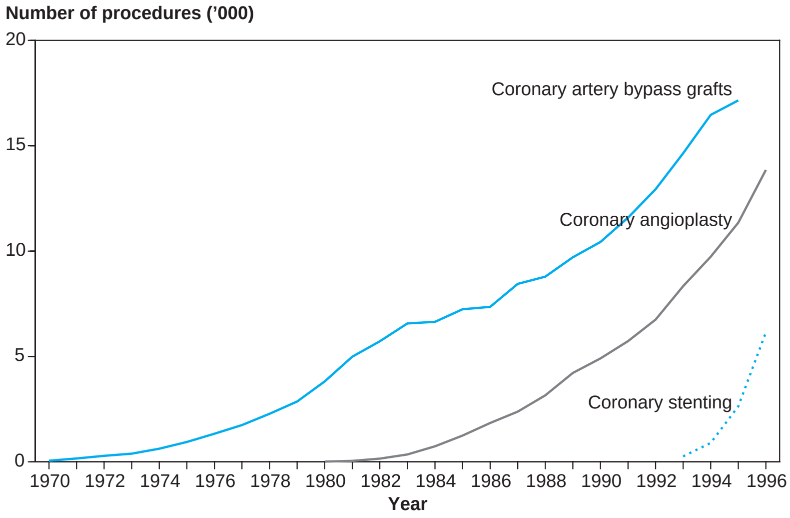
Although males were more likely than females to be hospitalised for cardiovascular disease, females tended to stay in hospital longer (5.8 days compared with 5.3 days). Length of stay in hospital for cardiovascular disease increased with age after age 30, with those aged 85 and over staying in hospital for 9.9 days on average compared with 3.1 days for those aged 30–34 in 1997–98.

Cardiovascular procedures

The most common heart operation in Australia is coronary artery bypass grafting. This procedure was developed in the 1960s and its use has increased steadily since that time. In 1995, there were 17,150 coronary artery bypass graft operations, with 7% of these re-operations (AIHW: Senes & Davies 1999a). The death rate for coronary artery bypass graft operations was 2.3%.

Other revascularisation procedures include coronary angioplasty and coronary stenting. Coronary angioplasty, a less invasive technique than coronary artery bypass grafting (it does not require the opening of a patient's chest), was introduced in the 1980s and its use has grown dramatically since then. During 1996, there were 13,854 coronary angioplasty procedures performed in Australia, an increase of 22% from the previous year (AIHW: Senes & Davies 1999b). Coronary stenting, widespread since 1995 in Australia, was used in 54% of coronary angioplasty patients in 1996, an increase of 106% over its use in the previous year (Figure 2.20). The main cardiovascular procedures are explained in Box 2.9 (page 60).

In addition, during 1997–98 there were 76,362 coronary angiograms conducted and 24,855 CT brain scans performed for the diagnosis of stroke.



Note: Coronary angioplasty includes procedures with or without stents.

Source: AIHW/NHF National Cardiac Surgery and Coronary Angioplasty Registers.

Figure 2.20: Trends in coronary revascularisation procedures, 1970 to 1996

Box 2.9: Cardiovascular procedures

There is a range of procedures to diagnose and treat cardiovascular diseases. Some of the major procedures are:

***Coronary artery bypass grafting** (CABG) entails opening a patient's chest and using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood supply to the heart muscle. CABG is not a cure for coronary artery disease, and there is a risk of recurrence.*

***Coronary angioplasty** involves inserting a catheter with a balloon into a major artery via the skin. The catheter is threaded through the circulation back towards the heart and into the coronary arteries to the area of the vessel blockage. The balloon is then inflated against the blocked area to create a wider passage for blood flow.*

***Coronary stenting** involves expanding metal mesh tubes within the artery to form a supporting structure to hold the artery open at the point where there is narrowing. The development of this catheter-based technique was due to the risk of early acute closure of the coronary artery and a high rate of reblockage from coronary angioplasty.*

***Coronary angiography** gives a picture of the heart's arteries. The procedure is used to diagnose coronary heart disease and is essential before either coronary artery bypass surgery or coronary angioplasty.*

***Computerised tomographic (CT) scan** of the brain is used to guide treatment in acute stroke by distinguishing between major stroke types (either blocked blood supply to the brain, or bleeding within the brain or on its surface). The test is also done to confirm a clinical diagnosis of stroke.*

Mortality

Cardiovascular disease was the leading cause of death among Australians in 1998, accounting for 50,797 deaths or 40% of all deaths. Coronary heart disease was the major cardiovascular cause of death accounting for 55% of all such deaths, followed by stroke (24%), heart failure (5%) and peripheral vascular disease (4%). Cardiovascular mortality is higher among Indigenous Australians, in rural areas of the country, and among socioeconomically disadvantaged groups (DHAC & AIHW 1999b) (see chapter 4).

Over the last three decades there has been a considerable decline (around 66%) in cardiovascular death rates. These declines are substantial, especially when compared with a decline of around 22% in the death rate for non-cardiovascular diseases. During the period 1987 to 1998, death rates for cardiovascular diseases fell 3.9% per year for males and 3.7% per year for females, faster than for all causes overall (Table 2.10). Coronary heart disease death rates have been declining faster than death rates from stroke.

Declines in death rates for coronary heart disease and stroke have been influenced by improvements in some risk factors (levels of blood pressure, tobacco smoking and saturated fat) and in medical interventions such as counselling, drug use, emergency care, medical and surgical treatment, and follow-up care. These gains have been achieved despite there being a significant increase in the prevalence of overweight and little change in physical activity levels.

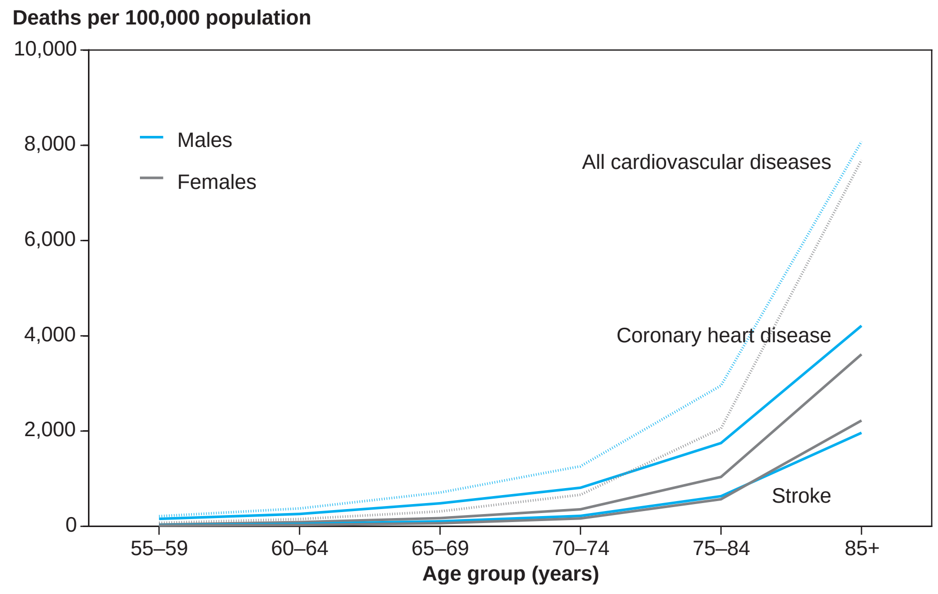
Table 2.10: Deaths from cardiovascular diseases, 1998

	Males			Females		
Cause of death (ICD-9 code)	**Number (1998)**	**Rate(a) (1998)**	**Annual rate of change(b) (per cent)**	**Number (1998)**	**Rate(a) (1998)**	**Annual rate of change(b) (per cent)**
All cardiovascular diseases (390–459)	*24,746*	*284.7*	*–3.9*	*26,051*	*188.0*	*–3.7*
Coronary heart disease (410–414)	15,024	171.3	–4.3	12,801	93.3	–4.1
Stroke (430–438)	4,812	56.4	–3.4	7,170	50.9	–3.6
Heart failure (428)	988	12.0	–4.3	1,567	10.3	–4.4
Peripheral vascular disease(441–444)	1,171	13.5	–2.9	916	6.8	–1.2
Hypertensive disease (401–405)	410	4.7	–3.2	730	5.2	–2.8
Rheumatic fever and rheumatic heart disease (390–398)	87	1.0	–5.2	171	1.5	–4.8
All causes of death (001–999)	**67,073**	**759.9**	**–2.3**	**60,129**	**470.2**	**–1.9**

(a) Age-standardised rate per 100,000 population.

(b) Annual change in the age-standardised death rate over the period 1987 to 1998.

Source: AIHW National Mortality Database.

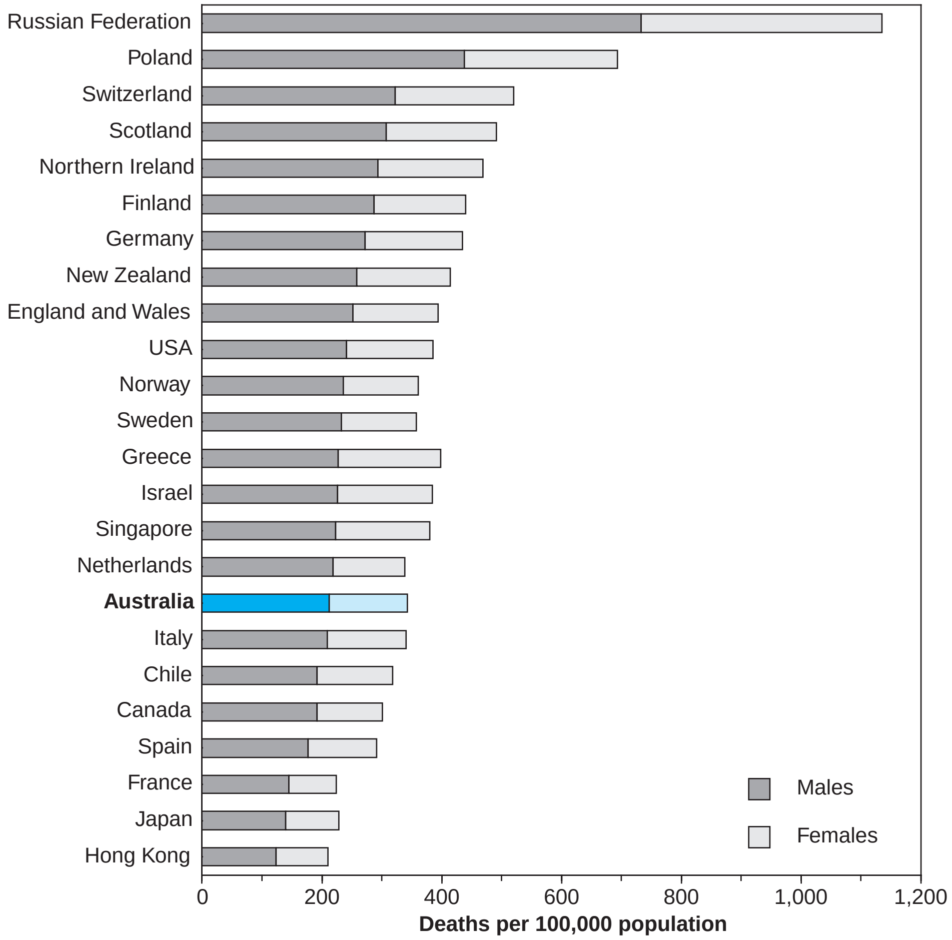


Source: AIHW National Mortality Database.

Figure 2.21: Death rates for major cardiovascular diseases, 55 years and over, 1998

Males were more likely to die from cardiovascular disease than females across almost all age groups, with death rates among males aged 25–74 two to three times those of females in 1998. For coronary heart disease, the sex differentials were more marked than for cardiovascular disease overall, particularly in the 25–64 age group where death rates among males were 3–4 times those of females. For stroke, the sex differentials were not as large as for coronary heart disease, with death rates across most age groups marginally higher for males than females (Figure 2.21).

Death rates for cardiovascular disease increased dramatically with age, with 82% of all such deaths occurring among those aged 70 and over, compared with less than 5% for those aged under 55.



Note: Death rates have been age standardised to the World Standard Population.

Source: WHO 1996, 1998.

Figure 2.22: Death rates for cardiovascular disease, selected countries, 1994

Cardiovascular disease death rates in Australia have declined by about 60% over the period 1960–64 to 1994. There have been similar large declines in other countries. Japan (for both males and females) and Canada (for females) are the only countries to exceed Australia's decline in cardiovascular disease death rates. Rates of decline in Canada (for males), the United States, France, Switzerland and Finland have also been substantial (WHO 1998).

Despite marked declines, Australia's cardiovascular disease death rates still compare unfavourably with those of some other developed countries. Of the 24 countries compared, Australia had the eighth and tenth lowest death rates for cardiovascular disease for males and females respectively in 1994. The Australian death rates, although one-third the rates in the Russian Federation and half the rates in Poland, were 72% and 50% higher for males and females than the rates observed in Hong Kong. Australian death rates were also significantly higher than rates in Japan and France (Figure 2.22).

The relative ranking of Australian death rates varies for the major components of cardiovascular disease. For coronary heart disease, Australian death rates ranked towards the middle of those compared, whereas for stroke Australian death rates were among the lowest of those compared.

Cancers

Cancer is a diverse group of diseases characterised by the proliferation and spread of abnormal cells in the body. These abnormal cells invade and destroy surrounding tissue and can spread (metastasise) to distant parts of the body. Cancer can develop in most types of cells, and each cancer has its own pattern of local behaviour and metastasis. Although some cancers share risk factors, most cancers have a unique set of risk factors that may be responsible for their onset. In Australia, information on cancers is collected by State and Territory cancer registries, and compiled by the AIHW in the National Cancer Statistics Clearing House (see Box 2.10, page 64).

It is estimated that 30% of cancers can be attributed to active smoking, 30% to dietary influences, 2% to radiation exposure, 5–15% to infectious agents, and the remainder to other risk factors (Trichopoulos et al. 1996). Some of these risk factors are modifiable through lifestyle changes, and others are inherited. Although some risk factors are unavoidable, risks of particular cancers may be reduced through clinical monitoring of a person and their risk factors and treating newly diagnosed cases early in their development.

Each year, approximately 345,000 new cancer cases are diagnosed in Australia. A large proportion of these, approximately 270,000, are non-melanocytic skin cancers (NMSC) which, if treated early, are far less life-threatening than most other cancers. Cancer currently accounts for 29% of male deaths and 25% of female deaths.

Cancer control is a National Health Priority Area. Eight cancers have been targeted for priority action: lung cancer, melanoma, NMSC, colorectal cancer, non-Hodgkin's lymphoma, prostate cancer in males and cancers of the cervix and breast in females. These cancers have a significant impact on the health status of the Australian population and are of concern in all States and Territories.

Box 2.10: Cancer surveillance and monitoring in Australia

The registration of cancer is required by law in each of the States and Territories, usually under the Public Health Acts, where the data are collated by cancer registries. These registries collect clinical and demographic information about people with newly diagnosed cancer. This information is obtained from hospitals, pathologists, radiation oncologists, cancer treatment centres and nursing homes. Generally, operational guidelines for each of the registries are similar and coincide with the objectives of the International Association of Cancer Registries. Although some registries operate under different coding systems for site, morphology and other variables, the bulk of information is directly comparable and has been reconciled for this publication.

Registrars of Births, Deaths and Marriages collect information related to deaths from cancer. By combining information from these sources, the State and Territory cancer registries produce statistics of cancer incidence and mortality. Data from these population-based registries enable monitoring of cancer incidence and mortality and have disclosed high-risk groups and emerging incidence trends that warrant a public health response.

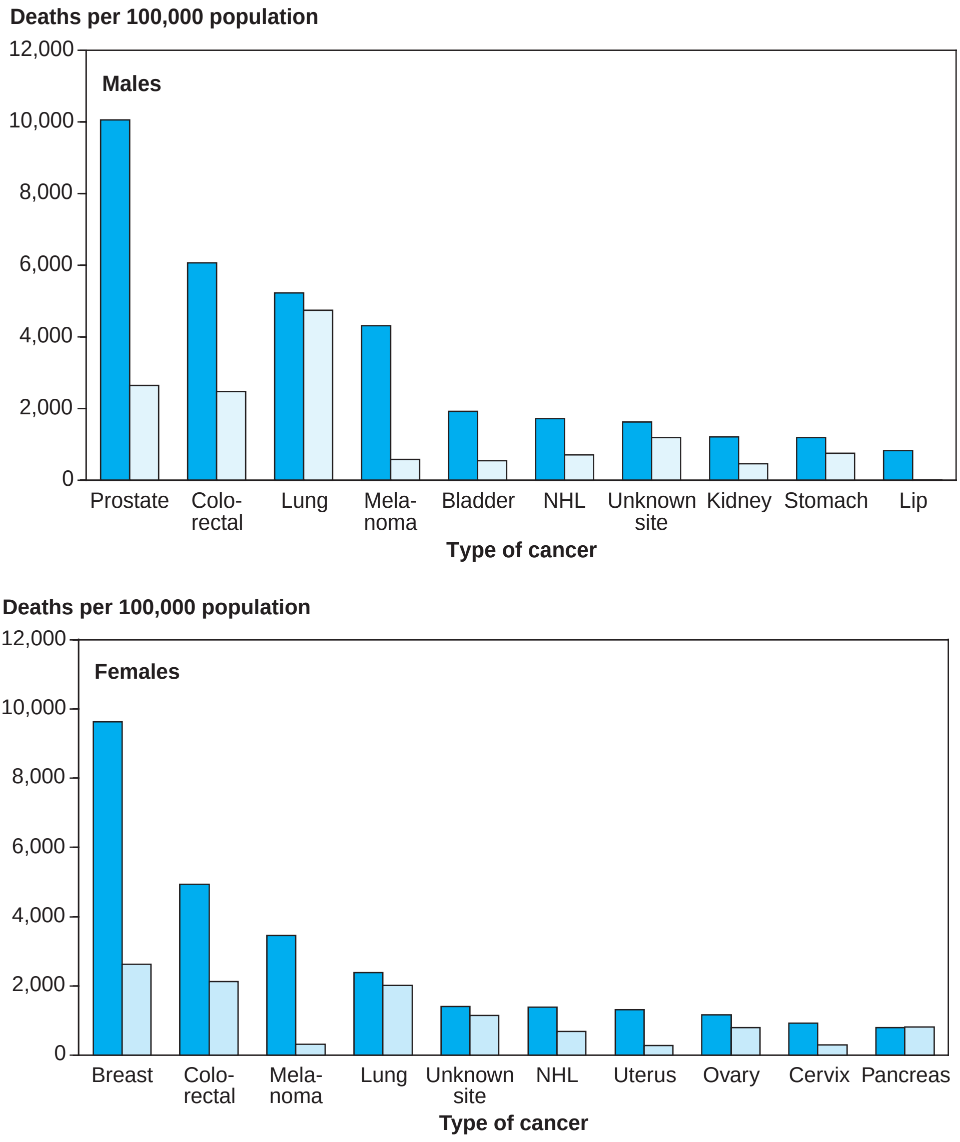
A national collection of cancer data is maintained by the National Cancer Statistics Clearing House at the Australian Institute of Health and Welfare, where data for incidence are currently available to 1996 and for mortality to 1998 (AIHW & AACR 1999).

Cancer incidence

Excluding NMSC, there were 42,733 new cancers in males and 34,933 new cancers in females in 1996, with age-standardised incidence rates of 489 per 100,000 males and 339 per 100,000 females. In the same year, there were 19,196 male deaths due to cancer with an age-standardised death rate of 226 per 100,000, and 14,893 female deaths due to cancer at the rate of 137 per 100,000 (AIHW & AACR 1999).

Details of NMSC are not recorded by all cancer registries as most are not histologically confirmed or reported. These skin cancers are often self-detected and are usually removed in doctors' surgeries. Staples et al. (1998) estimated, using survey methods, that the national age-standardised incidence rates (standardised to the World Standard Population) for treated NMSC in 1995 were 1,374 per 100,000 for males and 857 per 100,000 for females.

The incidence of the other most common cancers is presented in Figure 2.23. Prostate cancer is the most common cancer accounting for 23.5% of all cancers in males. Between 1989 and 1994, there was a dramatic rise in the number of new cases of prostate cancer registered. Incidence rates have fallen substantially since then, although not to pre-1989 levels. The rise and then fall in the prostate cancer incidence rate has been attributed to early detection through increased investigation, particularly following the introduction of prostate-specific antigen (PSA) testing around 1990. PSA tests are specifically designed to identify cancers before the onset of clinical symptoms. Many of these prevalent cancers may not show any symptoms, and therefore would not be detected except for PSA testing. The recent decline in the incidence rate indicates a return towards the underlying rate, removing the effect of these previously undetected cases. The incidence rate is also declining as the number of PSA tests conducted falls, reducing the number of prevalent cases detected (Smith et al. 1998; Threlfall et al. 1998).

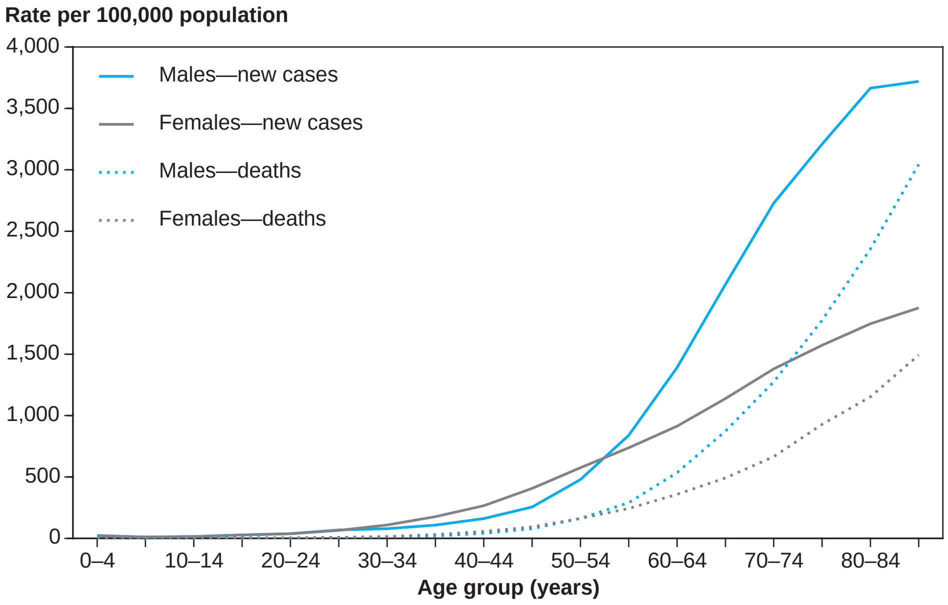


Note: NHL = Non-Hodgkin's lymphoma.

Source: AIHW & AACR 1999.

Figure 2.23: New cases and number of deaths from most frequently occurring cancers (excluding non-melanocytic skin cancer), by sex, 1996

The incidence of cancer is lowest in late childhood, but increases with age. Figure 2.24 presents age-specific incidence rates for all cancers. Males have a higher incidence than females beyond 55 years of age. However, females have a higher incidence than males between ages 30 and 54 years because cancers of the cervix, uterus, ovary and breast have an incidence almost seven times that of cancers specific to males in this age range.



Source: AIHW & AACR 1999.

Figure 2.24: Age-specific incidence and death rates for malignant neoplasms (excluding non-melanocytic skin cancer), by sex, 1996

Between 1990 and 1996, age-standardised incidence rates for all cancers combined (excluding NMSC) rose for both males and females by an average of 2.1% and 1.4% per year respectively. Trends in incidence rates for individual cancers for this period have varied. Among males, incidence of melanoma showed increases of approximately 3.6% per annum. The incidence of prostate cancer increased steadily until 1989 but has shown a large average annual increase of 8% since then, despite the recent falls. Other cancers to show average annual increases from 1990 to 1996 include: colorectal (1.0%), bladder (1.6%), kidney (1.6%), brain (1.1%), non-Hodgkin's lymphoma (0.7%) and testis (3.4%). Lung cancer has shown a consistent decline since 1983 and an average annual decline from 1990 to 1996 of 2%. The following cancers also recorded a decline: larynx (–3.4%), stomach (–2.1%), unknown primary (–1.9%), leukaemia (–1.1%) and pancreas (–0.7%).

Among females, the four most common cancers all showed average annual increases in the age-standardised rate for the period 1990 to 1996, although the increases were much more substantial for breast cancer (3%), melanoma (2.3%) and lung cancer (1.6%) than for colorectal cancer (0.2%). Cancers of the pancreas (0.5%), uterus (1.5%), bladder (1.2%) and kidney (1.2%), leukaemias (0.6%) and non-Hodgkin's lymphoma (2.7%) all showed an increase during this period. Cervical cancer showed one of the largest average annual declines in age-standardised incidence rate (–4.1%), but cancers of the larynx (–2.2%), brain (–0.8%) and unknown primary (–1.9%) also declined from 1990 to 1996.

Increases or decreases in the incidence of these cancers are due to variations in exposure to a range of risk factors such as UV radiation exposure, smoking, alcohol and other dietary components (Trichopoulos et al. 1996). Improvements in detection of cancers through the introduction and more widespread use of medical technologies has also increased the number of cancers reported, and improved the accuracy of determining their site of origin.

Survival following cancer

Survival from cancer depends on the type of cancer, its behaviour (i.e. slow- or fast-growing) and its metastasising characteristics; the stage at diagnosis; the availability of appropriate treatment; and the general health of the person and his or her capacity to handle treatment.

Relative survival analysis uses the ratio of the survival of a person diagnosed with a disease, in this case cancer, to that of a person from the general population matched on age and sex. The South Australian and New South Wales cancer registries have published survival estimates for their respective jurisdictions where the 5-year relative survival ratio for all cancers is approximately 46% for males and 57% for females.

Survival ratios decline with age at diagnosis for most cancers. For all cancers in South Australia in 1986–94, the relative survival ratios were 72% for those under 55 years, 54% at 55–64 years, 48% at 65–74 years and 43% at 75 years and over (South Australian Cancer Registry 1996).

The NSW Cancer Registry has noted significant improvements in survival from most cancers. For example, the 5-year survival ratio for cancer of the cervix improved from 69% in 1980–85 to 75% in 1990–95. For other cancers, the improvement in survival was: 61% to 83% for prostate cancer; 51% to 61% for colorectal cancer; 48% to 59% for kidney cancer; and 9% to 16% for cancer of the oesophagus (Supramaniam et al. 1999).

Mortality from cancer

In 1998, lung cancer accounted for 25% of cancer deaths among males, and prostate cancer and colorectal cancer both accounted for 13%. The major causes of cancer death in females were breast cancer (17% of all cancer deaths), colorectal cancer (14%) and lung cancer (14%).

From the age of 15 years, death rates for cancer increase with age (Figure 2.24). Further, an ageing population has meant that older people constitute a higher proportion of those dying from cancer. For example, in 1983, approximately 30% of all cancer deaths occurred in persons aged 75 years and over, but by 1998 this proportion had risen to around 40%.

Males have higher death rates than females before age 35 and from age 50 onwards. The higher death rates among females aged 35–49 years reflect the impact of the female-only cancers on the rates. However, the differential between the male and female rates in this age group is not as large as that observed for incidence.

Specific cancers

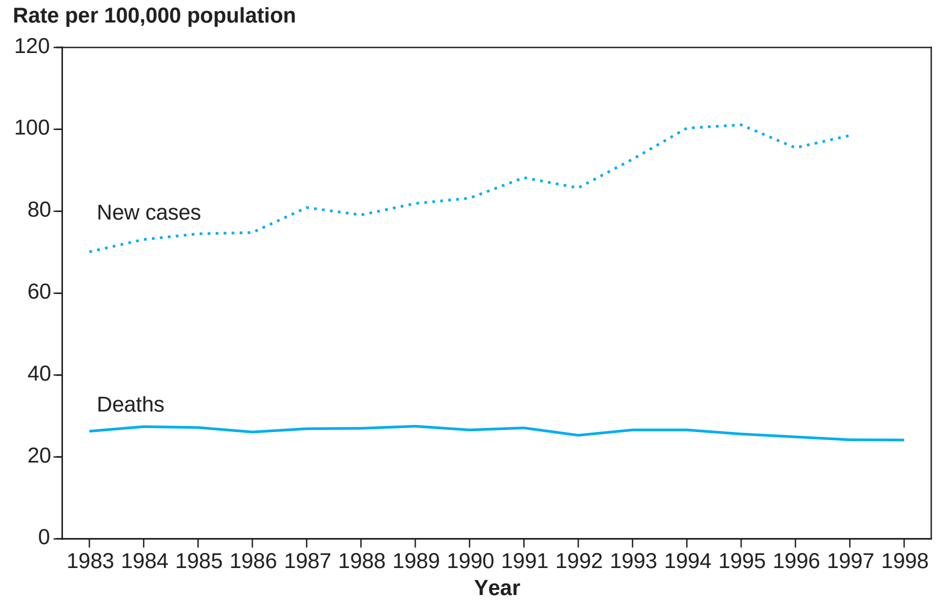
The following sections provide information about breast cancer, lung cancer and melanoma. These cancers are among the most commonly diagnosed cancers and have a significant impact on morbidity, mortality and health service use. Other common cancers, such as prostate and colorectal cancers, have been the focus of discussion in previous editions of *Australia's Health*.

Breast cancer

Apart from non-melanocytic skin cancers, breast cancer is the most common cancer detected in Australian females, where the lifetime risk of a female developing this disease before age 75 is 1 in 12. In 1997, 10,144 new cases of breast cancer were diagnosed in Australia. Breast cancer is also the most common cause of death from cancer in females with 2,602 deaths in 1997 and 2,542 in 1998. The incidence of breast cancer has been on the rise since the early 1980s (Figure 2.25). The death rate for breast cancer has remained relatively stable over this period, declining marginally from 24.9 deaths per 100,000 in 1980 to 23.0 deaths per 100,000 in 1998. The total health system cost for female breast cancer was estimated to be $184 million in 1993–94 (AIHW: Mathers et al. 1998b).

Established risk factors for breast cancer are age (breast cancer rates typically increase progressively with age from the third decade) and a family history of the disease. Other factors associated with increased risk are a previous history of breast cancer or benign breast disease, a larger body size, reproductive factors including late age at first birth, nulliparity (never borne a child), early start to menstruation and late age at menopause, use of oral contraceptives at young ages, use of hormone replacement therapy and exposure of breast tissue to ionising radiation (particularly before 20 years of age) (see, for example, McMichael & Armstrong 1988; Higginson et al. 1992; Kelsey 1993). More recently, a role for physical activity in decreasing risk of breast cancer has been proposed (Friedenreich & Rohan 1995). Diet, especially one rich in fat and animal protein, and consumption of alcohol are other potential risk factors. Prevention of some deaths from breast cancer is currently achievable mainly by earlier detection, principally by way of mammography in organised screening programs (such as that set up by BreastScreen Australia). Improvements in treatment have also contributed to increased survival.

The 5-year relative survival ratio for females diagnosed with breast cancer from 1982 to 1994 was 77%. The ratio has increased over time, with those diagnosed in the 1990s showing a better 5-year relative survival ratio (79%) than those diagnosed in the 1980s (74%). Females diagnosed with breast cancer in their 40s had the best relative survival, whereas those aged in their 80s and 90s had the worst survival (AIHW, AACR & NHMRC 1998).



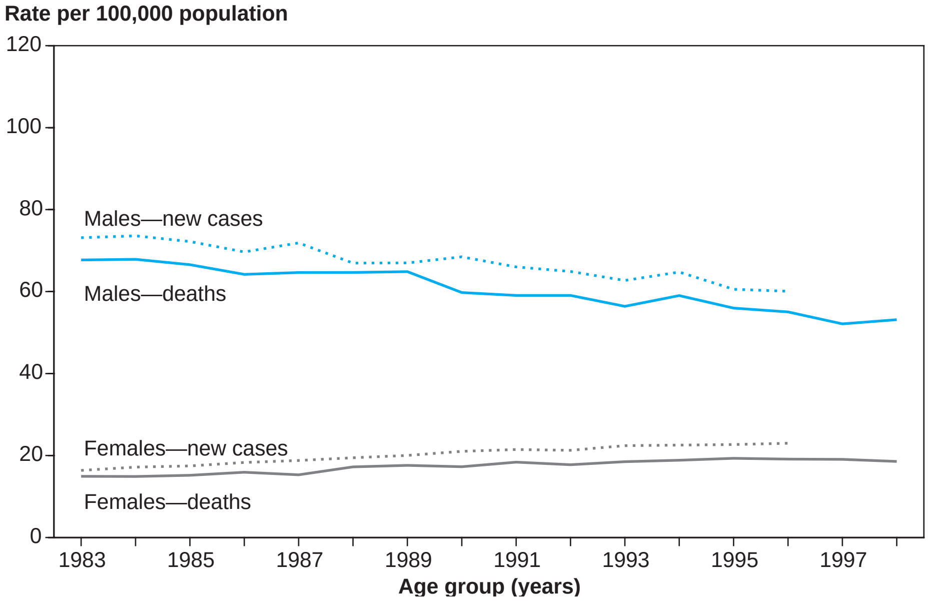
Source: AIHW & AACR 1999; AIHW National Mortality Database.

Figure 2.25: Age-standardised incidence and death rates for female breast cancer, 1983 to 1998

Lung cancer

National incidence data indicate that in 1996 there were 5,228 new cases diagnosed in males (60.1 new cases per 100,000 population) and 2,393 new cases diagnosed in females (23.0 new cases per 100,000). In the same year, there were 4,773 deaths (55.4 per 100,000) for males and 2,054 for females (19.4 per 100,000) with only a slight rise in 1998. Lung cancer currently accounts for 12.2% of all new cancer registrations in males and 6.9% in females, but 24.7% of all male cancer deaths and 13.6% of all female cancer deaths. Lung cancer is the leading cause of cancer death in Australia. South Australian and New South Wales studies estimate a 5-year survival ratio of approximately 11% (South Australian Cancer Registry 1996; Supramaniam et al. 1999). The 1993–94 health system cost for lung cancer was $107 million (AIHW: Mathers et al. 1998b).

Smoking is responsible for approximately 80% of lung cancers (English et al. 1995). Twenty-five years ago, smoking rates in men were almost double those in women. However, this is no longer the case, with the latest estimates indicating that 25% of men and 20% of women aged 14 years or over currently smoke (AIHW 1999d). Current patterns of incidence probably reflect smoking behaviour approximately 20 years ago, due to the timelag between exposure to carcinogens in tobacco smoke and the diagnosis of cancer. The changing behaviour in smoking between males and females is reflected in the trends for lung cancer incidence and mortality. Between 1990 and 1996, the incidence and mortality of lung cancer among males fell by an average of 2.0% per year. In contrast, lung cancer incidence among females increased at an average rate of 1.6% per year. The increase in lung cancer incidence is predominantly in females aged 65 years and over, whereas the rate in younger females has generally remained stable or fallen. Despite these patterns, the male rate is still more than 2.5 times greater than the female rate.



Source: AIHW & AACR 1999; AIHW National Mortality Database.

Figure 2.26: Age-standardised incidence and death rates for lung cancer, by sex, 1983 to 1998

Melanoma

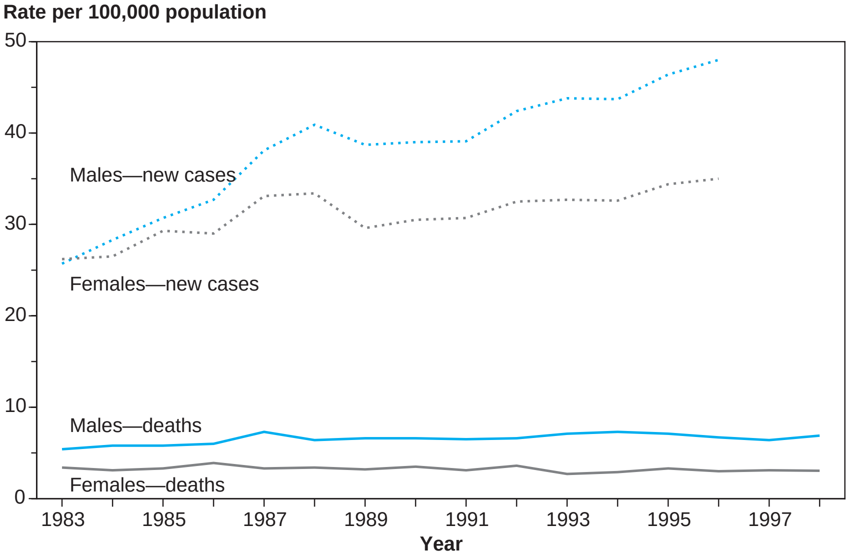
Melanoma is the fourth most common cancer in males and the third most common cancer in females. There has been a strong upward trend in melanoma mortality since the early 1950s. Since 1990, the death rates for both sexes have been relatively stable (Figure 2.27) although males have a rate twice that of females.

Incidence rates for melanoma have increased markedly since 1983, especially for males. The largest increase occurred in those aged 60 years and over. Melanoma cost the health system $66 million in 1993–94 (AIHW: Mathers et al. 1998b).

Australia's melanoma rates are among the highest in the world. A comparison between Australia and England and Wales shows a tenfold difference in incidence, and it is known that incidence in Australia is up to 150 times higher than in some other countries. International differences in death rates are substantially less than incidence rates (AIHW: Giles et al. 1995).

Melanoma risk is related to UV radiation exposure. Melanoma incidence is higher in people with fair, sun-sensitive skin, those with many moles, and those who have intermittent high recreational exposure or frequent sunburns. Exposure in childhood may be particularly important (DHFS & AIHW 1998a).

In 1996, there were 4,313 new cases diagnosed in males (48.0 new cases per 100,000 population) and 3,448 new cases diagnosed in females (35.0 new cases per 100,000 population). There were 635 male deaths (6.9 per 100,000) and 345 female deaths (3.1 per 100,000) in 1998. Melanoma currently accounts for approximately 10% of all new cancer registrations, and 3.0% of all cancer deaths in males and 2.2% in females. Survival studies show that male 5-year relative survival ratios vary between 86% and 89% and female ratios vary between 92% and 95% (South Australian Cancer Registry 1996; Supramaniam et al. 1999).



Source: AIHW & AACR 1999; AIHW National Mortality Database.

Figure 2.27: Age-standardised incidence and death rates for melanoma, by sex, 1983 to 1998

Injuries

Injury contributes significantly to mortality and morbidity in Australia. It is the leading cause of death among young people. Injury is also the cause of a range of disabling conditions, often persisting, that affect the quality of life of injured people and their families. The total health system costs of injury in 1993–94 have been estimated at $2.6 billion (AIHW: Mathers & Penm 1999b). Health Ministers have identified injury prevention and control as a priority area.

Deaths

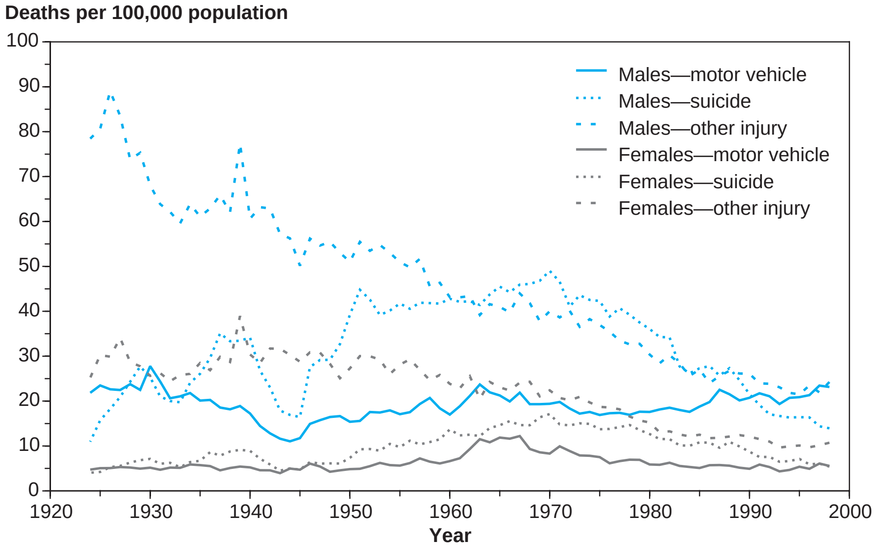
In 1998, a total of 7,946 deaths (5,614 males and 2,332 females) were the result of an external cause of injury (used here to mean injury and poisoning), representing 6% of all deaths that year. Injury was the leading cause of death for persons aged under 45 years, accounting for 43% of all deaths among people in that age group. Almost one-quarter of people dying from injury were young males aged 20–34 years.

Despite a large reduction in rates since 1970, road crashes remain a common cause of injury-related deaths. However, suicide accounted for the largest proportion of injury deaths in 1998, followed by deaths due to road crashes. Unintentional falls, mostly by older people, ranked third among commonly reported causes of injury death.

For nearly all types of injury, death rates in 1998 were higher among males than females. (One exception was falls by older people, for which male and female rates were similar.) Overall, injury death rates were the highest among young males, and in both males and females in old age.

Trends in injury-related deaths

The death rate for injury declined during the second half of the twentieth century, broadly in step with the decline in the all-causes death rate. Throughout this period, injury was responsible for 7–8% of male deaths and for 4–5% of female deaths. During the middle and late 1990s, however, injury death rates remained more or less static, whereas all-causes death rates continued to decline 1–2% annually.



Note: Age standardised to the Australian population at 30 June 1991.

Source: AIHW National Injury Surveillance Unit using mortality and population data from the ABS.

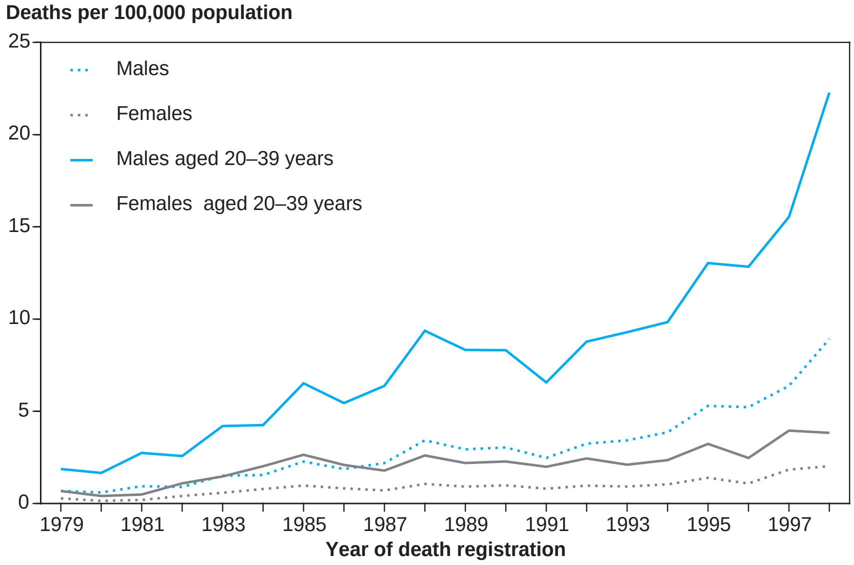
Figure 2.28: Injury mortality by sex and external cause, 1924 to 1998

Trends over time in injury deaths vary greatly for major types of external cause (Figure 2.28). No sustained underlying trend is evident in the all-ages suicide rate over the long term, although the age-specific rate has shown a differing trend. An increase in the suicide rate occurred in the 1960s, when the rate of suicide using pharmaceutical substances (especially barbiturates) increased. Death rates for motor vehicle crashes also rose with the emergence of this mode of transport in the first half of the twentieth century, but dipped with the reduced use of motor vehicles during the Great Depression and the Second World War. However, despite continued increases in vehicle numbers and the distance travelled, case numbers and the population-based road injury death rate have declined sharply since the early 1970s, due mainly to the success of road safety initiatives (DHFS & AIHW 1998b).

Suicides and opiate-related deaths

Two categories of injuries have shown upward trends in death rates in recent years. These are suicide among males and deaths related to opiate drugs.

At about 23 deaths per 100,000 population, the male suicide rates in 1997 and 1998 were the highest since the 1960s. The female suicide rate, on the other hand, has remained close to 5 per 100,000 population for two decades, but the rate is rising among young females. Further information about suicide can be found in the section on mental problems and disorders (see page 79).



Notes

1. Age standardised to the Australian population at 30 June 1991.
2. Includes underlying cause of death codes E850.0, E858.8, 304.0, 304.7 and 305.5.

Source: AIHW National Injury Surveillance Unit analysis of ABS mortality data.

Figure 2.29: Opiate mortality, 1979 to 1998

The rate for opiate-related deaths has risen dramatically since the early 1980s, especially among young adults (Figure 2.29). The rate has risen in both sexes, although the increases are much higher among males than females. The rate for suicide by opiates has also risen, though less rapidly, from about 0.5 deaths per 100,000 in the early 1980s to about 1.0 in the late 1990s.

Hospital care

Injuries are a prominent reason for hospitalisation. Injury was the principal diagnosis recorded for 403,386 separations from hospitals in Australia during 1997–98 (7% of all hospital separations).

Although records for 68,631 separations (1% of all separations) specified complications of care as the principal diagnosis, 255,120 (5% of all separations) had mention of complications, misadventure, abnormal reaction or adverse effect of treatment in the record. The occurrence of adverse events and other undesired outcomes of health care is discussed further in chapter 6.

Injury from causes other than complications of surgical and medical care was the principal diagnosis for 334,755 separations in 1997–98 (6% of all separations). These separations accounted for about 1.3 million patient bed-days, with an average length of stay of 4.0 days. The following discussion relates to these hospital separations.

Falls was the leading single cause of injury-related hospital care in Australia in 1997–98, accounting for 36% of all hospital separations for injury. Transport-related incidents (15%) and unintentional poisoning (5%) were the other common causes of hospitalisation.

Unintentional injuries accounted for 88% of separations from hospital due to injuries. Interpersonal violence and intentional self-harm each accounted for about half of the remaining 12%.

A fracture was the main diagnosis in 41% of the injury separations. Open wounds (17%), poisoning and toxic effects (11%), sprains, strains and dislocations (8%) and intracranial injuries (6%) were other common conditions.

Lower limb fractures to persons aged 65 years and over accounted for 7% of all hospital separations due to injury and for 21% of the bed-days. The average length of stay for these separations was 12.2 days, more than three times longer than for injury cases overall.

Prevention strategies

A range of strategies, developed by various sectors, has contributed to the sustained decline in death rates for injuries (National Injury Prevention Advisory Council 1999). The diverse nature of the issues constituting ‘injury’ is reflected in the degree and variety of institutional responses to the problem (NHMRC 1999). In particular, road injury, occupational injury, drug-related harm and suicide are subjects of specific policies and programs. The first two of these causes of injury are largely the province of agencies outside the health sector; the response to suicide is largely from a mental health perspective.

The risk of injury is particularly high for some sections of the population. Two groups well known to experience high rates of injury are people who live in rural and remote areas compared with urban-dwellers, and Indigenous peoples compared with non-Indigenous Australians (AIHW NISU: Moller 1996; AIHW 1998b).

At the national level, the health sector (in addition to efforts through the National Mental Health Strategy to tackle suicide prevention) is focusing attention on aspects of injury that are not covered by well-established institutions and programs. The draft National Injury Prevention Action Plan nominates four priority areas for immediate action by the health sector in the period 2000 to 2002 (DHAC 1999):

- injury due to falls among persons aged 65 years and older;
- falls among children under 15 years of age;
- drowning and near drowning; and
- poisoning of infants and children less than 5 years of age.

Table 2.11 presents summary information on these four types of injury.

Table 2.11: Injury prevention priority areas for 2000–2002: summary data

Indicator		Falls at ages 65 years and over	Falls at ages 0–14 years	Drowning	Poisoning at ages 0–4 years
Mortality (1998)					
Cases	Males	397	2	215	2
	Females	617	1	58	1
	Persons	1,014	3	273	3
Deaths per 100,000 population	Males	39.7	0.1	2.3	0.3
	Females	48.1	0.1	0.6	0.2
	Persons	44.4	0.1	1.5	0.2
Hospital separations (1997–98)					
Cases	Males	12,557	15,189	467	1,974
	Females	36,863	9,706	224	1,622
	Persons	49,420	24,895	691	3,596
Separations per 100,000 population	Males	1,268.9	755.9	5.0	298.7
	Females	2,895.3	508.1	2.4	258.9
	Persons	2,184.0	635.1	3.7	279.3

Notes

1. ICD-9 codes: falls E880–888; drowning: E830, E832, E910; poisoning: E850–869.
2. Hospital separations are limited to cases where the principal diagnosis is in the range ICD-9-CM 800–999.
3. Mortality is by year of registration. Episodes of hospital care are by year of separation from hospital.

Source: AIHW National Injury Surveillance Unit.

Mental problems and disorders

Mental problems and disorders relate to emotions, thoughts and behaviours which can manifest as anxiety and depression or more serious disorders such as schizophrenia. The 1995 National Health Survey estimates that about one million Australians suffer from a mental problem or disorder. More than 50% of these are affected long term. However, only 40% of these will seek help or have their problem diagnosed (ABS 1997b).

Mental health has been identified as a National Health Priority Area (NHPA) (AIHW & DHFS 1997). Depression is the most common mental disorder reported, and has been identified as the first priority for action (DHAC & AIHW 1999a).

Mental problems and disorders are responsible for a large number of hospitalisations, although the number of deaths from these causes is low compared with other NHPAs. This is particularly the case among those in the age group 25–44 years. Mental problems also account for much disability, incur high health system costs, and impose a heavy burden of human suffering including stigmatisation of people with mental disorders and their families.

Interventions able to impact on mental problems and disorders occur at many levels of the community, and across the spectrum of disease prevention, management and maintenance. In particular, prevention and early intervention activities are able to focus on recognition and early management of risk factors that increase people's vulnerability to mental problems and disorders.

Prevalence

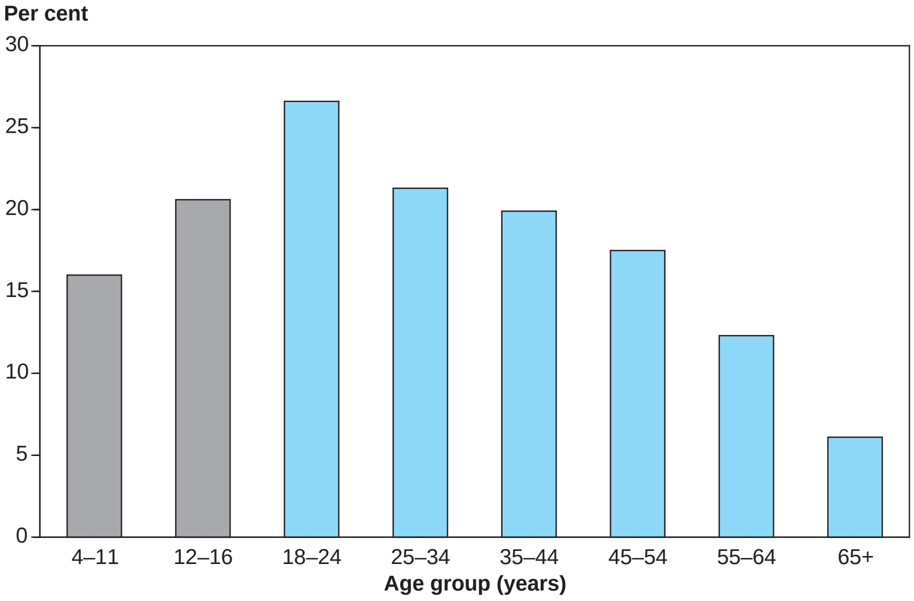
The prevalence and types of mental disorders are known to vary with age, sex and across population groups. Almost 1 out of 5 children and adolescents are reported to suffer from a mental problem or disorder within any 6-month period (Zubrick et al. 1995). Furthermore, the 1997 ABS Survey of Mental Health and Wellbeing found that approximately 18% of adults in the community suffer from a mental disorder (ABS 1998b).

The onset of most mental disorders occurs in mid-to-late adolescence—and tends to become chronic—affecting future psychosocial development. A comparative picture of prevalence of mental problems between children and adults is given in Figure 2.30. This shows considerable morbidity in childhood with a steady increase in prevalence to early adulthood but a gradual decline in the older years.

Although the overall prevalence rates are similar in both sexes, females are more likely to experience anxiety and affective disorders whereas males are more likely to experience substance use disorders (ABS 1998b). Further information on the prevalence of mental problems and disorders in Australia is contained in *Australia's Health 1998* (AIHW 1998a).

GP consultations

People with mental problems and disorders are cared for in various settings, ranging from community settings to general practice, outpatient departments, day hospital facilities and psychiatric admissions. However, the rates of attendance vary considerably for different levels of psychiatric care. Other than community support,



Note: Data for this figure come from two different sources: 1993 Western Australian Child Health Survey (children; dark grey bars) and 1997 National Survey of Mental Health and Wellbeing (adults; light blue bars). The data are presented here to show age-specific changes in the prevalence rates and have been interpreted broadly.

Sources: Silburn et al. 1996; ABS 1998b.

Figure 2.30: Prevalence of mental problems and disorders by age

GPs are usually the first point of healthcare contact by people with mental problems in Australia. The number of GP consultations for mental problems and disorders is more than twice the total contacts for other forms of professional care.

According to the BEACH (Bettering the Evaluation And Care of Health) Survey, psychological problems accounted for 7.2% of all problems managed by GPs in 1998–99, at a rate of 105 every 1,000 encounters (AIHW GPSCU: Britt et al. 1999). In 1996, there were approximately 1,230 primary care providers in Australia specialising in counselling and psychotherapy (DHAC & AIHW 1999a).

Hospitalisation

In 1997–98, mental disorders accounted for 235,477 hospital separations, or 4.2% of total hospital separations (Table 2.12, page 78), an average of 12.6 separations and 169 patient-days per 1,000 population (AIHW 1999b).

Persons diagnosed with major depressive disorder or schizophrenia accounted for the highest proportion of separations for mental disorders in 1997–98, 18.6% and 14.7% respectively (AIHW 1999b).

Table 2.12: Hospital separations[a] for mental disorders, all hospitals[b], 1997–98

		Hospital separations		
ICD-9-CM code	**Principal diagnosis**	**Total**	**Per cent**	**Rate[c]**
290, 294.1, 331.0	Dementia	7,836	3.3	0.4
291–294	Other organic psychotic conditions[d]	16,572	7.0	0.9
295	Schizophrenic disorders	34,552	14.7	1.9
296	Other affective psychoses[e]	16,229	6.9	0.9
298–299	Other psychoses	4,555	1.9	0.2
296.2–296.3	Major depressive disorder	43,869	18.6	2.4
311	Depressive disorder, nec	8,987	3.8	0.5
297	Paranoid states	2,164	0.9	0.1
300	Neurotic disorders	22,660	9.6	1.2
301	Personality disorders	8,247	3.6	0.4
302	Sexual deviations and disorders	284	0.1	<0.1
303	Alcohol dependence syndrome	14,211	6.0	0.8
304	Drug dependence	6,826	2.9	0.4
305	Non-dependent drug use disorder	6,399	2.7	0.3
306–310, 312–316	Other non-psychotic mental disorders	41,729	17.7	2.2
V71.0	Observation for suspected mental condition	253	0.1	<0.1
Other codes	Other factors influencing health status, services contact	104	0.04	<0.1
Total		**235,477**	**100.00**	**12.6**

(a) Includes same-day separations.

(b) Includes public psychiatric hospitals.

(c) Separations per 1,000 population.

(d) Excludes dementia in conditions classified elsewhere (294.1).

(e) Excludes major depressive disorder (296.2–296.3).

Source: AIHW National Hospital Morbidity Database.

Co-morbidity

Co-morbidity refers to the occurrence of more than one disorder at the same time, and is commonly found among people with mental disorders. The 1997 Survey of Mental Health and Wellbeing found that nearly 1 in 3 persons with an anxiety disorder also had an affective disorder, and 1 in 5 also had a substance use disorder. Of those who had an anxiety disorder, 8.7% also had both affective and substance use disorders. Also, those with mental disorders are more likely to have physical conditions. Almost 43% of persons with a mental disorder had one or more physical conditions such as a heart problem, diabetes or cancer. This coexistence of a physical condition and a mental disorder was reported much more commonly among females (ABS 1998b).

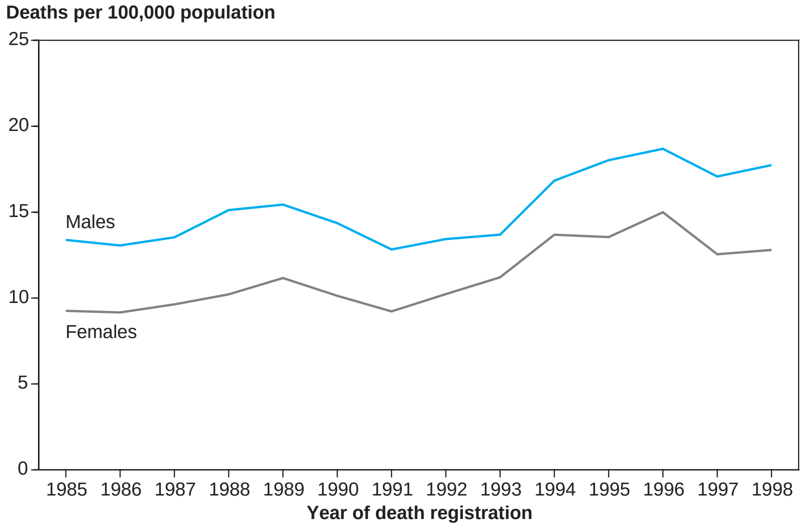
Disability

According to the 1998 Survey of Disability, Ageing and Carers, about 529,000 people had a disability related to a mental disorder (ABS 1999b). Females were more likely to report psychiatric disability than males. Disability was more common (62.9%) among those with both a physical condition and a mental disorder (ABS 1999b).

Mortality

In 1998, a total of 3,268 deaths occurred where a mental disorder was listed as the underlying cause of death. This figure does not include suicide, which is described separately in this section.

Death rates for mental disorders increased between 1985 and 1998 (Figure 2.31). Among males, the age-standardised rate increased from 13.4 deaths per 100,000 in 1985 to 15.4 deaths in 1989, rising to 17.9 deaths in 1998. Female death rates for mental disorders also increased from 9.3 deaths per 100,000 in 1985 to 11.2 deaths in 1989, rising to 12.2 deaths in 1998.



Note: Mental disorders defined as ICD-9 codes 290–319.

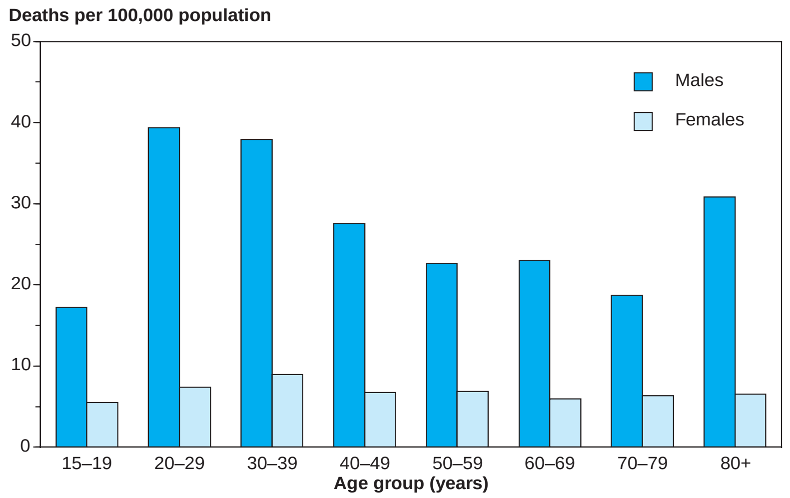
Source: AIHW National Mortality Database.

Figure 2.31: Trends in death rates for mental disorders, 1985 to 1998

Suicides

Suicide is a leading cause of death in Australia, responsible for 2,683 deaths (2,150 males, 533 females) in 1998. The male suicide rate was higher than the female rate across all age groups. Whereas the rate for adult females varied little by age, the male rate peaked between ages 20 and 39 years and (to a lesser extent) at ages 80 and over (Figure 2.32, page 80).

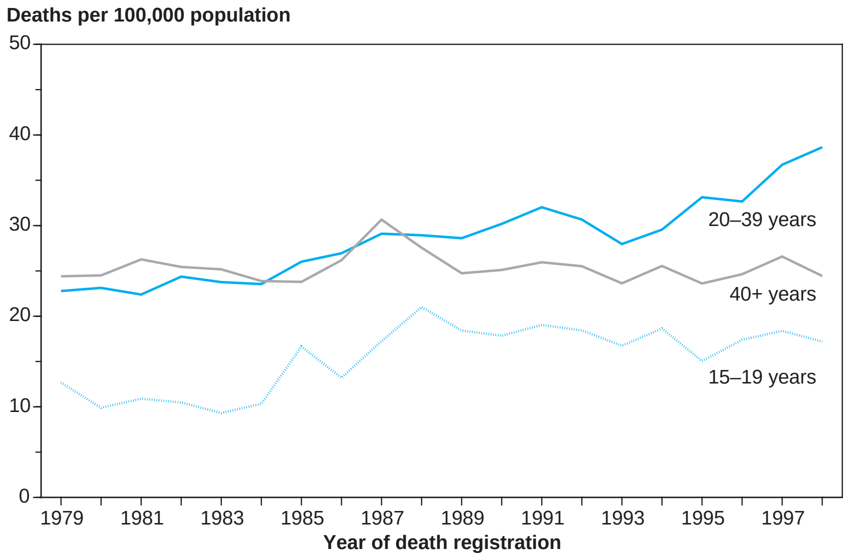
Suicide became a matter of national public health concern in Australia during the 1990s (DHAC 1998). A focus on youth suicide was prompted by the observation that the rate for young males (i.e. ages 15–24 years) had risen about threefold during the 30 years to 1990, and rates at older ages had tended to decline. During the 1990s, the rate did not rise further for males aged 15–19 years, but it continued to increase for males aged 20–39 years (Figure 2.33, page 80).



Note: Age standardised to the Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 2.32: Age-specific suicide rates, 1998



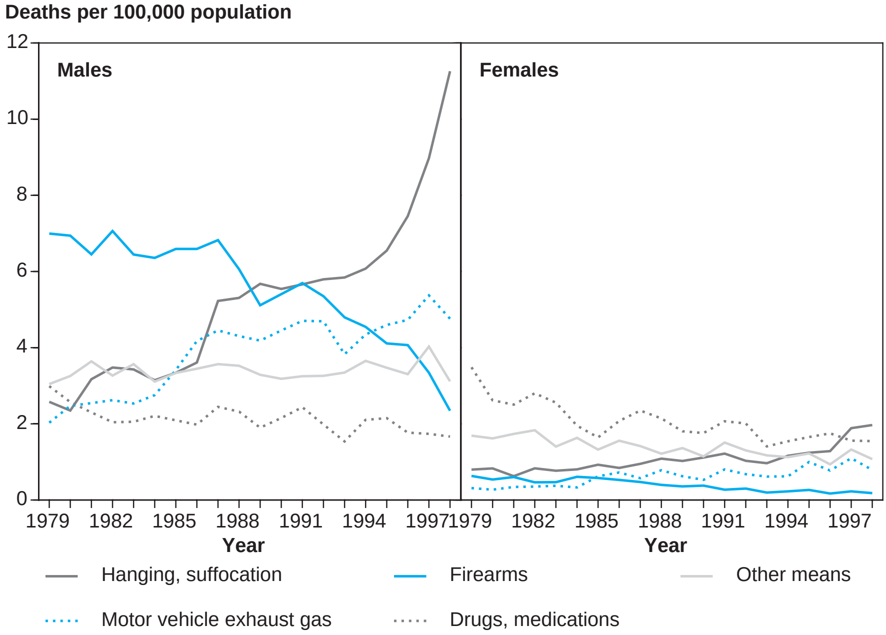
Note: Rates for ages 20–39 years and 40 years and over are age standardised to the June 1991 Australian population. Includes deaths with underlying cause of death codes E950–E959.

Source: AIHW National Injury Surveillance Unit analysis of ABS mortality data.

Figure 2.33: Suicide rates for selected male age groups, 1979 to 1998

Hanging has become the predominant method of suicide in Australia, and its use is accelerating (Figure 2.34). The 1,217 suicide deaths by hanging, strangulation and suffocation in 1998 were 15% of all deaths from external causes, up from 2% in 1980. Hanging has been the most common method of suicide for males since the early 1990s and for females since 1997. The dramatic increase in hanging more than accounts for the total increase in the suicide rate in recent years. Suicide by hanging, strangulation and suffocation rose from 13% of all suicides in 1980 to 45% in 1998. Rates remain much higher for males than females, but are increasing for both sexes.

The other marked changes in the method of suicide are a reduction by more than half in the rate of suicide by shooting since the late 1980s, and an increase of about 20% in suicide by motor vehicle exhaust gas over the same period. Males often use more violent means, which result in a greater number of deaths than among females. On the other hand, females have higher rates of hospital separations for suicide and self-harm attempts (DHAC 1998).



Notes

1. Age standardised to the Australian population at 30 June 1991.
2. Categories: hanging, suffocation E953; motor vehicle exhaust gas E952.0; firearms E955.0; drugs, medications E950.0–950.5; other means, rest of E950–959.

Source: AIHW National Injury Surveillance Unit analysis of ABS mortality data.

Figure 2.34: Suicide mortality, 1979 to 1998

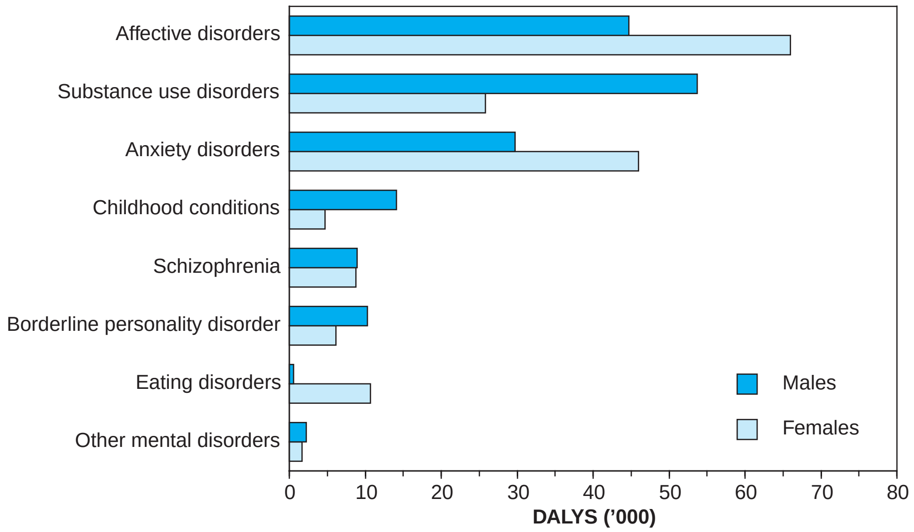
Approximately one-third of persons who die by suicide, and 40% of those who attempt suicide, were receiving psychiatric treatment before the episode (DHAC 1998). Between 60% and 90% of young people who attempt suicide are considered to be depressed (NHMRC 1997a).

Male psychiatric patients are more likely to commit suicide than female patients. Younger patients are at higher risk than older patients, and patients with extended periods of in-patient treatment are at twice the risk of suicide compared with short-stay patients (Lawrence et al. 1999).

Suicide and self-harm accounted for 20,131 hospital separations during 1997–98, more than 53,000 patient-days in total. These figures include people who died in hospital following the suicide attempt.

Burden of mental disorders

Mental disorders were responsible for 13.3% of the total disease burden and for about 30% of the non-fatal burden in 1996 (AIHW: Mathers et al. 1999a). Depression was the leading cause of non-fatal disease burden, responsible for 8% of the total years of 'healthy' life lost due to disability (YLD).



Note: 1 DALY (disability-adjusted life year) = 1 lost year of equivalent 'healthy' life.

Source: AIHW: Mathers et al. 1999a.

Figure 2.35: The burden of mental illness by sex and major category of mental disorder, 1996

In males, substance use disorders accounted for 33% of the burden of disease due to mental problems and disorders in 1996 (Figure 2.35). In females, affective disorders accounted for 39% of the burden. The burden of disease for affective disorders among females was due almost entirely (87%) to depression.

Health system costs

The institutional and non-institutional costs of mental disorders have been estimated at $2.58 billion or 8.3% of the total health system costs in 1993–94. Intentional self-inflicted injuries cost a further $69 million (AIHW: Mathers & Penm 1999b). Hospitals and nursing homes accounted for almost 64% of these costs (AIHW: Mathers & Penm 1999b).

In addition, there are numerous indirect costs to the community resulting from absenteeism, lost productivity, burden on carers and family, legal costs and lost quality of life which are difficult to quantify (DHAC & AIHW 1999a).

Major mental disorders

Two mental disorders, depression and schizophrenia, are discussed further in this section because of their large overall burden in the Australian population.

Depression

A mental problem is classified as 'depression' when at least five of the nine symptoms listed in Box 2.11 are present (DHAC & AIHW 1999a). The severity of depression ranges from minor melancholy and stress to debilitating levels requiring professional help and medication. Depression as defined here includes depressive neurosis and postnatal or reactive depression.

Depression was the most common mental disorder reported by adults in the 1997 Survey of Mental Health and Wellbeing, with 3.4% of males and 6.8% of females reporting the condition (ABS 1998b).

Depression was the fourth most common problem managed by general practitioners in 1998–99 as revealed by the BEACH survey, at a rate of 35 per 1,000 encounters (AIHW GPSCU: Britt et al. 1999). The majority of patients were females (68%), and between the ages of 25 and 64 years (72%). However, there is evidence that depression is underdiagnosed, and undertreated in primary care settings (NHMRC 1997a).

Box 2.11: Major depressive symptoms

- *Depressed mood most of the day.*
- *Loss of interest or pleasure (in all or most activities, most of the day).*
- *Large increases or decreases in appetite (significant weight loss or gain).*
- *Insomnia or excessive sleeping (hypersomnia).*
- *Restlessness as evident by hand wringing and similar other activities (psychomotor agitation) or slowness of movement (psychomotor retardation).*
- *Fatigue or loss of energy.*
- *Feelings of worthlessness, or excessive and inappropriate guilt.*
- *Diminished ability to concentrate, or indecisiveness.*
- *Recurrent thoughts of death or suicide.*

Source: APA 1996.

Depression and coexisting disease

Depression frequently occurs in combination with anxiety disorders, substance-related disorders, conduct disorders, eating disorders, attention deficit/hyperactivity disorder and chronic conditions such as heart disease, cancer and diabetes.

The 1997 Survey of Mental Health and Wellbeing found that approximately 50% of people who have an affective or depressive disorder also have a related physical problem. Recent studies indicate that persons treated for depression have 2.3 times the risk of having a heart attack than those without it (Musselman et al. 1998). Depression is also associated with an increased risk of developing diabetes and poorer diabetic control (Goodnick 1997). Furthermore, approximately half the people being treated for cancer have a psychiatric disorder, usually with depressive symptoms.

According to the BEACH survey, most of the co-morbidities presenting with depression-related GP encounters were for chronic conditions such as hypertension (67 per 1,000 depression-related encounters), back complaints (31 per 1,000), menopausal complaints (27 per 1,000) and diabetes (22 per 1,000). Sleep disturbance, including insomnia, managed at a rate of 21 per 1,000 depression encounters, was the only other psychological problem co-managed with depression.

People with depression may also indulge in more risky health behaviours. There is evidence that 35% of people with mental disorders smoke; the effect is age specific, being more prevalent in younger adults (Jorm 1999).

Schizophrenia

Schizophrenia, bipolar affective disorders and delusional disorders are generally known as psychotic disorders. Schizophrenia accounts for over 60% of the psychotic disorders, with males and females equally affected but with differing degrees of severity (Jablensky et al. 1999).

There are approximately 160,000 sufferers of schizophrenia in Australia, and the figure increases by at least 2,000 each year (NISAD 1998). Schizophrenia can lead to lifelong disability, affecting 1 in every 100 persons, often between the ages of 16 and 25 years.

For males, the incidence of schizophrenia is highest in those aged 15–24 years and for females in those aged 25–34 years. The disorder can also appear later in adulthood, although onset is less common after age 30 and rare after 40.

One in ten persons suffering from schizophrenia commits suicide and four out of ten are known to have attempted suicide. Most people who commit suicide do so within the first 10 years of their illness (DHAC & AIHW 1999a).

Diabetes

Diabetes is a long-term (chronic) condition in which blood glucose levels remain high because the body produces little or no insulin or cannot use insulin properly. Insulin is a hormone produced by the pancreas that helps the body to use glucose.

Diabetes is the seventh leading cause of death in Australia (ABS 1999d), and contributes to significant illness, disability, poor quality of life and premature mortality. Over the course of the disease, diabetes can lead to a variety of conditions and complications including heart disease, stroke, blindness, kidney failure and neurological problems. Diabetes also contributes to many pregnancy-related complications for the mother and the unborn child.

Types of diabetes

Because the common feature of diabetes is high blood glucose, it is often mistakenly thought to be a single disease. There are several types of diabetes, with different causal mechanisms. There are three major types:

Type 1 diabetes is marked by a complete lack of insulin. People with this form of diabetes require insulin therapy to survive. It is the most common cause of childhood diabetes.

Type 2 diabetes is marked by reduced levels of insulin, or the inability of the body to use insulin properly. The disease is common among people aged 40 years and over. Many people with this form of diabetes eventually need insulin therapy to control their blood glucose levels.

Gestational diabetes occurs during pregnancy in about 4–6% of females not previously diagnosed with diabetes. Gestational diabetes is a marker of greater risk of developing Type 2 diabetes later in life.

Both genetic and environmental factors contribute to the onset of diabetes. Type 1 diabetes is believed to be caused by particular biological interactions and exposure to environmental triggers. In addition to ageing and genetic predisposition, the risk of developing Type 2 diabetes increases with body fatness. Regular physical activity, on the other hand, plays a protective role against the development of Type 2 diabetes (Manson et al. 1992; Perry et al. 1995).

Poor nutrition in foetal and early infant life is also considered to predispose a person to the development of Type 2 diabetes (Storlien et al. 1997; Hales & Barker 1992). Low birthweight, therefore, is considered a useful marker of the lifetime risk for Type 2 diabetes (Leger et al. 1997). The risk factors for gestational diabetes are mostly similar to those for Type 2 diabetes.

Incidence and prevalence

There are no national estimates of the incidence or prevalence of diabetes, based on measured blood glucose levels. According to the 1995 National Health Survey (NHS), over 430,700 persons (2.4% of the total population) reported that they had been diagnosed with diabetes at some point in their lives. Of those, 82% reported that they currently have diabetes (ABS 1997d).

The true prevalence of diabetes is higher than the figures given above suggest because a large proportion of diabetes, especially Type 2 diabetes, remains undiagnosed in the community. It has been estimated that for every person in the population diagnosed with diabetes, there is one undiagnosed person (DHAC & AIHW 1999c). It is therefore estimated that there were about 700,000 persons with diabetes in Australia in 1995 (Amos et al. 1997).

Among the 1995 NHS respondents reporting diabetes, 18% had Type 1 diabetes, 42% had Type 2 diabetes, and 6% had gestational diabetes. Among the remaining 33%, i.e. those who did not report the type of diabetes, the majority were determined to have Type 2 diabetes (ABS 1997d). Estimates based on various data sources suggest that the prevalence of gestational diabetes is between 5.5% and 8.8% of all pregnancies (Stone & Halliday 1996; Moses & Colaguiri 1997).

The prevalence of diabetes increases with age, from 0.1% among people aged less than 15 years to 8.9% among those aged 75 years and over (ABS 1997d). There is also a marked difference in the age profile of people with various types of diabetes. Type 1 diabetes is more common among children and young adults because of its early onset; Type 2 diabetes is the predominant form among middle-aged and elderly persons on account of a rapid increase in its prevalence after the age of 45.

The prevalence of diabetes, particularly Type 2 and gestational diabetes, is higher in certain population groups, including Aboriginal and Torres Strait Islander peoples and people of Chinese, Vietnamese, Indian and Arab origin (Dowse et al. 1990; FECCA 1997). On the other hand, Type 1 diabetes is more common among populations of European origin.

Estimates from regional studies indicate that the incidence (new cases) of Type 1 diabetes is between 12 and 15 per 100,000 among persons aged less than 15 years (McCarty et al. 1996). In New South Wales, the incidence of Type 1 diabetes among children under the age of 15 years was reported to be about 22 per 100,000 in 1996. It has been suggested that the incidence of Type 1 diabetes in Australia is on the rise, increasing annually by 3% between 1992 and 1996 (Handelsman & Jackson 1999).

Efforts are being made to generate reliable estimates of the incidence and prevalence of diabetes in Australia. The AIHW has recently established the National Diabetes Register to assemble and maintain a national database of persons diagnosed with insulin-treated diabetes (see Box 2.12). The Australian Diabetes, Obesity, and Lifestyle Study (AusDiab) is also currently in progress to determine the prevalence of diabetes using the oral glucose tolerance test. Plans to conduct a national biomedical risk factor survey, which would include testing for diabetes, are also being developed.

Diabetes-related complications

Diabetes, if uncontrolled, can lead to a range of complications including diseases of the small blood vessels (microvascular disease) such as kidney disease, nerve damage and loss of vision, and diseases of the large blood vessels (macrovascular disease) such as coronary heart disease, stroke and peripheral vascular disease. The risk of microvascular complications is similar in both Type 1 and Type 2 diabetes, but macrovascular complications are more common in persons with Type 2 diabetes.

All types of diabetes are known to be associated with obstetric and neonatal complications. Poorly managed diabetes in pregnancy can lead to spontaneous abortions, stillbirths or difficult births.

A range of factors is known to lead to, or contribute to, the risk of developing complications in diabetes. In addition to uncontrolled glucose levels and duration of disease, these risk factors include age, genetic predisposition, obesity, high blood

Box 2.12: National Diabetes Register

The National Diabetes Register was established in 1999 as part of the National Diabetes Strategy to collect information about Australians who have insulin-treated diabetes. The Register is operated by AIHW using data from Diabetes Australia and the Australasian Paediatric Endocrine Group.

The Register is currently collecting information about people who have been diagnosed with insulin-treated diabetes since 1 January 1999.

Information contained in the register will assist in monitoring the incidence of insulin-treated diabetes in Australia (including Type 1, Type 2 and gestational diabetes). Researchers will also be able to use the Register for their studies on diabetes. In particular, it is expected that the Register will become an important source of information for clinical and epidemiological studies of the causes, complications and even prevention of diabetes.

pressure, high cholesterol and tobacco smoking. The avoidance or reduction of risk-increasing behaviours and conditions can delay the onset or slow the progression of complications associated with diabetes.

According to the 1995 NHS, the proportion of people with diabetes who also reported hypertension (44.1%) was more than four times that of people without diabetes (10.0%). Similarly, the proportion of people with diabetes who reported heart disease (14.9%) was more than six times that of people without diabetes (2.5%), and the proportion of people with diabetes who had kidney disease (6.8%) was over four times that of people without diabetes (1.5%). For eye disorders, 6% of people with diabetes reported blindness, 10% reported cataracts and 3% reported glaucoma, all complications at much higher rates than reported by people without diabetes (ABS 1997d).

A study in South Australia has estimated that among people with Type 2 diabetes, two out of three persons had at least one microvascular complication and more than one out of two persons had at least one macrovascular complication (Phillips et al. 1998). Common complications found were nerve damage, coronary heart disease and circulatory problems in lower limbs and feet. More males than females reported diabetes-related complications.

Data from the 1999 National Association of Diabetes Centres (NADC) survey have also shown that persons attending specialist diabetes services (diabetes centres and specialist endocrinologists in private practice) have had a wide range of complications including erectile dysfunction, nerve damage, kidney problems, eye damage, circulatory problems in the limbs, myocardial infarction and stroke (Table 2.13, page 88).

Further evidence of renal complications caused by diabetes is found in the Australia and New Zealand Dialysis and Transplant Registry, a register of people requiring kidney dialysis or a kidney transplant. About one in five registrants during 1995–97 were persons with diabetes (Disney et al. 1998a).

Table 2.13: Presence of complications among people with diabetes, 1999

Current condition	Per cent	Condition[(a)]	Per cent
Erectile dysfunction	26.4	Severe hypoglycaemia	4.5
Peripheral neuropathy	23.0	Myocardial infarction	2.3
Peripheral vascular disease	12.2	Stroke	2.1
Previous foot ulcer	5.0	New blindness	1.4
Active foot lesion	3.7	Lower limb amputation	0.9
Current foot ulcer	2.4	End-stage renal disease	0.8
Total sample	**7,110**	**Total sample**	**7,110**

(a) Condition seen in the last 12 months.

Source: NADC ANDIAB (Australian National Diabetes Information Audit & Benchmarking) Collection.

Health services use

People with diabetes are more than twice as likely as those without diabetes to consult health professionals or use hospital services (ABS 1997d). This higher rate is related to treatment for blood glucose control, as well as for complications associated with diabetes.

GP consultations

In 1998–99, according to the BEACH survey, diabetes was managed at 3.2% of all GP encounters with males and 2.1% of encounters with females (AIHW GPSCU: Britt et al. 1999). For persons with diabetes, high blood pressure and lipid disorders were the other main problems managed (Table 2.14). Ischaemic heart disease without angina and heart failure were also common problems managed for males, whereas osteoarthritis and depression were commonly managed for females with diabetes.

Table 2.14: GP consultations: top five 'other' problems managed at encounters where diabetes was managed, 1998–99

Males	Per cent[(a)]	Females	Per cent[(a)]
Hypertension	19.0	Hypertension	20.1
Lipid disorder	7.3	Lipid disorder	5.3
IHD[(b)] without angina	3.9	Immunisation[(c)]	5.1
Immunisation[(c)]	3.7	Osteoarthritis	3.0
Heart failure	2.7	Depression	2.9
Total number of complications	**1,544**	**Total number of complications**	**1,543**

(a) Listed condition as a proportion of all complications.

(b) Ischaemic heart disease.

(c) Includes preventive immunisation medication for hepatitis, tetanus, influenza and other non-specific conditions.

Source: AIHW GPSCU: Britt et al. 1999.

Hospital separations

In 1997–98, diabetes was the principal diagnosis in 23,855 hospital separations or 0.4% of all hospital separations for that period. Diabetes is often not reported as the principal diagnosis because the condition responsible for the hospitalisation, rather than the diabetes, is recorded as the principal diagnosis even when it is a complication of diabetes. Diabetes is often reported as an additional diagnosis, in particular in association with primary diagnoses of coronary heart disease, stroke and kidney disease. When separations for diabetes as the principal diagnosis and as an additional diagnosis are combined, the total number of such separations rises to 300,181 or 5.4% of all hospital separations (AIHW 1999b). This high number gives some insight into the extent of diabetes-related morbidity in the population, and the need to manage it in a hospital setting.

The impact of diabetes on the health system is further increased by the long periods that patients with diabetes spend in hospital. The average length of stay in hospital for persons with diabetes as the principal diagnosis was 7 days (8.1 days when same-day separations were excluded). In comparison, the average length of stay for all persons without diabetes as the primary diagnosis was 4.0 days (AIHW 1999b).

Diabetes also contributes to extended hospital stays for other related or non-related conditions. When separations for diabetes as an additional diagnosis were included in the analysis, the average length of hospital stay increased to 7.9 days.

Mortality

Diabetes was the underlying cause of 2,751 deaths, or 2.2% of all deaths in 1998. In addition, diabetes was listed as an associated cause of 6,703 deaths (ABS 1999d).

Diabetes is rarely listed alone as the cause of death. Of the deaths in 1998 where diabetes was given as the underlying cause of death, in less than 2% of cases it was listed as the only cause. Listed in association with diabetes (as an underlying cause of death) were conditions such as ischaemic heart disease (54.0%), hypertensive disease (22.6%), stroke (20.8%) and kidney-related diseases (19.7%).

Of the deaths in 1998 where diabetes was listed as an associated cause of death, ischaemic heart disease was recorded as the underlying cause of death in 26.4% of cases. Other prominent underlying causes of death with which diabetes was associated included cancer (13.8%) and stroke (8.3%).

The death rate for diabetes (as an underlying cause of death) has shown a consistent increase in recent years, with average annual increases of 1.7% and 0.4% for males and females respectively between 1986 and 1997.

Burden of diabetes

In terms of premature mortality, diabetes was responsible for almost 70,000 years of life lost (YLL) in 1996, almost 5.3% of the estimated YLL in Australia that year for all causes. Diabetes and its complications were also responsible for much disability in 1996, with more than 53,000 years of equivalent ‘healthy’ life lost to disability (YLD), or 4.6% of all YLDs estimated for 1996. Although the impact of diabetes in terms of premature mortality was similar in both sexes, YLD was much higher among males than females (AIHW: Mathers et al. 1999a).

As a result of the high impact of the disease, a substantial proportion of healthcare expenditure goes on diabetes and its complications. The direct costs of diabetes and its complications in 1993–94 have been estimated at $681 million, or 2.2% of total health system costs (AIHW: Mathers & Penm 1999a).

Asthma

Asthma is a chronic inflammatory disorder of the airways that results in variable airflow obstruction in response to certain triggers. The disease affects all age groups but particularly young people, and ranges in severity from intermittent mild symptoms to a severe, incapacitating and life-threatening disorder.

People with asthma experience reduced quality of life and require a range of health services, from consultations in primary care to emergency room visits to hospital inpatient care. The symptoms are reversible, either spontaneously or with treatment; however, death may result if the asthmatic episode is not managed properly (NHLBI 1992).

Asthma is highly prevalent in Australia. Although asthma mortality has declined in the past decade, Australia has the highest death rate for asthma among its young people in comparison to other developed countries (Peat et al. 1994).

Asthma became the sixth National Health Priority Area in 1999.

Prevalence

The prevalence of asthma in Australia is one of the highest in the world, with more than 2 million Australians estimated to be affected by the disease. According to the National Health Survey (NHS), the self-reported prevalence of asthma has increased from 85 per 1,000 persons in 1989–90 to 113 per 1,000 persons in 1995 (ABS 1997c). Most of these had asthma of mild to moderate severity, and were not at high risk of death from the disease.

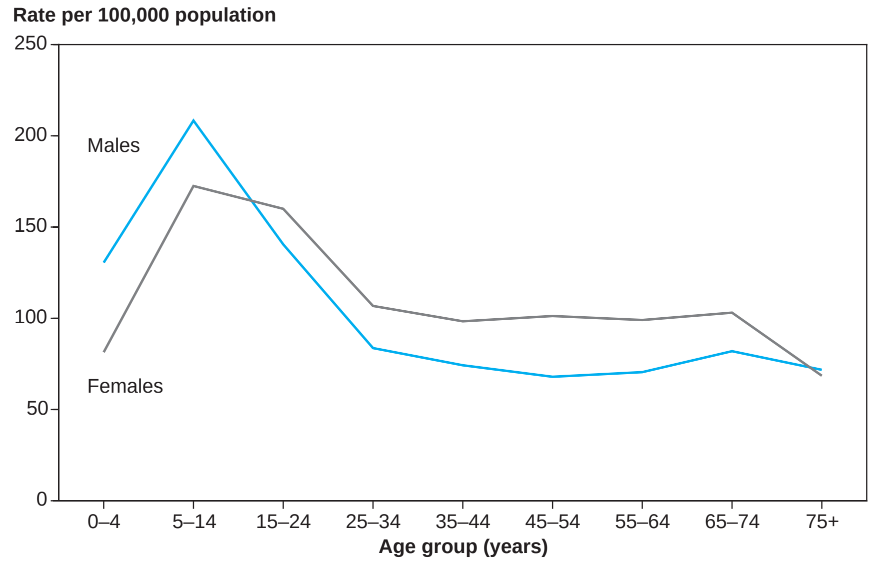
Asthma is more prevalent in young people. In the 1995 NHS, it was more commonly reported as a recent or long-term condition by those aged less than 25 years (149 per 1,000 persons). It was reported most often in those aged 5–14 years (192 persons per 1,000). Among those aged less than 15 years, asthma was reported more often by males, but in older age groups the condition was more common in females (Figure 2.36).

There is some regional/latitudinal variation in the prevalence of asthma in Australia. According to the 1995 NHS, Queensland had the highest (134 per 1,000 persons) and Tasmania the lowest (103 per 1,000 persons) prevalence of asthma. Symptoms of asthma do not vary much with season, although autumn has been reported as the time when asthma attacks increase in number and severity (ABS 1997c).

Risk factors

The symptoms of asthma can be triggered by a wide variety of agents in the environment, acting either alone or in conjunction with other irritants. The irritants that cause episodes of airway narrowing and other asthma symptoms are specific to each individual. The known irritants include allergens, exercise, viral infections, exposure to tobacco smoke, food chemicals, cold air and weather changes.

Allergens. Known asthma allergens include house dust mites, pollens and animal fur (usually cats and dogs). A high proportion of asthmatics (about 80%) are allergic to the house dust mite (Newton et al. 1998). Australian houses are reported to have some of the highest levels of house dust mite. This is mainly due to environmental factors such as the location of housing in temperate coastal climates, which provide ideal conditions for mite proliferation.



Source: ABS 1997c.

Figure 2.36: Age-specific prevalence of asthma, 1995

Smoking. Tobacco smoking has been identified as another risk factor for asthma. According to the 1995 NHS, asthma prevalence was higher among smokers (11%) and ex-smokers (11%) than those who have never smoked (9%). Furthermore, the prevalence of asthma in young children living in households with one or more smokers was higher than in non-smoking households. Of children aged 0–4 years, 13% living in households with one or more smokers had asthma compared with 9% in non-smoking households. Similarly, of children aged 5–9 years, 22% living in households with one or more smokers had asthma compared with 18% in non-smoking households (ABS 1997c).

Drugs. Traditional, prescription or non-prescription drugs can also trigger asthmatic episodes. The medications that may cause or exacerbate asthma symptoms include beta-adrenergic blocking agents and aspirin. Some herbal preparations, such as 'Royal Jelly' which has concentrated bee-pollen, can also trigger asthma. Allergic reactions and exacerbation of asthma have been reported with the use of herbs such as echinacea (Newton et al. 1998).

Other irritants. Exposure to sensitising agents in the workplace can also cause asthma, generally referred to as occupational asthma. Known agents include wood dust, flour, laboratory animals, industrial chemicals (isocyanates and epoxy resins) and metal salts. Extended exposure to these agents may also increase the severity of asthma symptoms (Newton et al. 1998).

Immunogenetic susceptibilities. Asthma often coexists with other respiratory and allergic conditions such as eczema, seasonal allergic rhinoconjunctivitis (hay fever), chronic obstructive pulmonary disease, emphysema and bronchitis, several of which are immunogenetic in origin.

Asthma management

Asthma can be controlled by effective education, regular use of peak flow meters, identification of trigger factors, coordinating self-management with written action plans, and regular medical consultations. Studies have shown that self-management education reduces hospitalisations, emergency room visits, unscheduled visits to the doctor, days off work and nocturnal asthma (Gibson et al. 1999).

Persons who have had a hospital admission related to asthma within the last 12 months of their consultation or who require three or more medications for control of their asthma are at an increased risk of dying from the disease. These persons need tailored management plans developed by their GP and close consultation with their provider (Ruffin & Southcott 1997).

General practitioner consultations

According to the BEACH survey, asthma is the sixth most frequently managed problem (32 per 1,000 encounters) by GPs, accounting for 2.2% of problems managed in 1998–99 (AIHW GPSCU: Britt et al. 1999).

Hospital separations

Asthma is in the top five problems referred to hospital by GPs (AIHW GPSCU: Britt et al. 1999). During 1997–98, asthma was the principal diagnosis in 60,280 hospital separations or 1.08% of all hospital separations, with an average stay of 3.5 days (AIHW 1999b).

Asthma is often reported as an additional diagnosis in hospital separations, in particular with principal diagnoses of pneumonia, cataract and heart conditions such as angina. When separations for asthma as the principal diagnosis and as an additional diagnosis are combined, the number rises to 251,472 or 4.52% of all hospital separations (AIHW 1999b). This figure gives some insight into the extent of hospital use associated with asthma.

Emergency department admissions

Asthma is one of the most common reasons for emergency department admissions. The clinical presentation encompasses the whole spectrum of disease severity from chronic cough or mild wheeze to respiratory arrest. Misdiagnosis, undertreatment or poor asthma control of persons with asthma in the community and possibly in hospitals often lead to re-admissions either in the course of the same attack or with subsequent attacks of asthma.

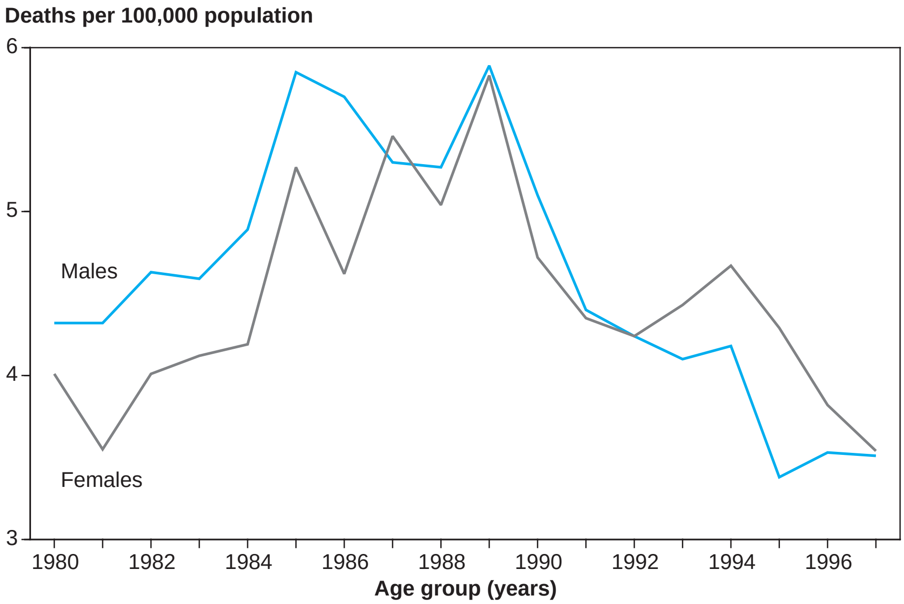
A cross-sectional survey in Adelaide in 1994 found that 62% of 272 patients aged under 15 years and 40% of 165 patients aged 15 years and over had attended hospital two or more times during the preceding year. Among adults, repeat attendance was related to asthma severity but among children re-admissions were associated with parental attitudinal variables relating to appraisal of their child’s asthma severity, management of asthma attacks and parental worry (Wakefield et al. 1997).

Disability

Asthma is a cause of significant disability in the community. According to the 1998 Disability, Ageing and Carers Survey (ABS 1999b), more than 171,000 people in Australia reported asthma as a disabling condition. The disability is mainly in the form of restriction of daily activities, including work and school participation. Furthermore, 131,400 Australians reported experiencing specific activity limitation in regard to self-care, mobility and communication due to their asthma (ABS 1999b).

Mortality

Asthma was the underlying cause of 685 deaths in 1998, compared with 543 in 1980 and 964 in 1989 (the peak year of asthma deaths). The death rates were generally similar for both sexes from 1980 to 1998, although the rate among females was slightly higher than the rate among males between 1993 and 1998. The declining death rates since 1990 (Figure 2.37) suggest improved treatment and management of the disease.



Note: Age standardised to the Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 2.37: Trends in death rates for asthma, 1980 to 1998

Burden of disease

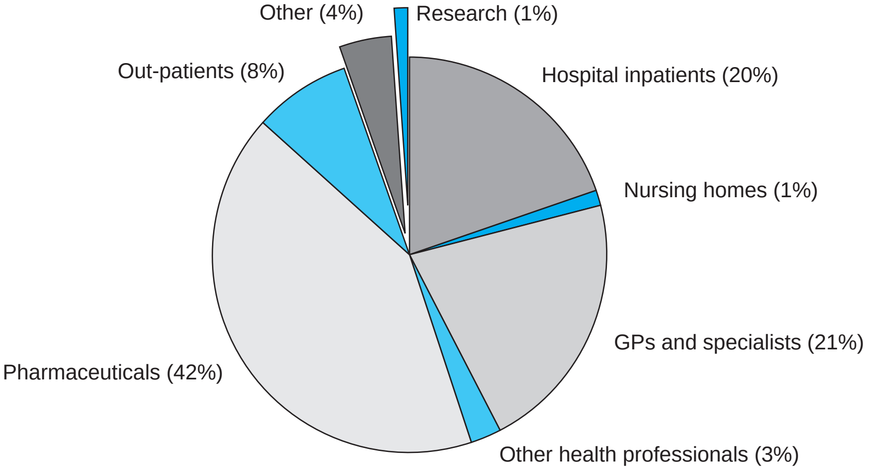
As indicated above, asthma is a major cause of disability rather than premature mortality. In 1996, asthma was responsible for 2.6% of the total burden of disease in Australia. However, most of the burden of disease was more in the form of YLD (over 86%) than YLL (AIHW: Mathers et al. 1999a).

The majority of cases of asthma are diagnosed before the age of 15. These cases contribute 70% of the total asthma burden. The average duration of childhood/ adolescent asthma is around 17 years and the average duration for asthma diagnosed in adulthood is around 30 years. As a result, the majority of asthma cases diagnosed in childhood will continue into adulthood. This means that at any point in time the majority of existing (prevalent) cases of asthma will be in adults, with around 67% of the disability burden associated with prevalent cases at ages 15 and over and 34% associated with prevalent cases at ages 25 and over.

Health system costs

The health system costs for asthma are estimated to be $478 million in 1993–94, more than 19% of the total costs for all respiratory conditions in that period. These include costs that relate to prevention, diagnosis and treatment of asthma.

Pharmaceuticals constitute a large proportion of asthma-related costs ($199 million, or 42% of the total costs). This is in contrast to the pattern of costs for other diseases, for which 45% of all costs are in the hospital sector (inpatients and outpatients), and only 13% of the costs are towards pharmaceuticals. Hospital sector expenditure accounts for only 28% of direct costs for asthma (Figure 2.38) (AIHW: Mathers & Penm 1998).



Source: AIHW: Mathers & Penm 1998.

Figure 2.38: Health system costs for asthma, 1993–94

2.4 Other major chronic diseases and conditions

Although more than 80% of the years of life lost due to premature mortality (YLL) have been attributed to the six National Health Priority Areas (NHPAs), a large proportion of years of equivalent ‘healthy’ life lost to disability (YLD) result from a variety of other chronic diseases and conditions. Prominent among the non-NHPA chronic diseases and conditions described in this section are chronic obstructive pulmonary diseases

(COPD), musculoskeletal diseases and conditions, nervous system disorders, kidney problems and cirrhosis of the liver. This section outlines morbidity, disability and mortality associated with these diseases and conditions.

Chronic obstructive pulmonary disease

COPD, also referred to as chronic obstructive airways disease, is a term used to describe a combination of several different but related diseases. COPD is a progressive and irreversible disabling disorder characterised by diminished breathing capacity of the lungs. Several factors have been identified as contributors to COPD. Cigarette smoking is the most common risk factor; other risk factors include exposure to pollution (in the workplace or elsewhere) and/or infection.

Chronic bronchitis and emphysema are the two prominent COPD diseases. Unspecified bronchitis, extrinsic allergic aleolitis and primary pulmonary heart disease (excluding kyphoscoliotic heart disease) are also categorised as COPD.

It is estimated that there were almost 300,000 persons with COPD in 1996, with more than 20,000 new cases every year (AIHW: Mathers et al. 1999a). A large proportion of these cases were males.

Mortality. Although much less prevalent in the population than asthma, COPD is responsible for more deaths. In 1998, COPD was responsible for 5,352 deaths, the fourth most common cause of death among males (3,326 deaths) and sixth most common cause of death among females (2,026 deaths).

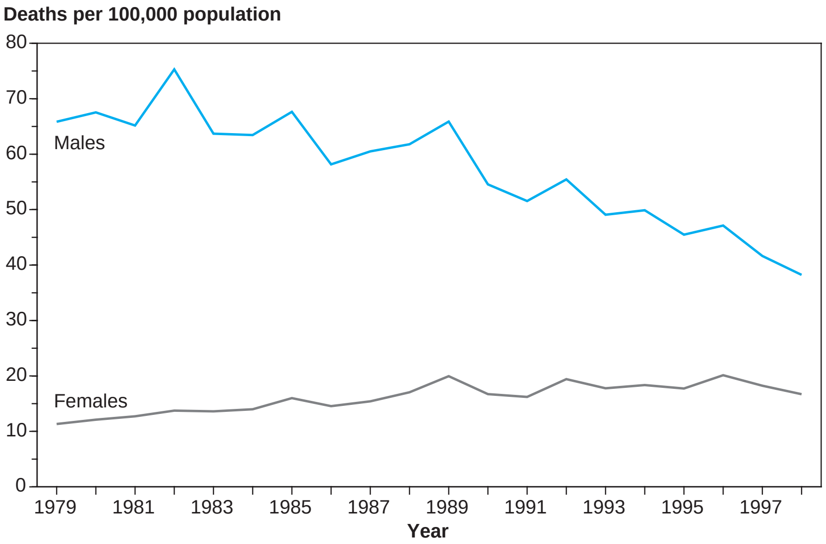
The male death rate for COPD decreased from a peak of 75 per 100,000 in 1982 to a low of 38 per 100,000 in 1998. In contrast, the female death rate increased slightly from 11 per 100,000 in 1979 to 17 per 100,000 in 1998 (Figure 2.39, page 96).

Reductions in male mortality from COPD are considered to follow the decline in smoking rates and, to a lesser extent, better management of the disease. The increase in the female death rate could be the delayed effect of an increase in the proportion of female smokers, from the late 1970s to mid-1980s.

Hospitalisation. In 1997–98, there were almost 40,000 hospital separations with the principal diagnosis of COPD, with an average length of stay of 5.3 days. Hospitalisations for COPD occur principally among the elderly.

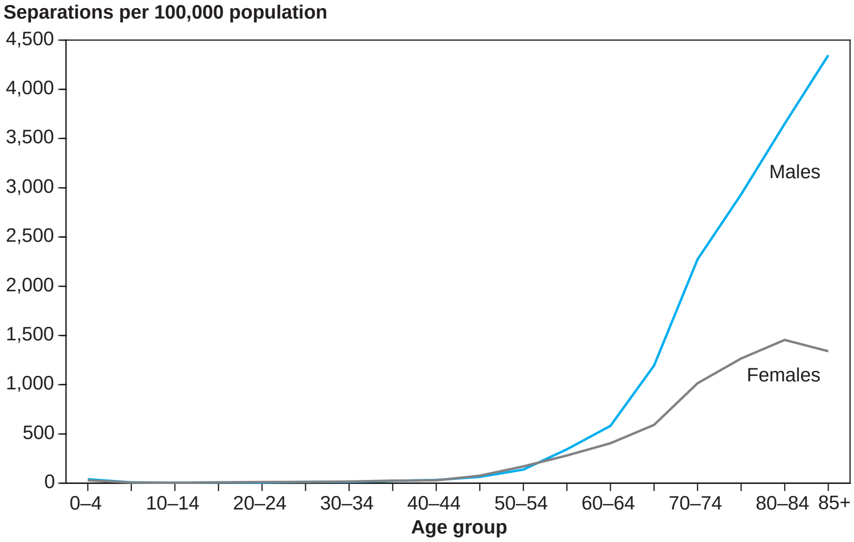
Hospital separation rates for COPD were higher for males than for females. Male hospital separations rates increased sharply from 140 per 100,000 in the age group 50–54 years to a peak of 4,300 per 100,000 in the age group 85 years and over. The increase in female rates with age was not as pronounced, rising from 170 per 100,000 in the age group 50–54 years to a peak of 1,450 per 100,000 in those aged 80–84 years (Figure 2.40).

Disability. COPD is a major cause of disability. It occurs more commonly among older individuals who often have multiple chronic conditions that contribute to overall disability. A prospective study of COPD suggests that disability in persons suffering from COPD progresses gradually. However, within 7 to 8 years of initial diagnosis, most persons with COPD are no longer capable of productive work (Goldring et al. 1993).



Source: AIHW National Mortality Database.

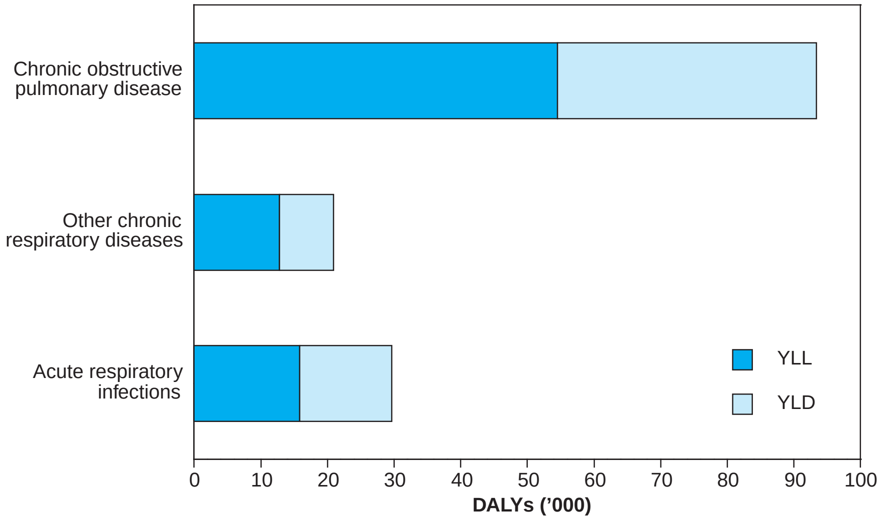
Figure 2.39: Trends in death rates for chronic obstructive pulmonary disease, 1979 to 1998



Source: AIHW National Hospital Morbidity Database.

Figure 2.40: Age-specific hospital separations with COPD as the principal diagnosis, 1997–98

Burden of disease. The burden of COPD includes both premature mortality and significant disability. In 1996, COPD was the largest contributor to the burden of disease associated with all respiratory diseases and conditions (including asthma), three times the burden of acute respiratory infections and more than four times the burden of other chronic respiratory diseases (Figure 2.41).



Source: AIHW unpublished data.

Figure 2.41: The burden of chronic obstructive pulmonary disease and other respiratory diseases, 1996

The burden of COPD was greater among males than females. In 1996, it was the fourth leading cause of disease burden among males, accounting for 4.2% of their total disease burden, and the sixth leading cause for females, 3.2% of their total disease burden (AIHW: Mathers et al. 1999a:66).

The burden due to COPD increases with age, to peak in the age groups 55–74 years for males and 75 years and over for females. Among those aged 65 years and over, COPD ranks as the fourth leading cause of burden for both males and females, accounting for 5.8% and 4.0% respectively of the total burden (AIHW: Mathers et al. 1999a:73).

Arthritis and other musculoskeletal disorders

Arthritis and other diseases of the musculoskeletal system and connective tissue are a diverse group of diseases and conditions that includes problems, conditions and disorders such as chronic back pain, gout, osteoporosis, osteoarthritis, rheumatoid arthritis and juvenile arthritis. They are responsible for considerable illness, morbidity and disability, compromising the quality of life, but have relatively low mortality when compared with other disease groups. The impact of these diseases and conditions is described below.

The scale of the problem

Incidence and prevalence. In 1995, almost 5 million Australians (26% of the total population) self-reported one or more musculoskeletal diseases or conditions (ABS 1997b:21). A majority of these respondents, 17% of the total population, reported their problem or condition as being long term (one that had lasted or was expected to last for 6 months or more). Arthritis and back problems (disorders of the intervertebral disc and unspecified back problems) were reported most commonly, by 15% and 6% of the total population respectively (ABS 1997b:20,21).

Hospital separations and visits to GPs are other useful indicators of the extent of illness caused by these diseases and conditions (Table 2.15). In 1997–98, hospital separations for diseases of the musculoskeletal system and connective tissue represented 5.6% of all hospitalisations, with an average length of stay of 4.1 days. There were slightly more separations among males (52%) than females (48%). Musculoskeletal diseases and conditions also accounted for 11.7% of problems managed by GPs in 1998–99, with back complaints and osteoarthritis being the most common (AIHW GPSCU: Britt et al. 1999:41).

Estimates of the incidence and prevalence of various musculoskeletal diseases and conditions, based on a range of data sources, have been recently generated (AIHW: Mathers et al. 1999a). Back pain is the most common of these diseases and conditions, with a prevalence rate of 51 per 1,000 population, followed by osteoarthritis with a rate of 34 per 1,000 population (Table 2.15).

Disability. Musculoskeletal diseases and conditions are responsible for much disability in the population. In 1998, about 1.2 million Australians were reported to have a disability due to arthritis and other musculoskeletal disorders (AIHW 1999a:219). This represents about one-third (34.4%) of people with a disability.

Of those reporting arthritis or other musculoskeletal disorders as their disabling condition, more than 90% had restrictions in one or more of their core activities of self-care, mobility and communication, and/or restrictions in schooling or employment. People who were unable to perform core activities, or who always needed assistance, together with those who sometimes needed assistance, represented 29% of people reporting a musculoskeletal disability (ABS 1999b:23). Old age, accident and injury were described as the major causes of disability attributed to arthritis and other musculoskeletal disorders, each accounting for 27% of the reported cases. Working conditions, work and overwork were reported as responsible in 21% of the cases of musculoskeletal disability (ABS 1999b:24).

Mortality. Compared with other major disease groups, deaths attributed to arthritis and other diseases of the musculoskeletal system as the underlying cause are relatively uncommon. In 1998, death rates for diseases of the musculoskeletal system and connective tissue were 2.3 per 100,000 males and 3.7 per 100,000 females.

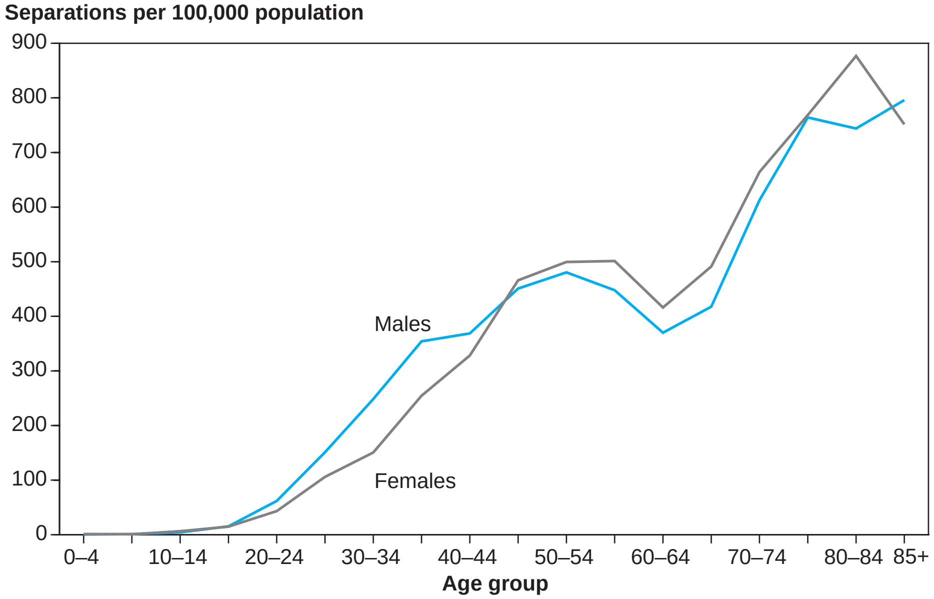
Disease burden. In 1996, musculoskeletal diseases and conditions represented 4.7% of the total disease burden among females and 2.6% of the total burden among males (AIHW: Mathers et al. 1999a:69). Years of 'healthy' life lost due to disability represented 94% of the total burden among males and 91% among females.

Health system costs. Musculoskeletal disorders and conditions accounted for about \$3 billion in health system costs in 1993–94, the third highest in the list of disease groups that are responsible for most health system expenditure. Back problems were a major component, accounting for 23% of the total expenditure on musculoskeletal disorders (Table 2.15). Osteoarthritis accounted for 21% of the costs, rheumatoid arthritis for 4% and osteoporosis for 2% (AIHW: Mathers & Penm 1999b:19).

Table 2.15: Selected musculoskeletal diseases and conditions: estimated incidence (1996), prevalence (1996), hospitalisations (1997–98) and health system costs (1993–94)

Disease or condition	Incidence per 1,000	Prevalence per 1,000	Hospital-isations	Total costs (\$'000)
Back pain	337.4	50.6	44,402	700
Osteoporosis	0.8	8.5	17,130	60
Osteoarthritis	2.3	34.1	51,306	624
Rheumatoid arthritis	0.2	3.0	5,683	129
All musculoskeletal diseases and conditions	**480.5**	**131.1**	**312,383**	**3,002**

Sources: AIHW National Morbidity Database; AIHW: Mathers et al. 1999a; AIHW: Mathers & Penm 1999b.



Source: AIHW National Hospital Morbidity Database.

Figure 2.42: Age-specific hospital separations with principal diagnoses of chronic back pain or slipped disc, 1997–98

Back pain

Back pain encompasses both chronic back pain and slipped disc. It can be caused by the displacement of an intervertebral disc, bone growth, and ligament and/or muscle strain. Most back problems and complaints are transitory and short term, but in some cases they can become chronic.

In 1996, the prevalence rate for back pain was 51 per 1,000 persons (Table 2.15, page 99), higher in males (57 per 1,000) than females (45 per 1,000). The incidence rate for back pain has been estimated as 354 per 1,000 males and 321 per 1,000 females (AIHW: Mathers et al. 1999a:209).

Back complaints were the most frequent musculoskeletal disease or condition managed by GPs (AIHW GPSCU: Britt et al. 1999:41). Overall, back complaints were the seventh most frequent problem managed by GPs in 1998–99, accounting for 1.8% of the total problems managed.

Considerable hospitalisation occurs for back pain. In 1997–98, there were about 44,000 hospital separations with back pain as the principal diagnosis (Table 2.15). The rates were slightly higher for females (245 per 100,000) than males (240 per 100,000), although the separation rates were higher among males in the age groups between 20–24 years and 40–44 years (Figure 2.42, page 99).

Osteoporosis

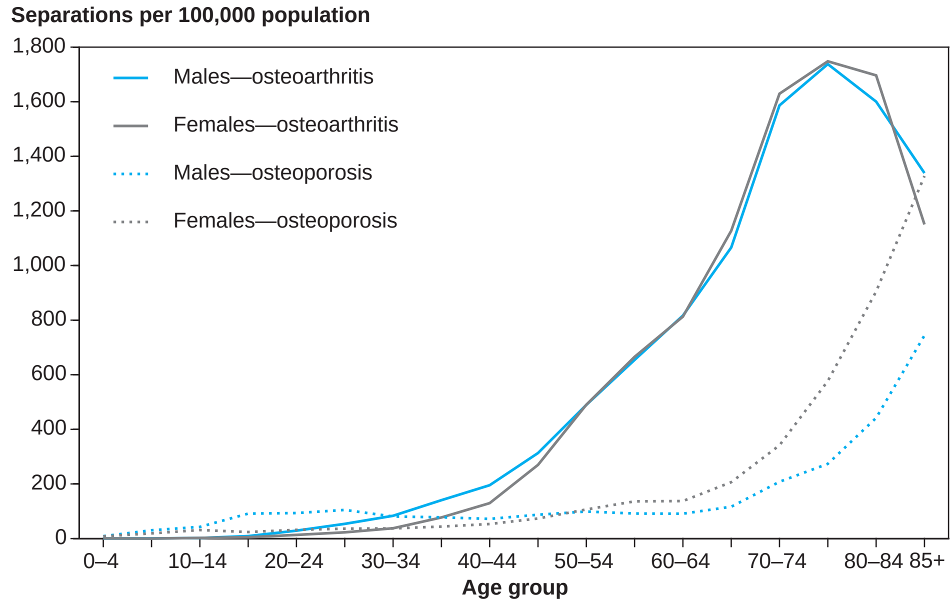
Osteoporosis is a condition in which reduction in bone mass over time increases risk of fractures, back pain and a curving of the spine. The occurrence of the condition increases with age and is common among older people.

Females are more susceptible to osteoporosis because of the reduction in bone density that begins around the age of 40 and accelerates in the years after menopause. For example, it is estimated that the proportion of females with osteoporosis increases from 15% among those aged 60 to 64 years to 71% among those over 80 years of age (AIHW: Mathers et al. 1999a:74,209). The prevalence of osteoporosis among females (13.7 per 1,000) was more than four times that among males (3.2 per 1,000) in 1996.

A similar picture emerges for hospital separations. In 1997–98, hospital separation rates for osteoporosis were 109 per 100,000 females and 89 per 100,000 males. The separation rates increase with age, most rapidly from age 60–64 years to peak in the age group 85 years and over (Figure 2.43).

Osteoarthritis

Osteoarthritis is a degenerative joint disease affecting primarily the hands, spine and weight-bearing joints such as hips, knees and ankles. The disease begins in cartilage overlying the ends of joint bones, and is caused and accelerated by mechanical forces, disrupting the normal function of the joint. Pain is initially experienced in the joints during and after activity, but as degeneration progresses it may occur with only minimal movement or even during rest. Obesity, overuse of a joint during recreational or work-related activities, meniscus tears and other forms of arthritis are associated with the development of osteoarthritis, as are genetic factors.



Source: AIHW National Hospital Morbidity Database.

Figure 2.43: Age-specific hospital separations with principal diagnoses of osteoporosis and osteoarthritis, 1997–98

Osteoarthritis is the second most prevalent musculoskeletal disease, after back pain, with a rate of 34 per 1,000 persons in 1996 (Table 2.15, page 99). It is more prevalent among females (42 per 1,000) than males (27 per 1,000) (AIHW: Mathers et al. 1999a:209). It was the tenth most frequently managed problem in general practice, representing 1.5% of all problems managed in 1998–99 (AIHW GPSCU: Britt et al. 1999:41).

Hospitalisation for osteoarthritis is mostly concentrated in the older age groups (Figure 2.43). In 1997–98, the hospital separation rate for females (311 per 100,000) was slightly higher than the rate for males (283 per 100,000).

Osteoarthritis ranked as the tenth leading cause of total disease burden, ranking higher among females (9th) than males (15th) (AIHW: Mathers et al. 1999a:66). It accounted for 63% of the total burden of musculoskeletal diseases and conditions in 1996. The burden of osteoarthritis is almost entirely (99%) composed of years of equivalent 'healthy' life lost due to disability.

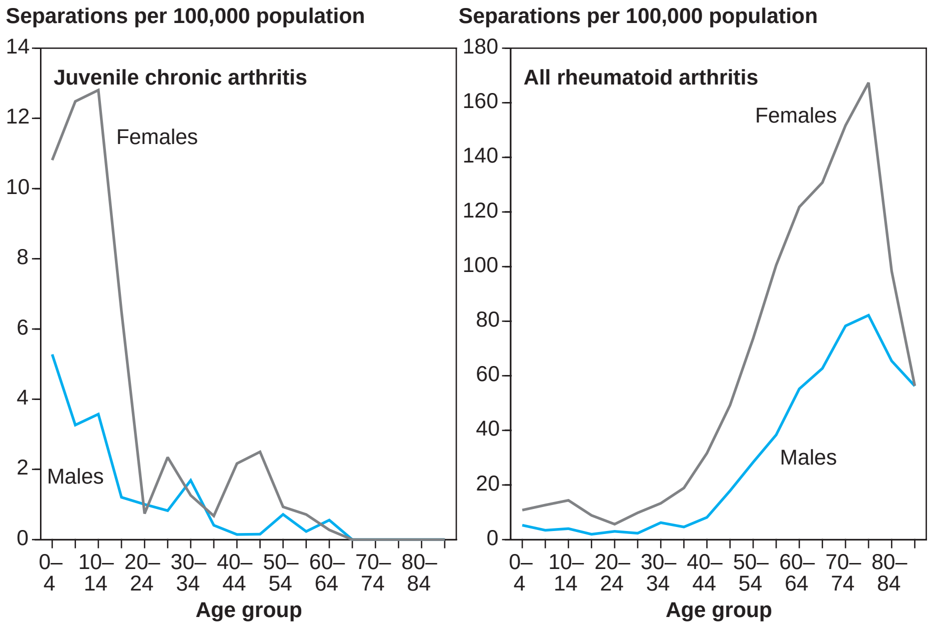
Rheumatoid arthritis

Rheumatoid arthritis (which includes juvenile rheumatoid arthritis) is the most disabling form of arthritis as it involves more than one joint and can ultimately lead to joint destruction. The disease commences as an inflammation of the joint lining or synovium that progresses to other parts of the joint and leads to destruction of the bone.

It is most common in joints of the fingers, toes, wrists, knees, elbows and ankle. However, rheumatoid arthritis can also cause inflammation in the heart, blood vessels and other body tissues.

Rheumatoid arthritis is more common among females. The prevalence rate in 1996 was 4.1 per 1,000 females compared with 1.9 per 1,000 males (AIHW: Mathers et al. 1999a:209). The hospital separation rate among females (42.8 per 100,000) was 2.5 times the rate among males (17.4 per 100,000). There was a similar difference in hospital separation rates for juvenile rheumatoid arthritis, 3.7 per 100,000 females compared with 1.4 per 100,000 males.

Hospital separation rates for rheumatoid arthritis increased rapidly from the age group 40–44, reaching a peak in the age group 75–79 years. The juvenile form of the disease was concentrated in the younger age groups, particularly among those aged 0–14 years (Figure 2.44).



Source: AIHW National Hospital Morbidity Database.

Figure 2.44: Age-specific hospital separations with principal diagnoses of juvenile chronic arthritis and rheumatoid arthritis, 1997–98

Gout

Gout is a form of arthritis in which joint inflammation is caused by a deposit of sodium urate crystals in the synovium. It occurs mostly in toes, ankles, knees, elbows, wrists and hands, and more frequently in older males.

Gout is a major cause of hospitalisation, particularly among males. In 1997–98, hospital separation rates for gout were 24 per 100,000 males and 8 per 100,000 females.

Hospital separation rates for gout increase markedly with age. For males, it increased from 8 per 100,000 in the age group 30–34 years to 53 per 100,000 in the age group 65–69 years, then increased sharply to 310 per 100,000 in the age group 85 years and over. For females, the hospital separation rate was comparatively lower in all age groups, nonetheless increasing from 11 per 100,000 in the age group 65–69 years to 140 per 100,000 in the age group 85 years and over in 1997–98.

Nervous system disorders

Nervous system disorders account for 9% of the total disease burden in Australia, mostly in the form of disability. They are also responsible for significant lost productivity and healthcare costs. Several of these disorders, such as dementia (including Alzheimer's disease) and Parkinson's disease, are highly age-associated and are important causes of death and disability among older persons. Epilepsy and multiple sclerosis are other important nervous system disorders that contribute significantly to the burden of disease.

Table 2.16: Selected nervous system disorders: estimated incidence (1996), prevalence (1996), mortality (1996), hospitalisations (1997–98) and health system costs (1993–94)

Nervous system disorder	Incidence per 100,000	Prevalence per 100,000	Mortality per 100,000	Hospital-isations	Total costs ($'000)
Dementia[(a)]	130	680	21	9,281	113,829
Epilepsy	30	340	1	17,255	157,419
Parkinson's disease	40	200	4	3,132	148,715
Multiple sclerosis	2	39	1	2,995	21,589

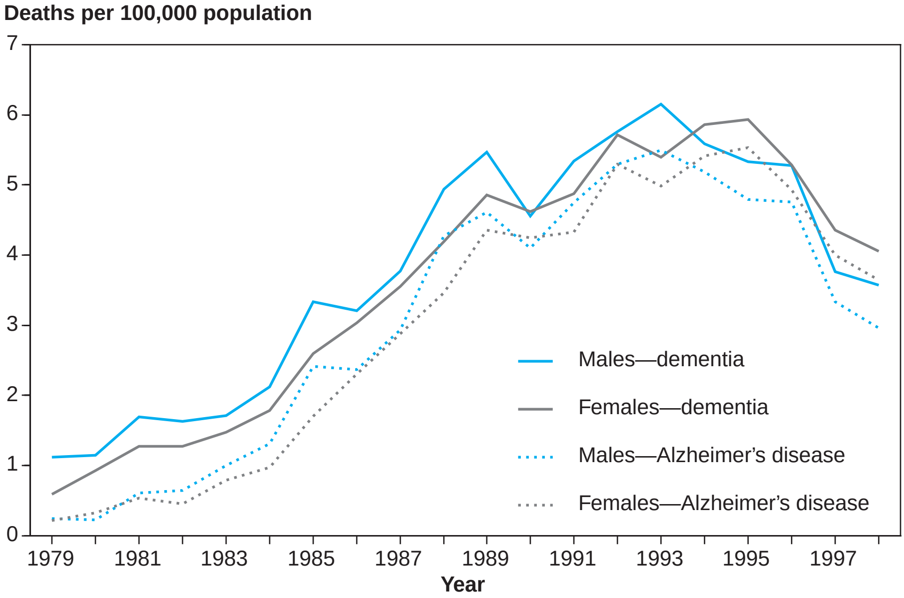
(a) ICD-9 codes 290, 330–331 used for incidence, prevalence, mortality, and hospitalisations; ICD-9 codes 331.0 and 331.2 used for costs.

Sources: AIHW National Morbidity Database; AIHW: Mathers et al. 1999a:208,214.

Dementia

Dementia is the sixth leading cause of disease burden in Australia, accounting for 3.5% of the total burden. The main symptoms are progressive loss of memory and other cognitive functions, with both incidence and prevalence rising sharply after age 50. Alzheimer's disease is the principal type of dementia, accounting for approximately 50% to 60% of known cases of dementia in persons over 50 years of age.

In Australia, death rates for dementia rose steadily up to 1995 due probably to increased awareness of the disease (Figure 2.45, page 104). This pattern is largely influenced by trends in death rates for Alzheimer's disease. A large number of deaths due to Alzheimer's disease have been coded to pneumonia since 1997, creating a break in the time series. This largely explains the apparent fall in the death rate for dementia and related deaths in recent years (Figure 2.45).



Source: AIHW National Mortality Database.

Figure 2.45: Death rates for dementia and Alzheimer's disease, 1979 to 1998

Epilepsy

Epilepsy, a condition characterised by recurrent (two or more), unprovoked seizures, affects over 62,000 Australians, with estimated prevalence rates in 1996 of 360 per 100,000 males and 320 per 100,000 females. Relatively few deaths (1 per 100,000) are attributable to epilepsy, but there were 17,255 hospitalisations in 1997–98 alone (Table 2.16). The health system costs for epilepsy are considerable, over $157 million in 1993–94.

Age-specific incidence follows a U-shaped pattern, with higher rates in the youngest and oldest age groups. Several risk factors that lead to the development of epilepsy have been identified, and these are known to vary with age. In addition to family history, the major risk factors for epilepsy are: anoxia (oxygen starvation); congenital malformations and structural brain abnormalities among the newborn; cerebral palsy, mental retardation and central nervous system infections such as bacterial meningitis and viral encephalitis among children; and moderate to severe brain injury among young adults. Cerebrovascular disease (stroke) and Alzheimer's disease are the major risk factors for epilepsy among the elderly.

Parkinson's disease

Parkinson's disease is a progressive, incurable neurological disease that affects an estimated 36,000 persons (AIHW: Mathers et al. 1999a). It mainly afflicts people over the age of 50, with only 10% of the cases occurring at an earlier age.

The disease affects the brain (basal ganglia), leading to a progressive loss of motor skills involving sequential movements, and impacts on cognition, behaviour and mood. It is marked by increasing rigidity of the limbs, trunk and face, and by regular tremors, particularly when the body is at rest. At advanced stages, swallowing and speech become affected and the patient eventually is confined to a wheelchair or bed. Without effective treatment and support, people with Parkinson's disease become increasingly dependent on institutional care.

Prevalence is higher among females (260 per 100,000 in 1996) than males (130 per 100,000), although death rates are higher among males (4 per 100,000 compared with 2 per 100,000 females). Health system costs were $149 million in 1993–94 (Table 2.16, page 103), predominantly for nursing home care.

Multiple sclerosis

Multiple sclerosis (MS) affects mainly adults between the ages of 20 and 50 years, with average age of onset in the early 30s. The disease affects the myelin sheaths of the nerves and often involves progressive impairment of vision, speech, muscle coordination and bladder dysfunction.

The estimated prevalence rate for MS in Australia in 1996 was 39 per 100,000, with prevalence among females more than twice that among males (AIHW: Mathers et al. 1999a). Recorded death rates in 1998 were 0.6 per 100,000 females and 0.3 per 100,000 males, but most persons with MS die from other causes. Hospital separations for MS have recently increased by nearly 50%, from 2,018 in 1993–94 to 2,995 in 1997–98. Nearly three-quarters of hospital separations for MS are among females. Health system costs for MS as a primary cause were about $22 million in 1993–94 (Table 2.16).

As in several other countries, in Australia the prevalence of multiple sclerosis is positively correlated with latitude, with Tasmania having about seven times the prevalence rate of tropical Queensland. Because of this geographical variation, several studies have focused on the potential role of infective agents in multiple sclerosis (McLeod et al. 1994).

End-stage renal (kidney) disease

A variety of diseases and malfunctions affect the kidneys, including primary renal disease (nephritis and nephrosis) and conditions such as cancer, hypertension, diabetes, congenital malformations, infectious diseases and some injuries. The most serious consequence of these diseases is end-stage renal failure, a condition that is fatal within a few weeks if untreated.

The Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) monitors the incidence and prevalence of end-stage renal disease, and outcomes of dialysis and transplantation, in Australia. According to ANZDATA, incidence of renal failure in Australia is about 8 per 100,000 persons, with more males (59%) than females (41%) reported to develop renal failure (Disney et al. 1999:1,13).

The most common cause of end-stage renal disease is glomerulonephritis, an illness that includes a variety of conditions affecting the glomerular portion of the nephron and inhibiting the ultrafiltration of blood (Table 2.17, page 106). In 1998, glomerulonephritis represented 32% of new cases of end-stage renal disease notified to the Registry. Long-term complications associated with diabetes also cause nephropathy, the second most common cause of end-stage renal disease. Another major cause, analgesic nephropathy, is attributed to the long-term use of various analgesic compounds and related agents, and is potentially preventable and partially reversible. Hypertension is also a major cause of renal failure.

The proportion of new cases of renal failure resulting from diabetic nephropathy increased from 16% in 1993 to 22% in 1998 (Table 2.17). Renal failure attributed to hypertension also increased over that period, from 9% to 12% of new cases. On the other hand, analgesic nephropathy dropped to 6% of all cases in 1998, by almost half of the proportion in 1993. This decline may be attributed to restrictions placed on the use of certain analgesics (NHMRC 1992:2).

Table 2.17: Causes of renal failure, 1993 and 1998

	1993		1998	
Cause	**Number**	**Per cent**	**Number**	**Per cent**
Glomerulonephritis	380	33	507	32
Diabetic nephropathy	181	16	350	22
Analgesic nephropathy	124	11	97	6
Hypertension	105	9	191	12
Other	370	32	444	28
Total	**1,160**	**100**	**1,589**	**100**

Note: The data reported here have been supplied by the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA). The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as an official policy or interpretation of the Australia and New Zealand Dialysis and Transplant Registry.

Source: Disney et al. 1998b, 1999.

Dialysis and kidney transplantation

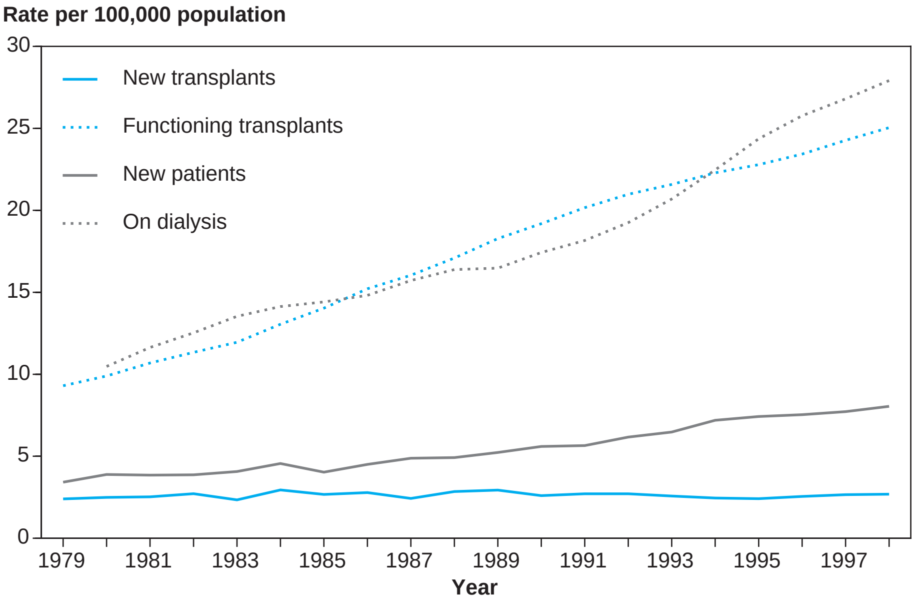
There are two major treatment options to sustain life for people with renal failure—dialysis and transplantation. Dialysis is a method of removing waste products from the blood when the kidneys are unable to function effectively. Transplantation involves the surgical replacement of a patient's kidney with one from a donor. Over the last three decades, these treatments have been increasingly refined.

The number of people on dialysis and those with functioning transplants is increasing (Figure 2.46), but for very different reasons. The increase in the number of people on dialysis is mainly due to older patients being accepted on the program. In 1998, 38% of new patients were aged 65 years and over compared with 7% in 1979 (Disney et al. 1999). Stagnancy in the availability of new donor or cadaver kidneys during the 1990s has also contributed to the increase in dialysis patients (Disney et al. 1999).

The increase in the number of people with functional transplants is due mainly to a marked improvement in the survival of kidney transplants. Of people who had a cadaveric kidney transplant in 1983, 58% had a functioning transplant 5 years later, increasing to 73% of those who had a transplant in 1993 (Disney et al. 1998b, 1999). Consequently, the rate for functioning kidney transplants has increased, from 9 per

100,000 in 1979 to 25 per 100,000 in 1998 (Figure 2.46). There were 517 kidney transplant operations in 1998, 85% of which were for primary recipients (first kidney transplant), meeting less than one-third of the waiting list (Disney et al. 1999).

Dialysis procedures are the most common reason for admission to public hospitals (378,466 separations in 1997–98) and the fifth most common in private hospitals (44,640 separations in 1997–98) (AIHW 1999b). People requiring haemodialysis are likely to use it at least twice a week, with about 100 separations from a hospital in any one year. However, due to the large number of people receiving dialysis at home or in a satellite centre, hospital separations represent only about 30% of all dialysis procedures occurring in Australia (Disney et al. 1998b:84). As at 31 December 1998, there were 5,523 Australians dependent on dialysis.



Note: Age standardised to the Australian population at 30 June 1991.

Source: Disney et al. 1998b, 1999.

Figure 2.46: Kidney disease: new cases and treatments, 1979 to 1998

Deaths

In 1998, there were 789 male and 903 female deaths for which nephritis, nephrotic syndrome or nephrosis were recorded as the underlying cause, with age-standardised death rates of 9.3 and 6.5 per 100,000 respectively (ABS 1999d:23). An additional 9,370 deaths (5,162 males, 4,208 females) listed nephritis, nephrotic syndrome and nephrosis as a contributing cause of death (ABS 1999d:46). There has been little change in the underlying cause of death rate over the past 20 years. Improvements in treatment technology are likely to have offset any increase in incidence.

Kidney disease among Aboriginal and Torres Strait Islander peoples

Indigenous people constitute an increasing and disproportionately large proportion of new patients commencing renal treatment, increasing from 5% in 1990 to 8% in 1998 (Disney et al. 1999:13). In contrast, the proportion of persons with functioning transplants remained the same (Disney et al. 1998b, 1999).

Diabetes is the major cause of kidney disease among Aboriginal and Torres Strait Islander peoples. In 1998, diabetic nephropathy contributed 42% of the Indigenous dialysis group, compared with 22% among the total dialysis group (Disney et al. 1999).

In 1994–98, there were 90 Indigenous deaths (42 males and 48 females) attributed to renal failure in Western Australia, South Australia and the Northern Territory alone (identification of Indigenous peoples in death records in other jurisdictions is not of sufficient quality to allow for reporting). Indigenous deaths from renal failure also occur at relatively younger ages than non-Indigenous deaths (ABS 1999e).

Cirrhosis and other chronic liver diseases

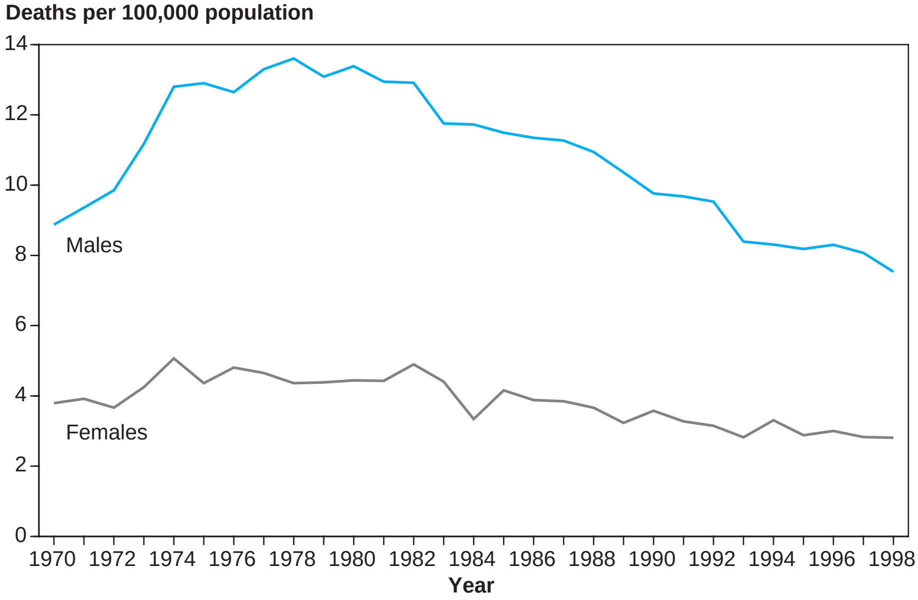
Cirrhosis results from damage to the liver, where the liver cells are destroyed and replaced by scarred tissue. As the disease develops, the liver shrinks since there are progressively fewer healthy cells.

There are four main categories of liver disease, namely alcoholic fatty liver, hepatitis, cirrhosis, and other or unspecified forms of liver disease. Some of these forms are preventable or reversible. Almost all heavy drinkers have alcoholic fatty liver, but it is partly reversible with abstinence from alcohol. Generally benign, alcoholic fatty liver may cause death through liver failure or the formation of lung or brain blood clots. Hepatitis is inflammation of the liver, which can cause widespread liver cell loss. Chronic active hepatitis can progress to cirrhosis and liver cancer. Cirrhosis contributes significantly to the burden of disease in Australia, both in terms of premature mortality and health system costs.

Determining the incidence and prevalence of cirrhosis and other chronic liver diseases is difficult because most cases show no signs or symptoms until late. In 1996, it was estimated that there were more than 1,000 new cases of cirrhosis and chronic liver disease in Australia. The prevalence was estimated at about 70 per 100,000 males and 50 per 100,000 females (AIHW: Mathers et al. 1999a:208). Cases are concentrated among those aged 35 years and over.

In 1998, cirrhosis of the liver was the underlying cause of 1,018 deaths (725 males and 293 females) and the contributing or associated cause for another 876 deaths. The death rate among males was higher than among females in all age groups, in particular between the ages of 55 and 79 years. The disease was also the major reason for 9,836 hospitalisations in 1997–98. Again, the age-standardised hospitalisation rate for males (71 per 100,000) was higher than that for females (42 per 100,000). In 1997–98, the average length of hospital stay for a person with a principal diagnosis of cirrhosis was 9 days.

The death rate for cirrhosis and other chronic diseases of the liver is declining. After rising consistently for several decades, the rate peaked in the late 1970s (Figure 2.47). Since then, the age-standardised death rates have declined from 13 per 100,000 males and 4.5 per 100,000 females in 1979 to 8 and 3 per 100,000, respectively, in 1998.



Source: AIHW National Mortality Database.

Figure 2.47: Death rates for cirrhosis of the liver, 1970 to 1998

2.5 Communicable diseases

Communicable or infectious diseases are illnesses due to specific infectious agents or their toxic products. Bacteria cause diseases such as pertussis (whooping cough) and tuberculosis; viruses cause diseases such as measles, influenza and Ross River virus infection; fungi are responsible for conditions such as tinea; protozoan parasites cause diseases including malaria; and bacterial toxins are responsible for conditions such as some forms of food poisoning. Infestations of larger parasites such as head lice are also regarded as communicable diseases.

This section provides an overview of communicable diseases in Australia, including notifications and deaths, and discusses the associated burden of disease, hospitalisation and health system costs. Information on communicable diseases in general, including pneumonia, influenza and meningitis, is presented first, followed by notifiable diseases such as blood-borne diseases, gastrointestinal diseases, sexually transmitted diseases, vector-borne diseases, tuberculosis and vaccine-preventable diseases.

Information on the occurrence of communicable diseases in this section is derived mainly from disease notifications, hospital separations and deaths data. Self-reports from the National Health Surveys, data on visits to general practitioners, data from the Australian Paediatric Surveillance Unit, laboratory investigations and special surveys are other sources of information useful for the surveillance of communicable diseases in Australia.

Communicable diseases were responsible for considerable morbidity and mortality in Australia in the early part of the twentieth century. However, the incidence and death rates for communicable diseases have been much reduced, with improvements in hygiene (building on advances begun in the nineteenth century), the introduction of antibiotics and mass immunisations making major contributions (see chapter 8 for an overview of changing patterns of disease in Australia over the twentieth century).

In 1998, there were 85,096 notifications of communicable diseases to the National Notifiable Diseases Surveillance System, representing a slight decrease from the 89,576 notifications in 1997 (Thomson et al. 1999). The most commonly notified diseases were blood-borne diseases, followed by gastrointestinal and sexually transmitted diseases. For a brief description of communicable disease notifications in Australia, see Box 2.13.

In 1997–98, there were 79,156 hospital separations with a principal diagnosis of infectious and parasitic diseases. In addition, there were 67,683 hospital separations for pneumonia and influenza, and 924 hospital separations for meningitis (AIHW 1999b).

There is much variation in the epidemiology, distribution and mortality associated with various communicable diseases. Management of these diseases and the approaches available to control them also vary considerably. The following provides brief overviews of the epidemiology of some of the high profile communicable diseases in terms of notifications, hospital separations and deaths.

Box 2.13: Disease notification

A disease may be made notifiable to State and Territory health authorities if there is potential for its control. Information on more than forty notifiable communicable diseases is available from the National Notifiable Diseases Surveillance System.

Surveillance of communicable diseases varies between jurisdictions, as each State/Territory has specific requirements under their public health legislation for notification by medical practitioners, laboratories and hospitals. The notifiable diseases and the case definitions may also vary between jurisdictions. However, Australia is working towards a model public health legislation that will standardise the approach to communicable disease surveillance.

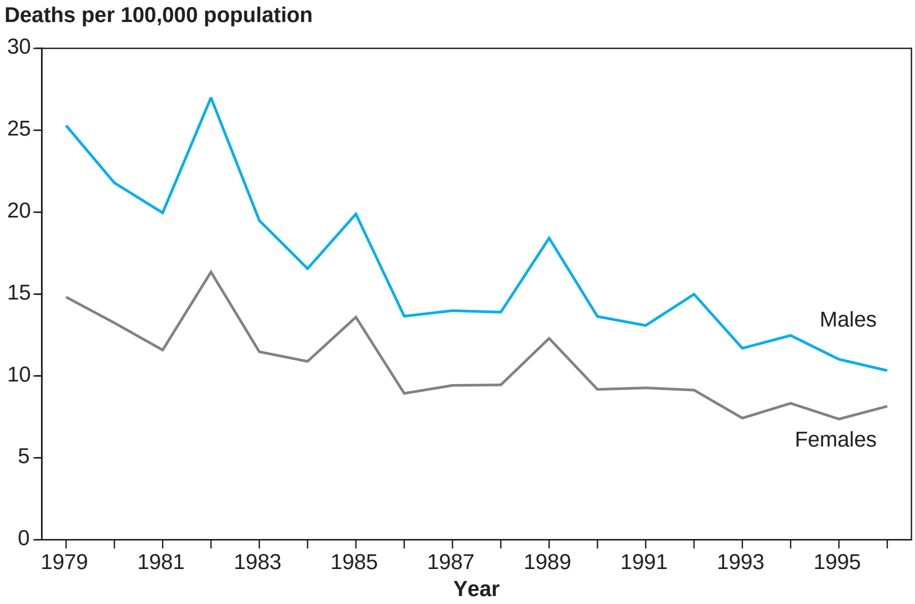
Newly diagnosed HIV infection and AIDS are notifiable conditions in every State and Territory. The National Centre in HIV Epidemiology and Clinical Research compiles HIV/AIDS notifications.

Acute respiratory infections

Acute respiratory infections (ARI) are usually divided into upper respiratory tract infections (URTI) and lower respiratory tract infections (LRTI). These infections are responsible for much morbidity and mortality. It is estimated that in 1996 there were 43 million new cases of URTI, and 7 million cases of LRTI.

Mortality. ARIs contribute significantly to mortality. Pneumonia alone was responsible for 4,459 deaths (2,000 males and 2,459 females) in 1998, the third largest cause of death among females and the eighth largest cause of death among males. Deaths are concentrated among males and females aged 70 years and over.

Both male and female death rates for ARI decreased over the period 1979 to 1996. However, the male death rate was consistently higher than the female rate. The male death rate fell from 25 per 100,000 in 1979 to 10 per 100,000 in 1996. For females, the death rate decreased from 15 per 100,000 in 1979 to 8 per 100,000 in 1996 (Figure 2.48).



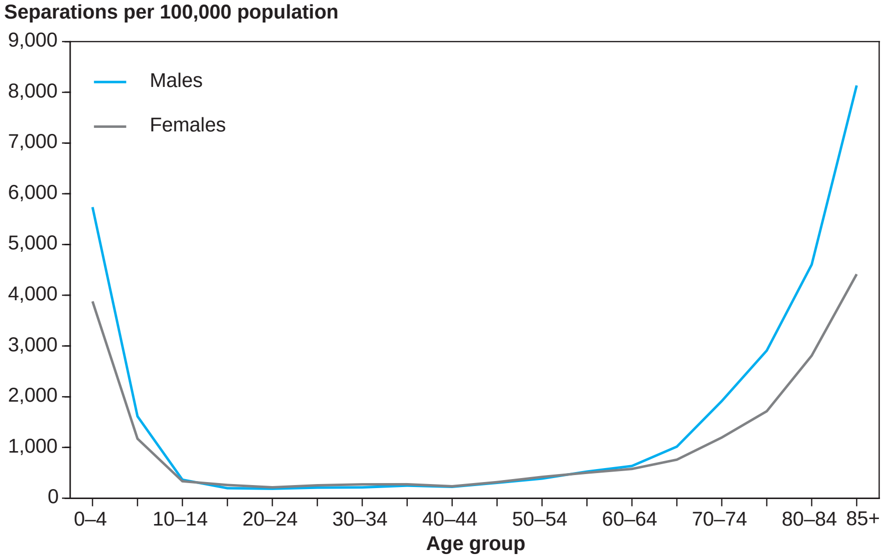
Note: Data for 1997 and 1998 are not included as they are not comparable with previous years following the introduction of automatic coding of deaths data in 1997.

Source: AIHW National Mortality Database.

Figure 2.48: Trends in death rates for acute respiratory infections, 1979 to 1996

Hospitalisations. In 1997–98, there were 155,960 hospital separations with the principal diagnosis of ARI. Of the three groups of respiratory conditions considered in this report (asthma, COPD and ARI), ARI had the highest rate of hospitalisation but the shortest average length of stay (1.4 days).

Hospitalisations are concentrated among the elderly and the young. Again, rates are higher for males than females. In the age group 0–4 years, hospital separation rates in 1997–98 were 5,700 per 100,000 for males and 3,900 per 100,000 for females. From age group 50–54 years onwards the rates rose sharply from around 400 per 100,000 to peak in the age group 85 years and over with rates of 8,100 per 100,000 males and 4,400 per 100,000 females (Figure 2.49).



Source: AIHW National Hospital Morbidity Database.

Figure 2.49: Age-specific hospital separations with a principal diagnosis of acute respiratory infection, 1997–98

Burden of disease. The burden from ARI is almost equally divided between premature mortality (YLL) and years of equivalent 'healthy' life lost due to disability (YLD). As with the other major respiratory categories, the burden is similar for both the sexes but is higher among the young and the elderly.

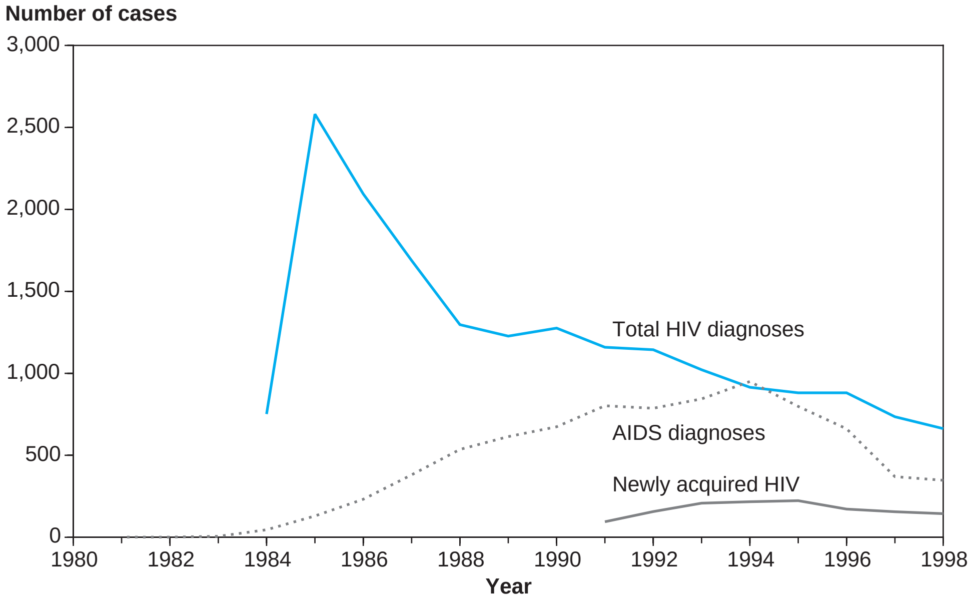
Blood-borne diseases

Blood-borne diseases are diseases spread via blood, blood products and body fluids, although there are other modes of transmission, including sexual contact. They include HIV infection, hepatitis B, hepatitis C and hepatitis D. Initial HIV infection may cause a transitory illness similar to glandular fever. The infection goes on to damage the immune system with AIDS developing as the patient's susceptibility to infections and cancers increases. Hepatitis B, hepatitis C and hepatitis D are viral infections characterised by inflammation of the liver, jaundice, anorexia, vague abdominal discomfort, nausea and vomiting and/or fever. Severity can range from unapparent cases, detectable only through laboratory tests, to fatal cases. Some people may become persistently infected and develop chronic hepatitis, and/or cirrhosis and/or liver cancer.

HIV/AIDS. At the end of 1998, there were around 11,800 people living with HIV. By then, the cumulative number of HIV infections in Australia was estimated to be about 17,600. Most cases of HIV infection (85%) were transmitted by sexual contact between males, with relatively little transmission through other sources of exposure (NCHECR 1999).

The number of HIV diagnoses in Australia has declined, from a peak of over 2,500 in 1985 to just over 660 in 1998 (Figure 2.50). These include both newly acquired (and diagnosed) infections and new diagnoses of infections acquired some time in the past (Box 2.14, page 114). Around 20–25% of the total HIV diagnoses recorded each year since 1993 have been in persons who are considered to have newly acquired the disease.

New diagnoses of AIDS in Australia, after adjustment for reporting delay, peaked in 1994 with an estimated 950 diagnoses. The number is estimated to have declined to 348 new diagnoses in 1998 (Figure 2.50). This decrease in the number of AIDS diagnoses, in addition to reductions in new infections, is due to the use of effective drug therapies for the treatment of HIV infection. It is estimated that there were 1,090 fewer AIDS diagnoses between 1995 and 1998 than would have been expected if the use of these therapies had not delayed the progression from HIV to AIDS. A total of 2,430 persons were estimated to be living with AIDS in 1998 (NCHECR 1999).



Note: Age standardised to the Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 2.50: Diagnoses of HIV infection and AIDS, 1980 to 1998

Comparison of HIV/AIDS hospital separations over time is made difficult by the change in coding practice for HIV/AIDS from ICD-9-CM (US version) to ICD-9-CM (Australian version) in July 1995. Therefore, only data since 1995–96 are reported here. Over the period 1995–96 to 1997–98, there were 904 hospital separations with the

Box 2.14: HIV and AIDS diagnosis

Newly diagnosed HIV: *Total number of cases of HIV infection newly diagnosed in a particular year. Includes both newly acquired HIV and older cases of HIV that have only just been diagnosed.*

Newly acquired HIV: *Newly diagnosed HIV infection with a negative or indeterminate HIV antibody test result, or a diagnosis of HIV seroconversion illness, within 1 year of HIV diagnosis.*

Seroconversion illness: *Characteristic clinical findings that reflect the first interaction of HIV with the host immune system (i.e. primary HIV infection).*

HIV antibody test: *The test detects the presence of HIV antibodies that are produced by the immune system in response to infection by the virus. Antibodies to HIV are usually detected within the first 2 to 6 weeks of illness.*

AIDS: *AIDS diagnosis is based on a positive HIV antibody test along with the presence of any one of the conditions associated with severe immune deficiency.*

principal diagnosis of HIV/AIDS and 36,116 separations with HIV/AIDS as an additional diagnosis. Most of the separations were of males (95%), and the majority (63%) were of persons in the age group 30–44 years.

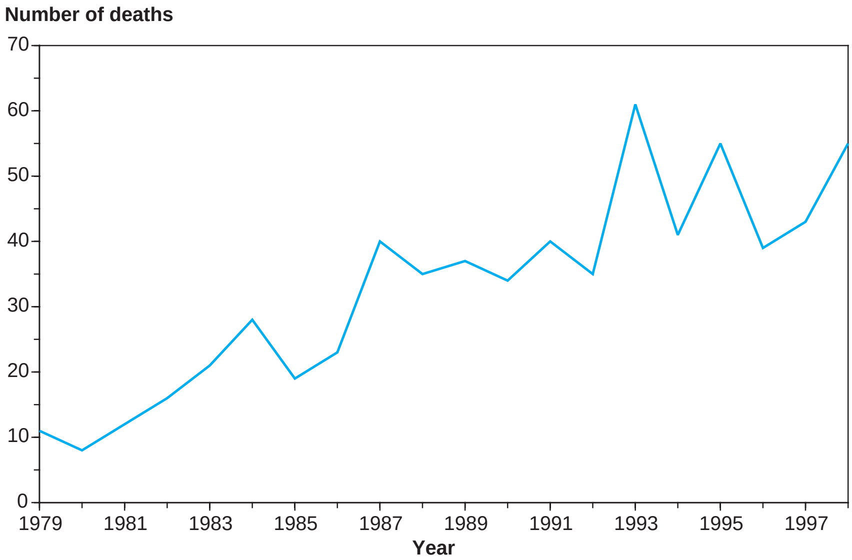
There has also been a considerable reduction in the number of AIDS-related deaths in recent years. There were 170 AIDS-related deaths in 1998, almost one-fifth of the 735 deaths recorded in 1994 (NCHECR 1999).

Hepatitis B. The number of notifications of incident (new) cases of hepatitis B has remained fairly consistent since 1994. The National Notifiable Diseases Surveillance System received notification of 247 cases in 1997 (1.3 per 100,000) and 261 in 1998 (1.4 per 100,000).

Over the period 1993–94 to 1997–98, there were 2,247 hospital separations with the principal diagnosis of acute or chronic hepatitis B and 16,314 separations with hepatitis B as an additional diagnosis. Hospital separations for hepatitis B were more common among males (64%) than females (36%), and the majority (62%) were of persons in the age group 25–49 years.

Over the past two decades, the number of deaths from hepatitis B has been rising. Between 1979 and 1998, there were 653 deaths with an underlying cause of hepatitis B, rising from 11 deaths in 1979 to 55 deaths in 1998 (Figure 2.51).

Hepatitis C. The numbers of hepatitis C cases notified (incident and unspecified) in 1997 and in 1998 were similar, 19,770 and 19,604 respectively. However, notifications of incident cases of hepatitis C increased from 81 in 1997 (0.5 per 100,000) to 343 in 1998 (2.0 per 100,000). This change may be due mainly to surveillance efforts to distinguish between new and old infections.



Source: AIHW National Mortality Database.

Figure 2.51: Hepatitis B deaths, 1979 to 1998

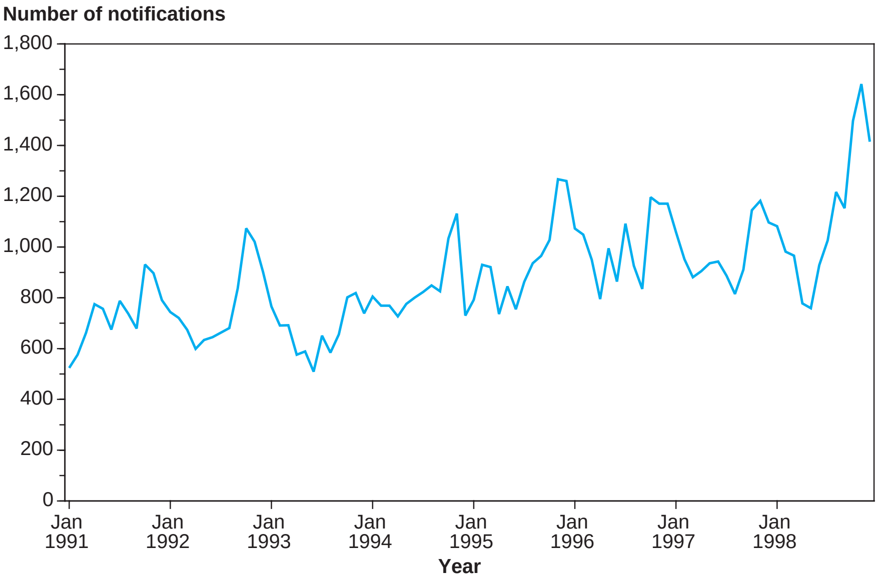
Over the period 1993–94 to 1997–98, there were 8,485 hospital separations with the principal diagnosis of acute or chronic hepatitis C and 45,367 separations with hepatitis C as an additional diagnosis. Hospital separations for hepatitis C were more common among males (61%) than females (39%), and the majority (65%) were of persons in the age group 25–44 years.

Hepatitis D. There were 13 notifications of hepatitis D in 1997 and 14 in 1998.

Gastrointestinal infections

The diseases currently classified as gastrointestinal for the National Notifiable Disease Surveillance System include hepatitis A, salmonellosis, campylobacteriosis, yersiniosis, listeriosis, shigellosis, botulism, typhoid and paratyphoid (Table S20, page 384). Haemolytic uraemic syndrome (HUS) became nationally notifiable in late 1998.

Campylobacteriosis. Campylobacteriosis accounts for more than 50% of all gastrointestinal notifications in Australia. The infection is transmitted mainly by food or by drinking untreated or poorly treated water. It usually causes diarrhoea for a few days, including abdominal pain, malaise, fever, nausea and vomiting. There were 11,848 notifications of campylobacteriosis in 1997 (96.7 per 100,000) and 13,439 in 1998 (108.3 per 100,000). Since 1991, campylobacteriosis notifications have trended upwards (Figure 2.52, page 116). The disease shows a seasonal pattern, with peak notifications in the spring and summer months.



Source: National Notifiable Diseases Surveillance System.

Figure 2.52: Notifications of campylobacteriosis, by month of onset, 1991 to 1998

Haemolytic uraemic syndrome. HUS is a potential complication of gastrointestinal infection with shiga-toxin-producing *Escherichia coli*. Acute renal failure and death are potential consequences of infection. The Australian Paediatric Surveillance Unit has reported 108 confirmed cases of HUS for the period July 1994 to December 1998, including 20 from the outbreak in South Australia in 1995 that was attributed to a type of smallgood (APSU 1999).

Over the period 1994–95 to 1997–98, there were 332 hospital separations with the principal diagnosis of HUS, an annual average of 83 hospital separations. The number increased from 84 in 1994–95 to 122 in 1997–98. The majority of hospital separations (60%) were of children aged 0–4 years.

Sexually transmitted diseases

Chancroid, chlamydial infection (not elsewhere classified), donovanosis, gonococcal infection, lymphogranuloma venereum and syphilis are the sexually transmitted diseases (STDs) monitored by the National Notifiable Diseases Surveillance System. There were 15,165 STD notifications in 1997 and 18,554 STD notifications in 1998.

Chlamydial infection. Chlamydial notifications have increased in the 1990s. There were 9,126 notifications of chlamydial infection in 1997 (74.5 per 100,000) and 11,405 notifications in 1998 (87.7 per 100,000).

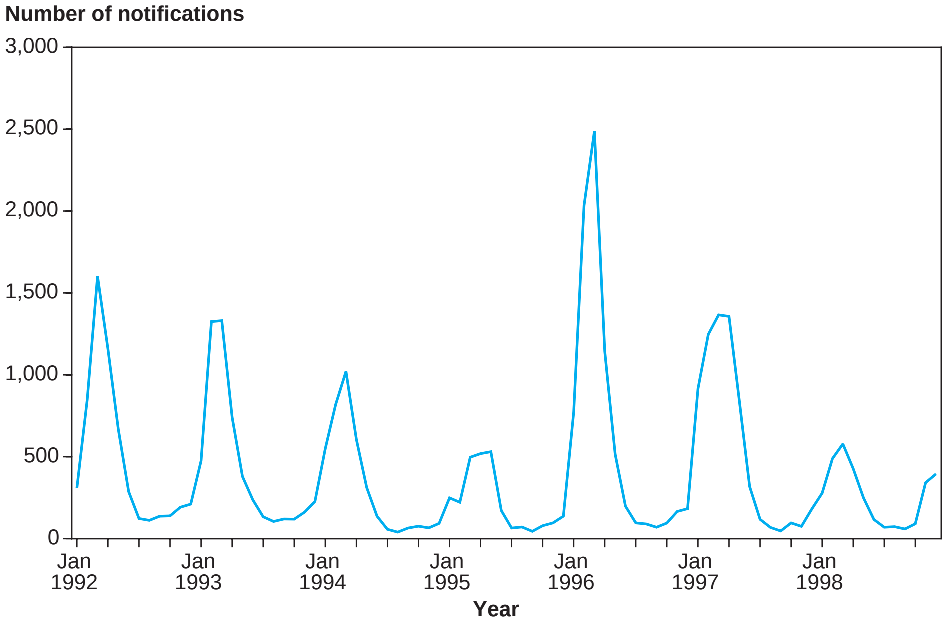
Gonococcal infection. NNDSS received 4,689 notifications of gonococcal infection in 1997 (25.3 per 100,000) and 5,428 notifications in 1998 (29.0 per 100,000). Notifications for gonococcal infection increased by more than 98% between 1991 and 1998. However, this increase may reflect improved diagnosis rather than any real increase in incidence.

Notifications of chancroid, lymphogranuloma venereum and syphilis have remained steady in recent years, whereas notifications of donovanosis have decreased.

Vector-borne diseases

The nationally notifiable vector-borne diseases include several mosquito-borne viral diseases and malaria. The viral diseases include infections caused by Barmah Forest virus and Ross River virus, which cause epidemic polyarthritis. Also included are Australian encephalitis (caused by Murray Valley encephalitis and Kunjin viruses), Japanese encephalitis and dengue fever.

Ross River virus. The Ross River virus infection was the most commonly notified vector-borne disease in Australia in 1998, with 3,094 cases (16.5 per 100,000). The infection shows a seasonal pattern, with peak notifications in the wet season or summer months (Figure 2.53).



Source: National Notifiable Diseases Surveillance System.

Figure 2.53: Notifications of Ross River virus infection, by month of onset, 1992 to 1998

Barmah Forest virus. Notifications of Barmah Forest virus infection have decreased in recent years. There were 558 notifications in 1998 (3.0 per 100,000), down from the 704 notifications in 1997 (3.8 per 100,000).

Dengue fever. Only a small number of cases of dengue fever were notified between 1993 and 1996. However, outbreaks of locally acquired disease in far north Queensland resulted in a large number of cases in 1997 and 1998. In 1997, 210 cases were notified (1.1 per 100,000), but 557 cases were notified in 1998 (3.0 per 100,000). Over 80% of these notifications were from Queensland.

Over the period 1993–94 to 1997–98, there were 205 hospital separations with the principal diagnosis of dengue fever. The numbers have increased consistently from 24 in 1993–94 to 68 separations in 1997–98. The majority of hospital separations (58%) were of persons between the ages of 15 and 34 years, and there was a greater proportion of males (62%) than females (38%). Almost 40% of the hospital separations were in Queensland. No deaths have been attributed to dengue fever as the underlying cause of death since 1967.

Japanese encephalitis. Following outbreaks in the Torres Strait in 1995, the first case of Japanese encephalitis acquired on the Australian mainland was reported in Queensland in March 1998. Around the same time, a further case of Japanese encephalitis was confirmed in the Torres Strait.

Malaria. Australia has been certified malaria-free since 1981. Recent cases are all imports—travellers returning from endemic areas. Malaria notifications remained stable in the period 1994 to 1998.

Over the period 1993–94 to 1997–98, there were 2,515 hospital separations with the principal diagnosis of malaria, 37% of which occurred in Queensland. This corresponds to an average of 503 hospitalisations per year. The majority of hospital separations (52%) were of persons between the ages of 15 and 34 years, and 71% were males.

During the period 1979 to 1998, there were 22 deaths from malaria, on average about one death every year. The number of malaria deaths has shown little change over the past 20 years. There were no malaria deaths reported in 1998.

Tuberculosis

Australia has one of the lowest rates for tuberculosis notification internationally, with little change in the number of notifications over the last 10 years. From 1986 to 1997, between 863 and 996 new tuberculosis cases (5.2 to 5.7 per 100,000) have been notified annually.

In 1997, a total of 954 new cases (5.2 per 100,000) were notified. Most of the cases were in the older age groups, and were slightly more common among males (5.5 per 100,000) than females (4.8 per 100,000). The majority of notified new cases (71%) were of those born overseas (Gilroy et al. 1999).

Over the period 1993–94 to 1997–98, there were 4,689 hospital separations with the principal diagnosis of tuberculosis, an annual average of 938 hospital separations. There were more hospital separations for males (54%) than females (46%).

A total of 1,807 tuberculosis deaths were recorded between 1979 and 1998. The number decreased from 95 in 1979 to 62 in 1998, with a high of 118 in 1981. Tuberculosis deaths occurred more frequently in the older ages, with 1,547 deaths (86%) of persons aged 55 years or more.

Vaccine-preventable diseases

Vaccine-preventable diseases are the communicable diseases for which the National Health and Medical Research Council schedule recommends routine vaccination/ immunisation for children in Australia. These are pertussis (whooping cough), tetanus, diphtheria, poliomyelitis, invasive *Haemophilus influenzae* type b (Hib) disease, measles, mumps and rubella. There have been a number of important changes to the vaccination/immunisation schedule in the last few years, which are outlined in Box 2.15.

Despite a reduction in their incidence, vaccine-preventable diseases remain a problem in Australia. Table 2.18 (page 122) shows recent notifications, hospital separations and deaths for these diseases.

Box 2.15: Recent changes to the vaccination/immunisation schedule

Recent changes to the vaccination schedule are:

- *a fifth dose of diphtheria, tetanus, pertussis (DTP) vaccine for children aged 4–5 years in 1994;*
- *the introduction in 1994–95 of the second dose of measles, mumps, rubella (MMR) vaccine for both sexes at age 10–16 years, and subsequent change in 1998 for this dose to be given between age 4 and 5 years;*
- *from 1 May 2000, the second dose of MMR and fifth dose of DTP was scheduled for 4 years;*
- *the introduction of* Haemophilus influenzae *type b vaccination in 1993; and*
- *the introduction of acellular pertussis vaccine, replacing whole-cell pertussis vaccine, as boosters in 1997 and for the primary schedule in 1999.*

The full immunisation schedule is contained in the NHMRC Australian Immunisation Handbook *(NHMRC 1997b).*

Pertussis. Pertussis remains the most frequently reported vaccine-preventable disease, and cyclic epidemics of pertussis continue to occur. The most recent peak occurred in 1997 with 10,668 notifications (57.6 per 100,000). In 1998, there were a total of 6,432 notifications (34.3 per 100,000), with the highest number of cases in children under 1 year of age. A large number of cases also occurred in children aged 5–9 years and 10–14 years.

Over the period 1993–94 to 1997–98, there were 4,031 hospital separations with the principal diagnosis of pertussis, an average of 806 hospital separations per year. The majority of hospital separations (60%) were of children aged less than 1 year of age.

During the period from 1979 to 1998, there were 26 deaths with pertussis as the underlying cause of death. In 1997, there were 6 pertussis deaths, reflecting the 1997 outbreak, but there were no deaths from pertussis recorded in 1998.

Tetanus. Tetanus cases remain rare in Australia. Only 7 notifications of tetanus were received in 1998.

Over the period 1993–94 to 1997–98, there were 101 hospital separations with the principal diagnosis of tetanus, an annual average of 20 separations. The majority of hospital separations (56%) were of persons aged 60 and older, and there was a greater proportion of females (59%) than males (41%). There were an additional 3 hospital separations for cases of tetanus among newborns over this period.

Although uncommon, tetanus deaths continue to occur. During the period from 1979 to 1998, there were 42 deaths with an underlying cause of tetanus, an average of about 2 deaths every year. There has been little change in the numbers of tetanus deaths over the past 20 years.

Diphtheria. No cases of diphtheria have been notified since 1993. Over the period 1979 to 1998, there were only 3 deaths with an underlying cause of diphtheria.

Polio. There have been no notifications of community-acquired (wild-type) polio since 1978 but a few possible cases of vaccine-related polio have been reported, the last one in 1995 (Burgess & McIntyre 1999). As a necessary part of the process for Australia to be declared polio-free, an enhanced polio surveillance has been undertaken over the past few years to supplement the notification system for this disease. No cases have been detected through these surveillance activities, which have included the active surveillance program for acute flaccid paralysis by the Australian Paediatric Surveillance Unit (APSU 1999).

Haemophilus influenzae type b (Hib). The number of reported cases of invasive infections likely to be due to Hib has declined following the introduction in April 1993 of a free Hib vaccine for children under 5 years of age. There were 35 cases (0.2 per 100,000) reported in 1998, the lowest annual number of notifications since national surveillance began in 1991. Most cases were of children under 5 years of age, in particular children under 2 years of age.

Hib is the agent most likely to cause *Haemophilus influenzae* meningitis and acute epiglottitis. Virtually all cases of epiglottitis in young children are caused by *Haemophilus influenzae* type b. From 1993–94 to 1997–98, there were 1,309 hospital separations with the principal diagnosis of acute epiglottitis or *Haemophilus influenzae* meningitis, an average of 262 hospital separations every year. The number decreased consistently over the period, from 436 in 1993–94 to 201 in 1997–98. There was a greater proportion of hospital separations for males (58%), and 54% of these separations were of children under the age of 10. Acute epiglottitis accounted for 72% of separations and *Haemophilus influenzae* meningitis for 28%.

Deaths from acute epiglottitis and *Haemophilus influenzae* meningitis have also been falling. During the period from 1979 to 1998, there were 251 deaths with these underlying causes, decreasing from 14 in 1979 to 3 in 1998. There was a high of 21 deaths in 1987.

Measles. There were 306 measles notifications in 1998, at a rate of 1.6 per 100,000 population. This was the lowest annual rate since national surveillance began in 1991. The highest notification rate in 1998 was in the age group 0–4 years (15.6 per 100,000), and there were slightly more notifications for males than females.

Over the period 1993–94 to 1997–98, there were 1,863 hospital separations with the principal diagnosis of measles, an annual average of 373 hospital separations. There was an 85% decrease in the number of measles hospital separations over this period, from 917 in 1993–94 to 133 in 1997–98. More than half of the hospital separations were in Queensland. Over half of the hospital separations were of children under the age of 10 years (55%), and a further 16% of children aged 10–14 years.

During the period from 1979 to 1998, there were 74 deaths attributed to measles. The trend shows a decrease from 11 in 1979 to none in 1995 through to 1998. Measles, including the impact of the Measles Control Campaign, is discussed further in the section on vaccination status (chapter 3, page 157).

Subacute sclerosing panencephalitis. Subacute sclerosing panencephalitis (SSPE) is a late complication of measles causing progressive brain damage and finally death, usually 10 to 15 years after the initial measles episode (NHMRC 1997b). In the period from 1995 to 1998, there were six cases of SSPE, with an incidence rate of 0.02 per 100,000 (APSU 1999).

Over the period 1993–94 to 1997–98, there were 55 hospital separations with the principal diagnosis of SSPE. The number of SSPE hospital separations declined consistently over this period from 19 in 1993–94 to 3 in 1997–98. Males (83%) were more likely to be hospitalised than females (17%), and the majority of hospital separations (74%) were of those in the age group 10–19 years.

During the period from 1979 to 1998, there were 79 deaths with an underlying cause of SSPE, an average of about 4 per year. There has been a general decrease in mortality due to SSPE over the period, from 3 in 1979 to none in 1998. There was a high of 9 deaths in 1981, with the last two deaths occurring in 1996.

Mumps. Annual notifications of mumps have remained stable since it became notifiable in all States and Territories in July 1996. In 1998, a total of 183 cases (1.0 per 100,000) were reported, with the highest notification rates in the age groups 5–9 years (3.1 per 100,000) and 0–4 years (2.6 per 100,000).

Over the period 1993–94 to 1997–98, there were 190 hospital separations with the principal diagnosis of mumps, an annual average of 38 hospital separations. A large proportion of the hospital separations (42%) were of children under the age of 14 years.

During the period from 1979 to 1998, there were 10 deaths from mumps, with an average of less than 1 per year. No mumps deaths have been reported since 1995.

Rubella. Notification rates for rubella have fallen from 4,380 notifications in 1995 (24.2 per 100,000) to a low of 772 cases (4.1 per 100,000) in 1998. Males aged 15–19 years continue to have the highest notification rate (15.8 per 100,000 in 1998), although this rate has declined since 1994–95 when the second dose of the measles, mumps and rubella vaccine was introduced for both sexes at age 10–16 years.

Over the period 1993–94 to 1997–98, there were 305 hospital separations with the principal diagnosis of rubella, decreasing from 73 in 1993–94 to 29 in 1997–98. There were more hospital separations of males (63%) than females (37%), and 50% were of children under the age of 5 years. The last recorded rubella death was in 1988, the only death from rubella during the 20-year period from 1979 to 1998.

The major burden of rubella on the community is children born with congenital abnormalities due to maternal rubella during pregnancy. In the period between May 1993 and December 1997, 26 children were born with congenital rubella infection (APSU 1999). Anomalies were identified in 21 children, with 17 having multiple defects. No cases were identified among children born in 1998.

Table 2.18: Notifications, hospital separations and deaths for the main vaccine-preventable diseases

Disease	ICD-9/ICD-9-CM codes	Notifications (1998)	Hospital separations (1997–98)	Deaths (1998)
Pertussis	033	6,432	989	0
Tetanus	037, 771.3	7	20	2
Haemophilus influenzae type b(a)	320.0, 464.3	35	201	3
Measles	055	306	133	0
Mumps	072	183	36	0
Rubella	056, 771.0	772	29	0

(a) *Haemophilus influenzae* cases were classified using the codes 320.0 (*Haemophilus influenzae* meningitis) and 464.3 (acute epiglottitis) as *Haemophilus influenzae* by type is not specified in the ICD-9 coding system.

Sources: National Notifiable Diseases Surveillance System; AIHW National Hospital Morbidity Database; AIHW National Mortality Database.

Burden of communicable diseases

Despite major reductions in mortality, and the overall success of vaccination, communicable diseases are responsible for considerable burden of disease and health system costs. In 1996, infectious and parasitic diseases, along with acute respiratory infections including pneumonia and influenza, represented 3% of the total disease burden in Australia. HIV/AIDS represented about one-fifth of the total burden of communicable diseases in 1996 (AIHW: Mathers et al. 1999a). The burden of communicable diseases was 30% higher among males than females. This difference was largely due to the greater burden of HIV/AIDS among males and its consequent premature mortality.

Infectious and parasitic diseases accounted for 2.7% ($849 million) of the total health system costs in 1993–94 (AIHW: Mathers et al. 1998a).

Issues and problems

Over the last few years, there has been a re-emergence of some of the infectious diseases previously thought to have been conquered, and the emergence of 'new' diseases. These have been associated with the increase in international travel, the development of resistance to antimicrobials and changes in the environment, and the way in which the population interacts with new infections. In addition, better understanding of disease epidemiology and new diagnostic methods have led to the recognition of 'new' communicable diseases.

Recently recognised emerging diseases include bat paramyxovirus, which causes respiratory disease in humans and horses, in Queensland (Selvey & Sheridan 1994), and a lyssavirus that causes neurological symptoms in humans (Allworth et al. 1996). Factors that may contribute to the emergence of new agents of disease are medical and animal husbandry practices and population movements. In addition, existing diseases such as dengue fever and Japanese encephalitis have spread more widely, as well as increased in incidence in the northern regions of Australia. These problems emphasise the need for continued control and active surveillance of these diseases.

The emergence of antibiotic-resistant bacteria has been recognised as an important indicator of inappropriate use of antibiotics in human medicine and in food-producing animals. Infections with multiresistant *Staphylococcus aureus* and more recently vancomycin-resistant enterococci pose an increasing threat to health, particularly in the hospital setting. Strategies to encourage prudent use of antimicrobials and better infection control are important in reducing the incidence of resistance (Turnidge et al. 1996; McAlister et al. 1999).

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3 Determinants of health

As discussed briefly in chapter 1, the health of individuals and populations is determined by many factors acting alone or together, often in complex interplay. Information on the determinants of health is particularly important because it can help explain trends in health and why some groups have better or worse health than others. This knowledge can then guide the nature and focus of preventive activities. Prevention can occur through the efforts of individuals acting on their own behalf, through health professionals, and through governments and other agencies.

The health determinants outlined in this chapter comprise:

- **Environmental factors.** These include physical, chemical, biological, social, economic, cultural and political factors. Socioeconomic factors such as education and employment can affect an individual's ability and opportunity to make healthy choices. Physical, chemical and biological factors affect the quality and safety of air, water, soil and food by, for example, chemical pollution and waste disposal methods. Larger scale environmental disruptions, such as human-induced climate change and ozone depletion, can have major health implications.

- **Genetic factors.** Some diseases, such as muscular dystrophy, result entirely from an individual's genetic make-up whereas many others reflect the interaction between that make-up and environmental factors.

- **Attitudes and beliefs.** Attitudes, beliefs and knowledge influence individuals' lifestyle and behaviours and so affect health.

- **Lifestyle and behaviour.** Patterns of eating and drinking, use of tobacco and other drugs, physical activity, sexual practice, and other behaviours can all contribute strongly to a person's health (Box 3.1, page 134). Along with genetic factors, lifestyle and behaviour influence biomedical factors that affect health.

- **Biomedical factors.** Blood pressure, blood cholesterol and bodyweight are among the important biomedical factors that affect health (Box 3.1). The levels of these factors in an individual are the result of lifestyle, behaviour and genetic predisposition.

3.1 Environmental factors

Australia's present social, economic and physical environment generally provides access to good-quality food and water, housing and places for recreation as well as education and employment. These contribute to an overall standard of living and health that compares well with other developed countries (enHEALTH 1999; AIHW: de Looper & Bhatia 1998; AIHW: Lester 1994).

Box 3.1: Some behavioural and biomedical risk factors associated with major causes of morbidity, disability and mortality

Risk factors	*Cause of ill health, disability and mortality*
Behavioural	
Poor diet and nutrition	*Coronary heart disease, stroke, breast and digestive system cancers, type 2 diabetes, gallstones, osteoporosis, malnutrition, dental conditions*
Excess alcohol consumption	*Coronary heart disease, liver and pancreatic disease, stroke, high blood pressure, cancers of the digestive system, accidents, mental illness, violence*
Smoking	*Coronary heart disease, several cancers including lung, mouth and cervical cancers, stroke, chronic lung disease*
Other drug abuse	*HIV/AIDS, hepatitis, renal failure, mental illness, suicide, violence, accidents*
Inadequate physical activity	*Coronary heart disease, stroke, type 2 diabetes, colon cancer, osteoporosis, bone fractures, falls, mental illness, obesity*
Excessive sun exposure	*Melanoma and other skin cancers, premature ageing of the skin*
Not vaccinated	*Measles, diphtheria, tetanus, pertussis, poliomyelitis,* Haemophilus influenzae *type b*
Unprotected sexual activity	*HIV/AIDS, hepatitis, cervical cancer, infertility, pelvic infection, venereal disease*
Biomedical	
Overweight and obesity	*Coronary heart disease, type 2 diabetes, breast cancer, gallstones, degenerative joint disease, obstructive sleep apnoea*
High blood pressure	*Coronary heart disease, stroke*
Raised blood cholesterol level	*Coronary heart disease, stroke*

Despite this, some Australians such as Indigenous peoples have generally poor social and economic conditions and poor health. In addition, significant changes to Australia's physical environment since European settlement have been at considerable cost to resources such as soil, rivers and aquifers, and biodiversity (State of the Environment Advisory Council 1996; CSIRO 1998a). Also, material released into Australia's atmosphere and the oceans contributes to environmental issues that could have significant population health impacts in Australia and worldwide (Epstein 1999; McMichael 1993; McMichael & Powles 1999).

These changes to the physical environment are relevant to Australia's long-term ability to supply basic human needs and may also pose more direct threats to health. Unfortunately, although environmental factors are increasingly seen as important, there are presently insufficient data to monitor nationally the levels and changes in many of these factors or to accurately estimate their effect on current or future health.

Social, economic, cultural and political determinants

The strong association between health and social and economic factors has become increasingly recognised and documented. However, the mechanisms behind that association are less clear (Yen & Syme 1999). Much of the research on the social and economic bases of health focuses on the observation that people in poor circumstances have worse health than those in more advantaged conditions. Social and economic disadvantages (e.g. poor education, unemployment and few assets) tend to occur together, and magnify the negative effects on health (WHO 1998). Social and economic circumstances can also cause anxiety, low self-esteem and social isolation which in turn can influence health-related behaviours and health itself.

In Australia, men and women with lower socioeconomic status (as measured by education level, occupation, family income and areas of socioeconomic disadvantage), including many Indigenous peoples, bear a higher burden of disease (see chapter 4).

Social, economic and cultural determinants of health are closely related. Social circumstances affect behaviour, and socioeconomically disadvantaged people may be influenced by economic and cultural reasons in their choice of behaviours that affect health. People in lower socioeconomic groups are more likely to exhibit behaviours, such as smoking and heavy use of alcohol, that place them at higher risk (DHAC & AIHW 1999). Unhealthy behaviour may be driven partly by a lack of knowledge, partly by more fatalistic attitudes and feelings of hopelessness, and partly by desire for immediate gratification in the absence of other rewards.

Cultural factors may influence health because of traditions, attitudes and beliefs, and customs. Family life, parental support and social exclusion are other factors that cross the social and cultural boundaries and may affect health in various ways. There are also related issues of ‘social capital’, a concept developed to explain the apparent benefits that social ties within communities have by making resources, advantages and opportunities available to individuals. Migrants, minority groups and refugees may be susceptible to ill health due to social isolation and often have few social support networks (Kawachi et al. 1996; Wilkinson & Marmot 1998). Despite this, overseas-born Australians, especially those born in southern Europe, generally have lower death rates than those born in Australia (Powles & Gifford 1990).

Physical, chemical and biological determinants

Over the past decade there has been growing concern about the links between health and the damage that humans are doing to the physical environment (McMichael 1993). Humans now have a large and growing capacity to affect the life support systems of this planet such as water, agricultural land and climate.

Australia currently has no system of monitoring to provide regular national data about issues such as the quality of drinking water, food, sewerage, soil health and biodiversity.

In the absence of agreed national indicators, the following provides an overview of some significant environmental issues relating to the environment and health.

Australian climate

The atmosphere and its expression through the weather affect the economic and social health of the country (CSIRO 1998b). Average annual temperatures have gradually increased to be about 1° Celsius higher in the year 2000 than they were in 1900, with many of the warmest years on record having occurred in the 1980s and 1990s (Bureau of Meteorology 1999a). Although average annual rainfall in north-west and south-east Australia has increased since 1910, rainfall in the other quadrants shows little or no change (Bureau of Meteorology 1999b). Depending on location within Australia and the severity of global warming, temperatures are estimated to rise by between 0.6° and 3.8° Celsius within 70 years, and winter rainfall over most of Australia may fall by up to 20% (CSIRO 1998a).

Global climate is changing and the factors causing this are of both natural and human origin (enHEALTH 1999). Although the timing and size of future changes are difficult to predict, the consequences upon health are likely to be significant (enHEALTH 1999). Health impacts could include increases in vector-borne diseases such as dengue fever, water- and sewerage-related diseases, and respiratory problems related to urban pollution. There could also be indirect health impacts resulting from impairment of agriculture and water resources as well as damage to buildings and roads (Watson et al. 1997; enHEALTH 1999).

Some interesting environmental indicators are:

- a steady increase in atmospheric carbon dioxide concentrations from 330 parts per million (ppm) in 1976 to over 360 ppm in 1998 (CSIRO 1999);
- per capita carbon dioxide emissions from energy use of 16.6 tonnes, which is lower than those of the United States (20.4) but higher than those of the Organisation for Economic Co-operation and Development (OECD) average (11.1) (OECD 1997) and much higher than those for developing nations;
- estimated falling net greenhouse gas emissions from land clearing, from 103 million tonnes of carbon dioxide equivalents in 1990 to 65 million tonnes in 1997;
- an 11% increase in net emissions from all other sources (related mainly to energy and agriculture) between 1990 and 1997, from 389 to 431 million tonnes of carbon dioxide equivalents (Australian Greenhouse Office 1997);
- 3% of Australia's energy production occurring through renewable methods, compared with 11% in Canada, 17% in Japan, 1% in the Netherlands and 7% in the United States (ABS 1999b); and
- 79% of Australians driving to work, 7% being driven to work as car passengers, 16% travelling by bus or train and 9% walking or cycling (ABS 1996a).

Stratospheric ozone

The stratospheric ozone layer filters cancer-causing ultraviolet radiation from sunlight before it reaches the Earth's surface. This helps protect against skin cancer, cataracts and perhaps some suppression of the immune system (UNEP 1998). Human production and release of chlorofluorocarbons (CFCs) and similar compounds into the atmosphere has caused a decrease in the concentration of stratospheric ozone, especially evident over Antarctica in spring. Through international agreement, the release of CFCs into the atmosphere has slowed. However, since many CFCs persist in the stratosphere for years, the concentration of the main CFCs has remained unchanged or is still increasing slightly (CSIRO 1999). The concentration of ozone over Antarctica in October has halved since the 1950s (Fraser 1999). The Commonwealth Scientific and Industrial Research Organisation (CSIRO) estimates that the ozone layer may recover between the years 2050 and 2070 (Fraser 1999). However, fair-skinned populations at mid-latitudes are predicted to experience a 5–10% increase in skin cancer incidence during the middle decades of the twenty-first century as a result of current higher ultraviolet light exposure (Slaper et al. 1996).

Human health indicators of environmental effects

Although the importance of the environment is increasingly being recognised, its contribution to health is often likely to be indirect, subtle, complex and delayed. It is therefore very difficult to estimate the full range and size of the health effects that can ultimately be traced to the environment, and so to plan accordingly. Australia's ability to report on health-related environmental issues is poorly developed, as elsewhere. The reporting that is currently possible relies mainly on measures of ill health rather than 'good health'. Three environment-related human health issues for which data exist are vector-borne diseases, skin cancer and low-level lead exposure of children.

A number of communicable diseases are influenced by environmental conditions or are kept in check by the efforts of environmental and other health workers. These diseases include Ross River virus, Murray Valley encephalitis, Japanese encephalitis, dengue fever, Barmah Forest virus, food poisoning diseases and legionellosis. The prevalence of diseases influenced by environmental conditions fluctuates considerably with changes in the weather and the prevalence of insect vectors. Surveillance of arboviruses and their vectors is important for the detection and management of these diseases, and climate and environmental changes associated with global warming are likely to result in higher numbers and wider geographic distribution of vector-borne diseases within Australia. The first case of Japanese encephalitis (a potentially fatal virus transmitted by mosquitoes) on the Australian mainland was diagnosed in March 1998 (Thomson et al. 1998). In recent years, Japanese encephalitis has also been diagnosed in the Torres Strait Islands.

Development of melanoma and other skin cancers is related to exposure to ultraviolet radiation in sunshine. Although the death rate from melanoma has remained relatively unchanged, the incidence of new cases is growing steadily (AIHW 1999b) (see section 2.2, page 70).

Industrial use of lead, especially in the manufacture of paint and as an additive in petrol, has resulted in the widespread distribution of lead in the environment where it is available for people, and especially children, to swallow or inhale. Community concern over the past decade about the health effects of lead, especially its effects on young children, has stimulated action to solve the problem. There has been only one systematic national study of blood lead concentration in children. This was conducted in 1995, and found that less than 1 in 12 children aged 1–4 years had blood lead concentrations greater than or equal to the 1993 National Health and Medical Research Council (NHMRC) goal for all Australians (AIHW: Donovan 1996). From many individual Australian studies there appears to be a general trend for blood lead concentrations in children to have decreased over time. It appears likely that this decrease is in response to the introduction of legislation encouraging the use of unleaded petrol, the general lowering of paint-lead concentration over the decades and community awareness.

3.2 Genetic factors

Genetic factors play an important role in human health and disease. An individual's genetic make-up (genome) sets the main features and boundaries within which life is to be experienced. It also provides the blueprint for how the human body interacts with the environment. In addition, the genome is programmed to protect its own molecular structure and to repair any damage caused to it by environmental agents.

Human health also depends on the genetics of other life forms, especially organisms that infect humans. Therefore, human health should be seen as the result of our environment (including the genetics of other life forms), our genes, and the interaction between the two.

The spectrum of genetic diseases

Genetic factors contribute to diseases at various levels and in many different ways (Khoury 1996). A study in British Columbia, Canada, suggests that prior to age 25, more than 5% of all live-born individuals will be affected by a disease that primarily has a genetic component (Baird et al. 1988). Separate estimates put the proportion at about 10% when measured for recurrent genetic diseases over the whole lifetime (UNEP & ICPEMC 1992).

Broadly, three major types of genetic diseases/disorders are identified. (For explanation of various genetic terms and a description of the organisation of the human genetic material, see Box 3.2.) These are:

- single gene (monogenic) disorders, genetic defects that result from an alteration or a change (mutation) in the structure of the gene and can be traced through families and clearly defined;
- chromosomal abnormalities, caused by structural changes in the chromosomes or the gain or loss of whole chromosomes (or parts of chromosomes), some of which can be related to specific clinical syndromes; and
- multifactorial diseases, which seem to have a strong genetic component but are expressed following interaction of genes with environmental factors such as diet, chemical exposure and lifestyle.

About 2% of the population will have a monogenic problem or condition, with some of the problems showing up at birth and others showing up later in life. Common examples of monogenic disorders are muscular dystrophy, cystic fibrosis and haemophilia. Limited data are available to generate reliable estimates of the prevalence of these problems in Australia.

The incidence of chromosomal abnormalities or malformations among live-born infants is estimated to be at least 0.5%. In addition to well-defined clinical syndromes, e.g. Down syndrome, chromosomal abnormalities also account for more than 20% of spontaneous abortions (Riccardi 1977). Chromosomal abnormalities represented 13% of all notified

Box 3.2: Human genetic organisation

It is estimated that each human cell has at least 70,000 different types of genes. Genes, whose main function is to code for various proteins, are regions of deoxyribonucleic acid (DNA) that operate as units of heredity. The total set of genes and its organisation is called a genome.

The genetic information is stored in the ordered sequence of four types of nucleotides (building blocks of nucleic acids) that are linked together to form DNA molecules. There are some 6 billion nucleotides in each human cell. This extensive information system is packaged up into 46 chromosomes (23 pairs) within the nucleus of the cell, with genes situated at specific sites or loci on the chromosomes.

For every pair of chromosomes, one chromosome comes from one parent and the second from the other parent. These paired chromosomes are separated again at the time of formation of sperm and ova.

While broadly similar in underlying structure, i.e. the ordered sequence of their nucleotides, individual genes on each member of a pair of chromosomes may exist in alternative forms, called alleles. Examples of this variation are alleles of the ABO gene, located on Chromosome 9, that lead to the formation of A, B and O blood groups.

This existence of many different forms of the same gene in the population – although an individual may carry no more than two alleles for any one gene – in concert with various chromosomal combinations (possible from a set of 23 pairs of chromosomes) is the source of much genetic variation. In addition, maternally inherited genetic information contained in mitochondria, components of cells that are important in various cellular activities, adds to the genetic complexity.

An international effort, the Human Genome Project, is currently under way to map the location of each gene on the chromosomes along with their nucleotide sequence in order to understand the function of various genes (Box 3.3, page 140).

Genetic terms

Cell: *Cells are basic structural units of organisms, made up of various membranes, organelles and cytoplasm. The genetic material (DNA) is contained within the nucleus of the cell as well as its mitochondria.*

Chromosome: *A very long strand of DNA supported by proteins. In each human cell, except the egg and sperm cells, there are 46 chromosomes (arranged in 23 pairs, with one member of a pair inherited from one parent) that vary in size and structure.*

Chromosomal abnormalities: *An anomaly resulting from a change in the number or structure of the chromosomes. Chromosomal anomalies may occur either during the production of the egg or sperm, or at conception, and may even transmit (or be inherited) over generations.*

DNA (deoxyribonucleic acid): *The molecule in which genetic information is stored; composed of two complementary chains of nucleotides (its basic unit) wound in a double helix.*

Gene: *The basic unit of heredity; a sequence of nucleotides that codes for a peptide chain (assembled into proteins), along with other intermediary genetic molecules such as ribonucleic acid (RNA).*

Box 3.3: The Human Genome Project

Initiated in the United States in 1988 – the project is now an international research effort – the Human Genome Project (HGP) plans to generate genetic maps of all human chromosomes by 2005 (Trent 1999). This includes the location of various genes on the chromosomes and determination of their ordered nucleotide sequence.

Several useful outcomes with relevance to human health are expected from the project, including:

- *knowledge about the structure of various genes and their function;*
- *improved diagnosis and predictive testing for genetic disorders; and*
- *new treatments for genetic disorders, including gene therapy.*

Before the advent of HGP, only 4–6% of all human genes had been identified and their function partially described. These genes could at best be used as markers of various diseases. Availability of new molecular techniques, and a concerted international effort, has now ensured that the full sequence of the human genome, covering more than 70,000 genes, will soon become available (Foote 1999).

There have been many spin-offs from the HGP already, including the development of:

- *new technologies for microtesting, e.g. automated DNA testing of relatively small samples of tissue or blood, with a variety of forensic, diagnostic, screening and biological applications; and*
- *sophisticated methods to link vast arrays of data, originally developed to determine locational relationships between different genes, which may prove highly suitable for linking various administrative collections.*

congenital malformations in Australia in 1996, with an incidence rate of about 228 per 100,000 live births (Table 3.1) (AIHW NPSU: Hurst et al. 1999). In addition to chromosomal abnormalities, genetic contribution to congenital malformations such as spina bifida, congenital heart disease, and cleft lip/cleft palate is also high (Weatherall 1993).

The health impact of various genetic disorders mentioned above is small compared with their role in common diseases, several of which are multifactorial in origin. High blood pressure, asthma, diabetes and schizophrenia, common chronic diseases whose population impacts are known to be linked to environmental and lifestyle factors, also have large genetic components (Schull & Hanis 1990). However, the involvement of many genes in these diseases, each with an additive effect, makes it difficult to quantify the extent of the genetic contribution (Nora et al. 1991).

In addition to the diseases that result from the abnormal functioning of the genes that people have inherited from their parents, many genetic diseases result from abnormalities of the genetic machinery of cells that manages genetic and cellular processes (UNEP & ICPEMC 1992). Many forms of cancer which result from acquired abnormalities of the genetic machinery in body cells are prime examples of such changes. With the exception of a few rare childhood forms, cancer is now considered to result from mutations acquired during the lifetime. These changes affect only the body cells, and are not passed on unless they affect the DNA of the egg or sperm. However, it appears that we may inherit genes that make us more likely to develop a particular cancer following their mutation in body cells (Weatherall 1993).

Table 3.1: Notifications of chromosomal malformations, 1996

ICD-9 code	Chromosomal abnormality	Number	Incidence (per 100,000 births)
758.0	Trisomy 21 (Down syndrome)	312	121
758.1	Trisomy 13 (Patau's syndrome)	25	10
758.2	Trisomy 18 (Edward's syndrome)	56	22
758.3	Autosomal deletion	46	18
758.5	Other autosomal anomalies	76	30
758.6	Turner's syndrome	28	11
758.7	Klinefelter's syndrome	17	07
758.8	Sex chromosome anomalies	25	10
758.9	Unspecified	2	1
758	**Total**	**587**	**228**

Note: All States and Territories notify foetuses and infants with major congenital malformations, including chromosomal abnormalities, to the AIHW National Perinatal Statistics Unit which provides a national monitoring system.

Source: AIHW NPSU: Hurst et al. 1999.

Genetic resistance to disease

Examples of genetic diseases given above reflect mutational changes in the genome that can damage health. However, not all mutations are harmful. Generally, along with other mechanisms, mutations lead to the generation of significant genetic diversity that is essential to our survival as a species.

The wide range of human leukocyte antigens (HLA), sentries that help differentiate self from non-self (see immunological health in chapter 2 for immune mechanisms), are good examples of this type of variation. The HLA diversity ensures that there is enough variation among individuals in a population to resist new diseases.

Other forms of genetic resistance to disease include our innate ability to counter various infections and environmental hazards. Genetic traits such as sickle cell haemoglobin and ovalocytosis, which resist infection by the malarial parasite *Plasmodium* or stunt its growth inside the cell, are good examples of innate genetic resistance. However, individuals differ markedly in their ability to resist infection (Wakelin 1988), and this changes with age (Anderson & May 1991). Other environmental hazards are also handled variously by individuals using many different genetic mechanisms.

The genetic preparedness of the human host to resist disease is also influenced by the genetic ability of the invading organism to bypass the resistance mechanisms. Quite often, human parasites evolve in step with the disease-resistance mechanisms of the host. Host–parasite interactions therefore present a fascinating example of how environmental interactions between species influence health and disease processes. Undoubtedly, many of the genetic traits we observe today, in either host or parasite, are results of this co-evolution.

A variety of determinants, however, may influence our inherent resistance to disease (Table 3.2). These include age, nutrition and socioeconomic factors. Variation in the capacity and mechanism for DNA repair may also lead to differences in the survival of harmful mutations. The genetic complexity of the invading organisms, as mentioned earlier, is another important factor.

However, this variation in response to infectious and other environmental agents depends on the degree of exposure. If the exposure is high, such as a highly virulent strain of a virus, then a large proportion of the population may be overwhelmed by the exposure irrespective of genetic resistance.

Table 3.2: Factors influencing genetic susceptibility to disease

Factor	Mechanisms and outcomes
Age	Older people are more vulnerable to disease than younger people because of the decline in their ability to handle environmental damage to DNA and the accumulation of harmful mutations over time.
Nutrition	Diet can have a major influence on DNA mutation and cancer promotion. Some dietary factors may lead to certain genetic changes that in turn lead to cancers.
Socioeconomic factors	No direct relationship has been identified between socioeconomic factors and increases in genetic risks. However, poor diet, inadequate health care, infectious diseases, and exposure to environmental agents such as tobacco smoke can increase an individual's susceptibility to agents that cause genetic change.
Genetic complexity of parasites	Several parasitic organisms have evolved to circumvent the defence mechanisms of the human host, e.g. drug resistance, the ability to mutate at a faster rate, increased virulence and other evading mechanisms.
Degree of exposure	There is an upper limit to the ability of organisms to survive in a hostile environment. For example, extensive exposure to agents such as sunlight increases risks of skin cancer and may override all DNA repair capacities.
DNA repair mechanisms	Damaged capacity to repair DNA may allow new mutations to survive. This repair capacity varies between individuals and between different tissues of the same individual.
Evolutionary maladaptations	Several genetic traits such as sickle cell haemoglobin and thalassemias have evolved to help individuals and populations adapt to their environment. However, when the affected individuals live in other environments, the disadvantages may outweigh any special advantage.

Note: Based on list given in UNEP & ICPEMC (1992).

Prevention of genetic diseases

A common perception is that, since the genetic inheritance of an individual or a population is unchangeable, its outcomes cannot be significantly altered. However, the latest advances in genetic testing may remedy this problem partly through disease prevention. A series of tests for prenatal screening of chromosomal abnormalities and some single-gene disorders is now available. A variety of gene therapy techniques has also been developed to manipulate naturally occurring genes and introduce them into the body to combat disease. Also, given the role of genetic factors in influencing an individual's response to various diseases, gene technology has the potential to contribute to the prevention of these diseases by identifying those most at risk.

3.3 Attitudes and beliefs

People's attitudes, beliefs and knowledge are among the many influences on health-related behaviour, and therefore on health itself. Documenting and tracking these so-called cognitive factors among Australians may help to explain overall health levels and trends. It may also help shed light on the differences in the lifestyles and health of different groups in the population.

Available data indicate that health is an important issue for Australians. For example, Tasmanian adults rated 'health' over factors such as 'ability to perform activities of daily living', 'relationship with partner', 'personal safety' and 'relationship with children' as the most important factor for quality of life (DHHST 1999).

Attitudes and beliefs on specific health issues

Data on Australians' attitudes, beliefs and knowledge are available for major health issues such as diet, alcohol, illicit drug use and childhood immunisation. For example, most Australian adults believe that fat, sodium and sugar contributed to the development of disease and ill health (Crawford & Baghurst 1990). Despite the well-documented and widely promoted adverse effects of tobacco use, the 1998 National Drug Strategy Household Survey found that regular use of tobacco by adults is considered acceptable by 40% of Australians (Table 3.3, page 144).

Around 25% of Australians consider the regular use of cannabis/marijuana acceptable. For other drugs (except tobacco and alcohol), less than 10% of Australians believe that regular use by adults is acceptable. The legalisation of cannabis/marijuana is supported by around 30% of Australians, and about 10% support the legalisation of heroin, cocaine and amphetamines (AIHW 1999a). About 96% of Tasmanian adults believe that immunisation is 'very effective' or 'effective' in preventing childhood diseases such as measles, mumps, polio, diphtheria and tetanus (DHHST 1999).

Sex and age differences

Although Australian data are limited, differences in attitudes and beliefs relating to health are also evident between males and females, and between younger and older age groups. For example, men believe that increasing physical activity is an important healthy behaviour, whereas women focus more on social, environmental and dietary changes (Welsh et al. 1998). Further, older Australian men are more likely to highlight the importance of 'keeping busy' and 'having some purpose in life'. In contrast, older women appear to share the hope of 'slowing down more' after being busy with the multiple roles of paid work, household duties, children and grandchildren. Women are more likely to see 'rest and relaxation' as important for good health (Brown et al. 1999). Men are also more likely than women to consider regular use of cannabis/marijuana and alcohol to be acceptable (AIHW 1999a).

Younger people are more aware than older people of the importance of fibre in a healthy diet, and the role of fat and salt in relation to heart disease (Crawford & Baghurst 1990).

Table 3.3: Proportion of people who find regular drug use by adults acceptable, 1998 (per cent)

Drug	Males	Females	Persons
Tobacco	41.8	38.6	40.2
Alcohol	67.7	55.1	61.3
Cannabis/marijuana	30.4	20.9	25.6
Pain killers/analgesics(a)	10.3	8.8	9.5
Tranquillisers/sleeping pills(a)	7.2	3.8	5.5
Steroids(a)	3.9	0.9	2.4
Barbiturates(a)	2.7	0.7	1.6
Inhalants	1.7	0.3	1.0
Heroin	2.8	0.8	1.8
Methadone(b)	2.8	0.8	1.8
Amphetamines	4.7	1.7	3.1
Cocaine	3.8	1.1	2.4
Naturally occurring hallucinogens	6.4	2.2	4.3
LSD/synthetic hallucinogens	4.4	1.5	2.9
Ecstasy/designer drugs	5.1	1.5	3.3

(a) Non-medical use.

(b) Non-maintenance.

Source: 1998 National Drug Strategy Household Survey.

3.4 Lifestyle and behaviour

Dietary behaviour

Australia's Food and Nutrition (AIHW: Lester 1994) described a strong association between dietary behaviour and many chronic diseases. The major causes of death, illness and disability in which diet and nutrition play an important role include coronary heart disease, stroke, hypertension, atherosclerosis, some forms of cancer, type 2 diabetes, osteoporosis, dental caries, gall bladder disease and nutritional anaemias.

Ill health generally cannot be attributed to any one dietary component alone (Ashwell 1997). Diseases associated with diet are also associated with environmental, behavioural, biological and genetic factors. The complex relationships between diet, other risk factors and disease make it difficult to assess the contribution of diet to ill health (AIHW: Lester 1994).

In an optimal diet, the supply of required nutrients is adequate for tissue maintenance, repair and growth. The vitamins, minerals and proteins required to maintain the human body in good health can be met only through the intake of a well-balanced, wide variety of food.

The dietary guidelines for Australians recommend consumption of a wide variety of nutritious food. Essential nutrients for good health are found in varying amounts throughout many different food groups. Variety in a diet maximises the possibility of obtaining enough of these essential nutrients.

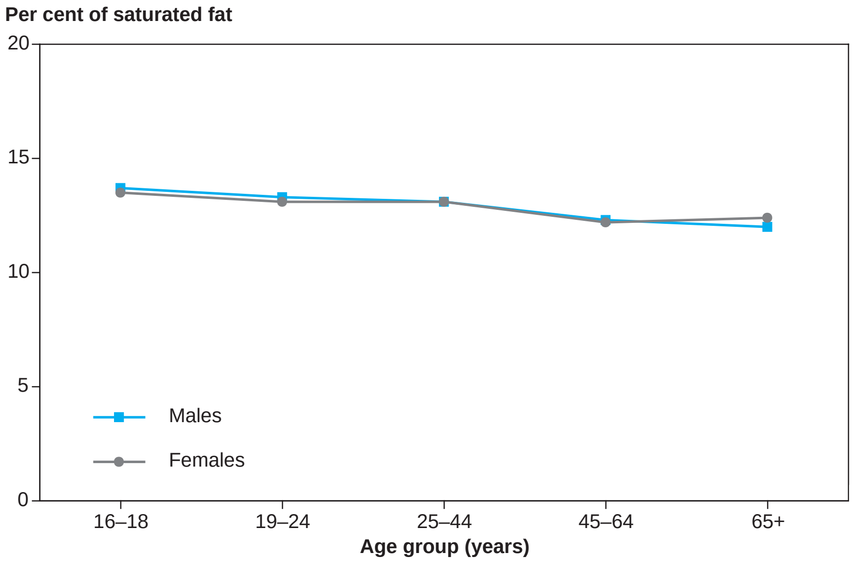
Food variety can be defined as the consumption of foods that are biologically diverse or nutritionally distinct from each other. Data from the 1995 National Nutrition Survey showed that the variety of food consumed in Australia increased significantly during the 14 years since the previous survey.

More than 90% of Australians reported consuming foods from the 'cereal and grains' and 'milk product' food groups in 1995 (ABS & DHFS 1997). However, over half of the males aged 12–44 years and approximately one-third of children aged 4–11 years had not eaten fruit on the day before the interview.

There is increasing evidence that fresh fruit and vegetable consumption offers protection against cancer, coronary heart disease and stroke (Ness & Powles 1997; NHMRC 1992a; Rimm et al. 1996; Steinmetz & Potter 1996). Previously, five serves of fruit and vegetables were recommended daily, but in recent years this has been increased to seven serves per day to obtain the best health benefits (Cashel & Jeffreson 1995).

In 1995, the proportion of people aged over 25 years who consumed less than five serves of fruit or vegetables per day ranged from a low of 46% for women aged 55–64 to a high of 70% for men aged 35–44 (ABS & DHFS 1997).

It is estimated that inadequate fruit and vegetable consumption (less than five serves) was responsible for 3% of the total burden of disease and 11% of total cancer burden in Australia in 1996 (AIHW: Mathers et al. 1999). By comparison, the net harm associated with alcohol consumption in 1996 was around 2.2% of the total burden of disease. The effects of alcohol consumption on health are discussed elsewhere in this chapter.



Source: 1995 ABS National Nutrition Survey.

Figure 3.1: Saturated fat as a proportion of total energy intake, 1995

High intakes of fat, especially saturated fats, are associated with elevated blood cholesterol levels, overweight and increased death from cardiovascular disease in populations where levels of physical activity are low (AIHW 1999c). Total fat (including saturated, mono-unsaturated and polyunsaturated) accounts for about 33% of the total energy intake of Australian adults. Although total dietary fat intake appears to have decreased from about 37% in the 1980s, the current level is still above the NHMRC's recommended level of 30% (NHMRC 1991).

Among Australian adults, saturated fat accounts for around 13% of total energy intake (Figure 3.1), higher than the recommended maximum level of 10% (AIHW 1999c). The major sources of saturated fatty acids in the adult diet are cheese, butter and margarine, pastries, milk and meat (ABS & DHAC 1998).

High salt consumption in some people is associated with an increase in blood pressure and possibly cardiovascular illness and death. No national data exist to assess levels of salt consumption among Australians. However, in one study conducted in Hobart, only 6% of men and 36% of women were below the recommended maximum intake of 100 mmol/day (Beard et al. 1997).

The recommended dietary intake (RDI) is a level of consumption for each nutrient considered to be adequate to maintain good health and prevent deficiency diseases (NHMRC 1991). Australia's mean nutrient intake from food and beverages, reported from the 1995 National Nutrition Survey, was very close to or exceeded the RDI for most vitamins and minerals in all age groups. The exceptions were calcium for females in most age groups and for boys aged 12–15 years, zinc for females aged over 12 years, and magnesium for girls aged 16–18 years (ABS & DHFS 1997). Calcium is important for bone and tooth development and insufficient dietary calcium increases the risk of developing low bone density and osteoporosis (NHMRC 1999). Zinc and magnesium are important for immune function, wound healing and muscle growth (Mann & Truswell 1998).

The evidence linking diet with preventable disease is recognised in Australia and internationally to provide sufficient reason for including improved nutrition as a major component of public health initiatives (AIHW: Lester 1994). The Strategic Intergovernmental Nutrition Alliance (SIGNAL) was established in 1997 as part of a strategic plan to further the implementation of the National Food and Nutrition Policy (DHCS 1992).

Alcohol consumption

Alcohol consumption is associated with considerable mortality and morbidity in the Australian community, accounting for an estimated 3,700 deaths in 1997 and almost 96,000 hospital episodes in 1996–97 (AIHW: Higgins et al. 2000).

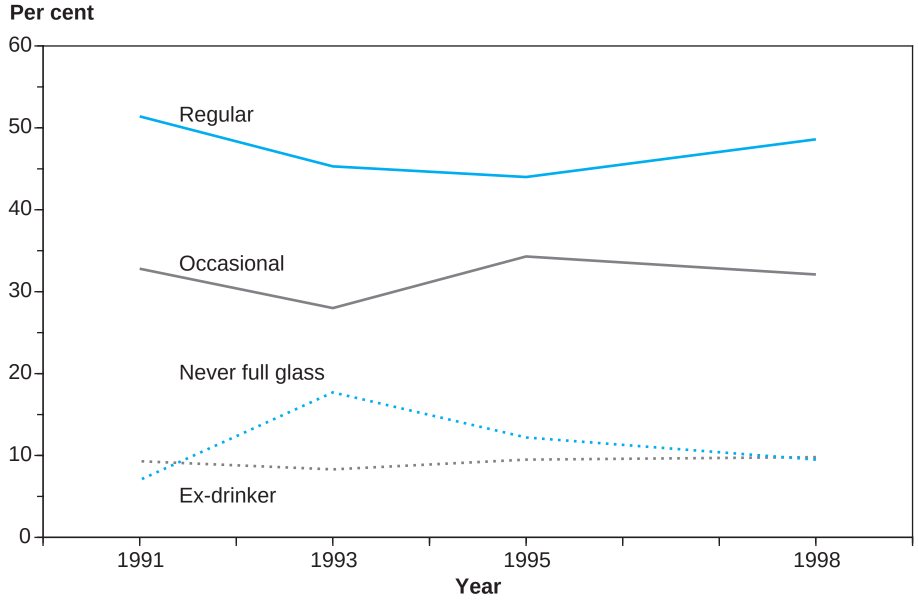
It has been estimated that the harm caused by alcohol consumption accounts for 4.9% of the total disease burden (AIHW: Mathers et al. 1999). Conditions associated with hazardous and harmful alcohol use include some cancers, liver disease, pancreatitis, diabetes and epilepsy. Alcohol is a significant factor in motor vehicle fatalities and injuries, and is associated with falls, drowning, burns, suicide and occupational injuries (English et al. 1995).

However, low to moderate levels of alcohol consumption can protect against hypertension, ischaemic heart disease, stroke and gallstones. The net harm associated with alcohol consumption, after taking into account these benefits, is around 2.2% of the total disease burden. The distribution of harm and benefit varies with age. For both males and females, the harmful burden of disease is highest in the 15–24 years age group, and the greatest protective effect is realised in persons over 75 years of age.

There are also social costs to the excessive use of alcohol. In 1998, over one-third of adult Australians reported being either verbally or physically abused by someone under the influence of alcohol (AIHW 1999a). About 1 in 10 persons reported being the victims of alcohol-related property damage or theft.

Based on results from the 1998 National Drug Strategy Household Survey, about 9 in 10 Australians aged 14 years or more had tried an alcoholic drink at some time in their lives, and around 8 in 10 persons reported drinking in the past 12 months (AIHW 1999a).

Drinking status has remained largely unchanged over the last decade (Figure 3.2), with around 50% of the population aged 14 years and over drinking regularly, i.e. on at least one day per week. A further 30% drank on only a few occasions each month, and the remainder either no longer drank alcohol or had never consumed a full glass of alcohol.



Source: National Drug Strategy Household Survey series.

Figure 3.2: Alcohol drinking status, persons aged 14 years and over, 1991 to 1998

Although the drinking status pattern has remained fairly constant, overall levels of alcohol consumption have decreased. Using apparent consumption data published by the Australian Bureau of Statistics (ABS), consumption of pure alcohol decreased markedly from 9.7 litres per person in 1981 to 8.2 litres in 1991, and then more slowly to 7.6 litres in 1997 (ABS 1998a).

The 1998 National Drug Strategy Household Survey showed that among recent drinkers (in the last 12 months), 14% of males and 6% of females typically consumed alcohol every day of the week (Table 3.4). Based on NHMRC recommendations regarding responsible drinking behaviour (NHMRC 1992b), at least 8% of adult male drinkers and 4% of females usually drank at levels considered to be hazardous or harmful to health (AIHW: Higgins et al. 2000).

Internationally, Australia ranked 19th in 1997–98 for per capita consumption of alcohol (total pure alcohol), at 7.6 litres per person (Productschap voor Gedistilleerde Dranken 1999). This figure is made up from 94.5 litres of beer per person (for which Australia ranked 9th), 19.7 litres of wine per person (ranked 18th) and 1.3 litres per person of pure alcohol from spirits (ranked 35th).

Table 3.4: Alcohol consumption patterns, recent drinkers aged 14 years and over, 1998 (per cent)

	Quantity (standard drinks)				
Frequency	**1–2**	**3–4**	**5–6**	**7 or more**	**Total**
			Males		
Every day	4	5	3	2	14
4–6 days/week	5	6	3	3	17
2–3 days/week	6	7	4	6	23
1 day/week	3	6	3	4	16
Less often	17	6	2	3	30
Total	**36**	**31**	**15**	**18**	**100**
			Females		
Every day	4	2	1	—	6
4–6 days/week	6	3	—	—	10
2–3 days/week	9	4	1	2	16
1 day/week	8	4	2	2	17
Less often	35	9	3	2	50
Total	**62**	**22**	**8**	**7**	**100**

Note: 'Recent' refers to the last 12 months.

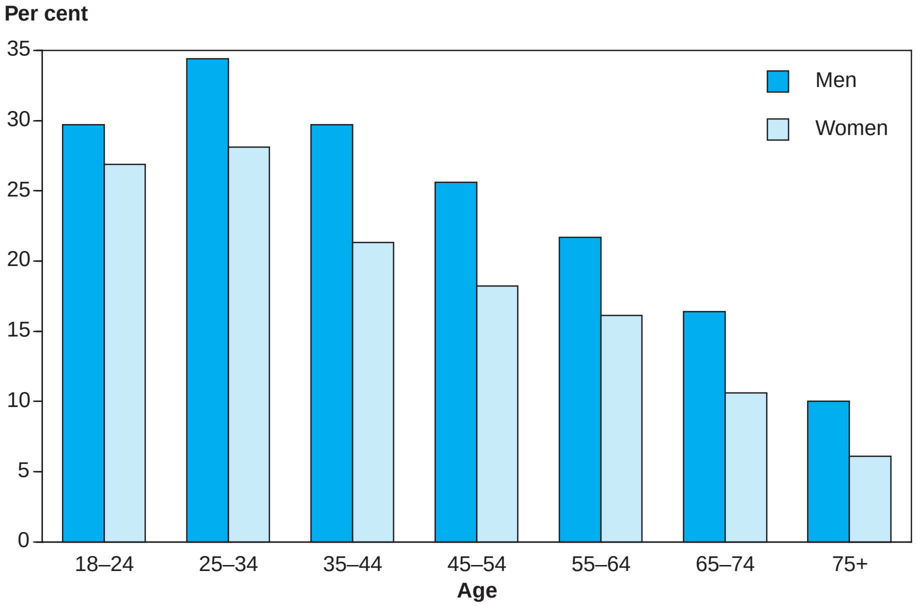
Source: National Drug Strategy Household Survey 1998.

Tobacco smoking

Of all risk factors for disease, tobacco smoking is responsible for the greatest burden on the health of Australians. It is estimated that in 1996 tobacco smoking was responsible for about 12% of the total burden of disease in males and 7% in females (AIHW: Mathers et al. 1999).

Tobacco smoking increases the risk of coronary heart disease, stroke and peripheral vascular disease as well as a range of cancers and other diseases and conditions. It is responsible for around 85% of new cases of lung cancer annually (DHFS & AIHW 1998). Approximately 13% of deaths from cardiovascular disease and 21% of deaths from cancer are due to smoking tobacco (AIHW 1996). It is estimated that smoking tobacco was associated with almost 150,000 hospitalisations in Australia in 1998 (AIHW 1999a).

From data collected in the 1995 National Health Survey it is estimated that almost 3.2 million adult Australians were at risk of developing heart disease and other chronic conditions from smoking tobacco products (AIHW 1999c). About 27% of men and 20% of women aged 18 years and over were smokers. Highest rates of smoking were found among men (34%) and women (28%) aged 25–34 years. After 34 years of age, the rate of smoking declined with increasing age to be lowest among men and women aged 75 years and over (Figure 3.3).

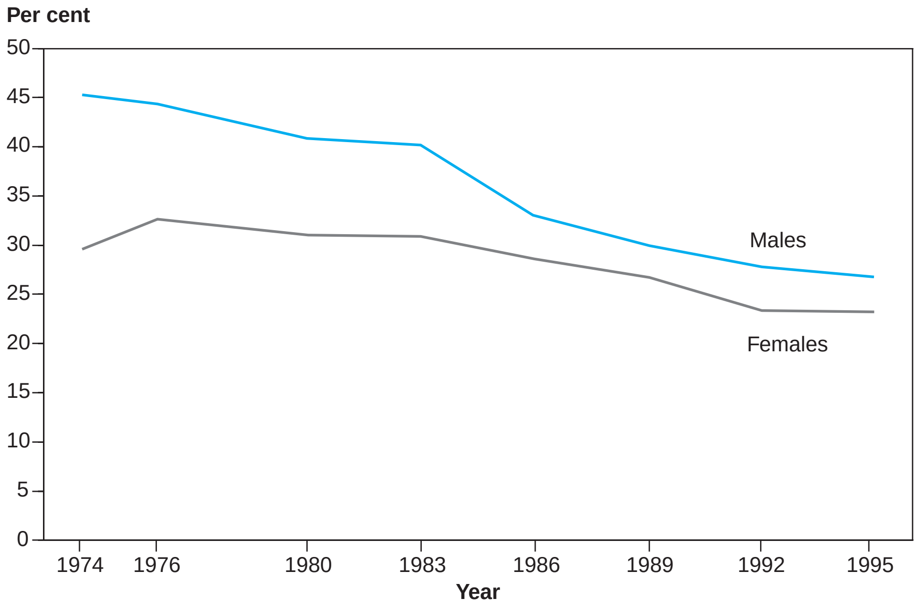


Source: ABS National Health Survey 1995.

Figure 3.3: Proportion of adults who are current smokers, 1995

In 1995, the proportion of ex-smokers in Australia was 32% for men and 23% for women. The proportion of people reporting to have never smoked was 40% for men and 57% for women (AIHW 1999c).

Male adult smoking rates have been declining since the 1960s, while among women smoking rates began to decline in the late 1970s. However, national surveys by the Anti-Cancer Council of Victoria show that the rate of decline of current smokers has slowed in more recent years (Hill, White & Scollo 1998) (Figure 3.4).



Source: Hill, White & Gray 1988, 1991; Hill & White 1995; Hill, White & Scollo 1998.

Figure 3.4: Proportion of adults who are current smokers, 1974 to 1995

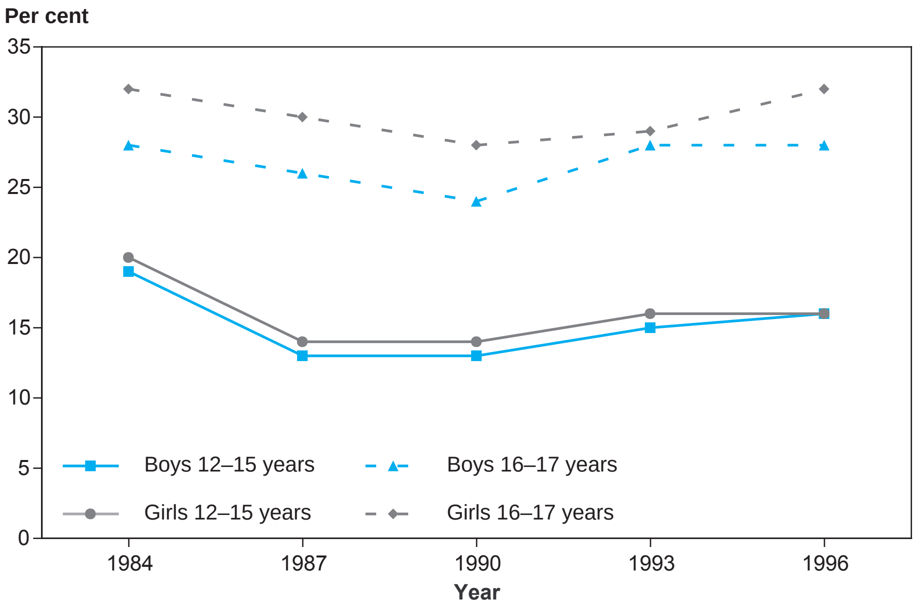
From data collected in a national survey of secondary students, it is estimated that more than 276,000 aged 12–17 years were current smokers in 1996. It has been estimated that approximately 70,000 take up smoking each year (Hill, White & Letcher 1999). The smoking rate for those aged 12–15 years in 1996 was 16% for both boys and girls, with the rate rising to 28% among boys aged 16–17 years and 32% among girls aged 16–17 years (Figure 3.5).

There was a decline in current smoking rates for students aged 12–17 years from 1984 through to 1990, but this decline has since ceased.

The 1998 National Drug Strategy Household Survey (AIHW 1999a) measured tobacco consumption patterns among Australians. The average number of cigarettes smoked per week by adult male and female smokers was 101 and 100 respectively.

The average number of cigarettes smoked per week by teenagers (aged between 14 and 19 years) was 60 for males and 57 for females (AIHW 1999a).

Quality of life is a subjective assessment made by individuals and relates to their functioning across a number of physical and mental health dimensions. Heavy smokers (more than 25 cigarettes per day) have lower quality of life than do light (less than 15 cigarettes per day) or moderate (15–24 cigarettes per day) smokers. Further, all types of smokers have lower quality of life than those who had never smoked and ex-smokers (Wilson et al. 1999).



Source: Hill, White & Letcher 1999.

Figure 3.5: Proportion of adolescents (12–17 years) who are current smokers, 1984 to 1996

Use of illicit drugs

Illicit drug use refers to the use of illegal drugs and the illicit use of drugs and volatile substances, including the non-medical use of prescription drugs. Illicit drug use is, directly and indirectly, a significant cause of death and ill health. Conditions associated with illicit drug use include overdose, HIV/AIDS, hepatitis C, low birthweight, infective endocarditis, poisoning, suicide and self-inflicted injury.

Approximately 2% of the total burden of disease in Australia can be attributed to illicit drug use (AIHW: Mathers et al. 1999), with the age-specific burden peaking in the age group 25–34 years.

Data from the 1998 National Drug Strategy Household Survey show that, defined in the above terms, an estimated 3.3 million Australians aged 14 years or more have used an illicit drug in the past 12 months. Most of this use is associated with marijuana/

cannabis (around 2.7 million persons). It is estimated that in 1997, over 800 people died from illicit drug-related causes, and in 1996–97 there were over 11,000 hospital episodes related to the use of illicit drugs (AIHW 1999a).

Although estimates of low-prevalence behaviours are subject to high relative standard errors, it appears that illicit drug use is generally increasing (Table 3.5). An exception is the non-medical use of barbiturates, which is declining, due apparently to increased restrictions on access to this class of drugs. As noted above, marijuana/cannabis use continues to dominate among the drugs surveyed: in 1998 almost two-fifths of the population aged 14 years and over had tried using marijuana/cannabis at some time in their life, and almost one-fifth had used the drug in the past 12 months. Use of this drug in 1998 increased from previous years, and there was an associated increase in community acceptance of its regular use by adults (AIHW 1999a).

Table 3.5: Summary of illicit drug use, persons aged 14 years and over, 1991–98 (per cent)

	Ever used				Recently used[(a)]			
Substance	**1991**	**1993**	**1995**	**1998**	**1991**	**1993**	**1995**	**1998**
Amphetamines[(b)]	8	8	6	9	3	2	2	4
Barbiturates[(b)]	(c)	4	1	2	(c)	—	—	—
Cocaine	3	2	3	4	1	1	1	1
Ecstasy	2	3	2	5	1	1	1	2
Hallucinogens	7	7	7	10	2	1	2	3
Heroin	2	2	1	2	1	—	—	1
Inhalants	3	4	2	4	1	1	—	1
Injected drugs	2	2	1	2	1	1	1	1
Marijuana/cannabis	32	34	31	39	13	13	13	18
Pain killers[(b)]	(c)	3	12	12	(c)	2	3	5
Steroids[(b)]	n.a.	3	1	1	n.a.	—	—	—
Tranquillisers	(c)	3	3	6	(c)	1	1	3

(a) Used in the last 12 months.

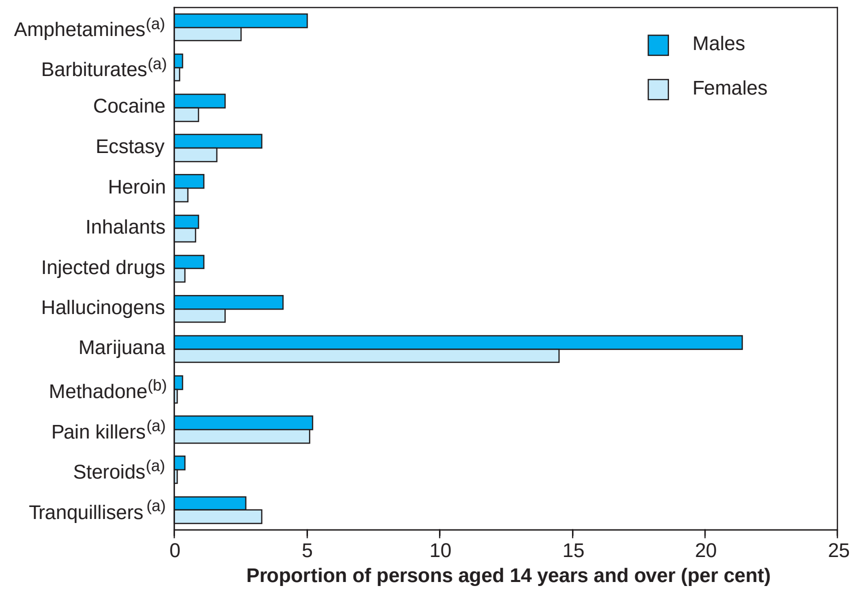
(b) For non-medical purposes.

(c) Data for 1991 not comparable to other years.

Sources: National Campaign Against Drug Abuse Household Survey 1991; National Drug Strategy Household Survey 1993, 1995, 1998.

In 1998, with the exception of tranquillisers, recent use by males exceeded that of females for all the substances included in the survey (Figure 3.6), and this reflected the pattern for lifetime use. However, between 1995 and 1998, illicit drug use among young females (aged 14–19) increased markedly (particularly for marijuana/cannabis), and use of illicit drugs among young males remained relatively stable. This has led to a convergence in the overall prevalence of illicit drug use between young males and females.

Injection of illicit drugs and non-prescribed pharmaceuticals can have significant adverse health effects, including drug overdose, acquiring of blood-borne infections (such as with HIV or hepatitis C virus (HCV)), and other illnesses from the injection of contaminants or impure substances. It is estimated that there were around 108,000 injecting drugs users in 1998 (AIHW 1999a).



(a) For non-medical purposes.

(b) Non-maintenance.

Note: 'Recent use' = use within the last 12 months.

Source: 1998 National Drug Strategy Household Survey.

Figure 3.6: Recent use of selected illicit drugs, persons aged 14 years and over, 1998

In a 1998 survey of injecting drug users who visited needle and syringe exchanges, 2% tested positive for HIV antibodies and 49% of the surveyed users tested positive to the HCV antibody. Prevalence of the antibodies is highly correlated with the length of injecting drug-use history (Table 3.6).

Table 3.6: Prevalence of HIV and HCV antibodies among injecting drug users[a], 1998 (per cent)

History of injecting drug use	Tested positive to HIV antibody			Tested positive to HCV antibody		
	Males	Females	Persons	Males	Females	Persons
Less than 3 years	1	1	1	15	20	17
3 to 5 years	2	—	1	25	34	29
6 or more years	2	1	2	63	73	66
Not reported	3	—	2	49	55	52
Total	**2**	**1**	**2**	**47**	**53**	**49**

(a) Survey of users attending 32 needle and syringe program sites.

Source: NCHECR 1999.

Using data from the National HIV Database, approximately 8% of HIV diagnoses in Australia have been in people with a history of injecting drug use, of whom half were men who also reported homosexual contact (NCHECR 1999).

Physical inactivity

Physical inactivity is a major determinant of ill health and the effects of physical activity on reducing the risk of mortality from all causes are well documented for people at all life stages (Mensink et al. 1999). According to recent estimates, physical inactivity is responsible for about 7% of the total burden of disease in Australia (AIHW: Mathers et al. 1999).

Studies show that participation in physical activity is associated with the prevention of cardiovascular disease. People who do not participate in regular moderate physical activity are about twice as likely to suffer a cardiovascular condition compared with those who participate (Blair et al. 1996).

Physical inactivity is associated with other risk factors for cardiovascular disease such as overweight, high blood pressure and high blood cholesterol. People who increase their levels of physical activity will reduce their levels of these risk factors (Bauman & Owen 1999; United States Department of Health and Human Services 1996).

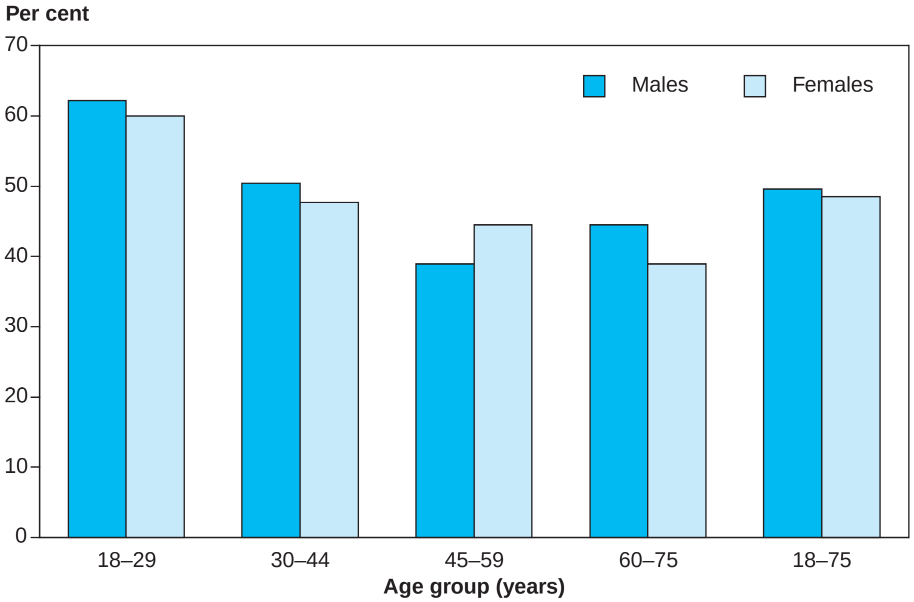
Participation in physical activity reduces the risk of developing colon cancer (Martinez et al. 1997), and emerging evidence suggests it provides a protective effect for breast cancer, especially among postmenopausal women (Sesso et al. 1997), and for lung cancer (Lee et al. 1999).

Participation in physical activity is associated with a reduced risk of developing diabetes (Hu et al. 1999) and improvements in musculoskeletal health. Further, studies have shown the benefits of physical activity on mental health (Chen & Millar 1999).

Currently, no nationally accepted uniform procedures exist for the collection and analysis of data on physical activity in Australia. The development of an appropriate tool to measure the physical activity among populations is a challenging task. Physical activity (any bodily movement produced by skeletal muscles that results in energy expenditure) for health benefit comprises several components (e.g. intensity, frequency, duration) that can be carried out in different settings (e.g. leisure time, occupational, transport). Measurement is further complicated because there are several dimensions of physical activity related to health such as energy expenditure, aerobic intensity, strength and flexibility. For example, physical activity for the prevention of cardiovascular disease is different from that required for prevention of musculoskeletal problems.

The 1997 Active Australia National Physical Activity Survey indicated that 50% of men and 49% of women aged 18–75 years undertook physical activity at a level which was beneficial to health. This level was defined as participation in at least 150 minutes activity of at least moderate intensity, spread over five sessions per week. In general, physical activity levels decline with increasing age (Figure 3.7).

The National Health Survey shows that the proportion of people doing no physical activity during their leisure time decreased only slightly between 1989–90 and 1995 from 36% to 34%. This decline was due mainly to an increase in physical activity among people aged 35–54 years (AIHW 1999c).



Source: 1997 Active Australia National Physical Activity Survey 1997.

Figure 3.7: People who are sufficiently active for health, 1997

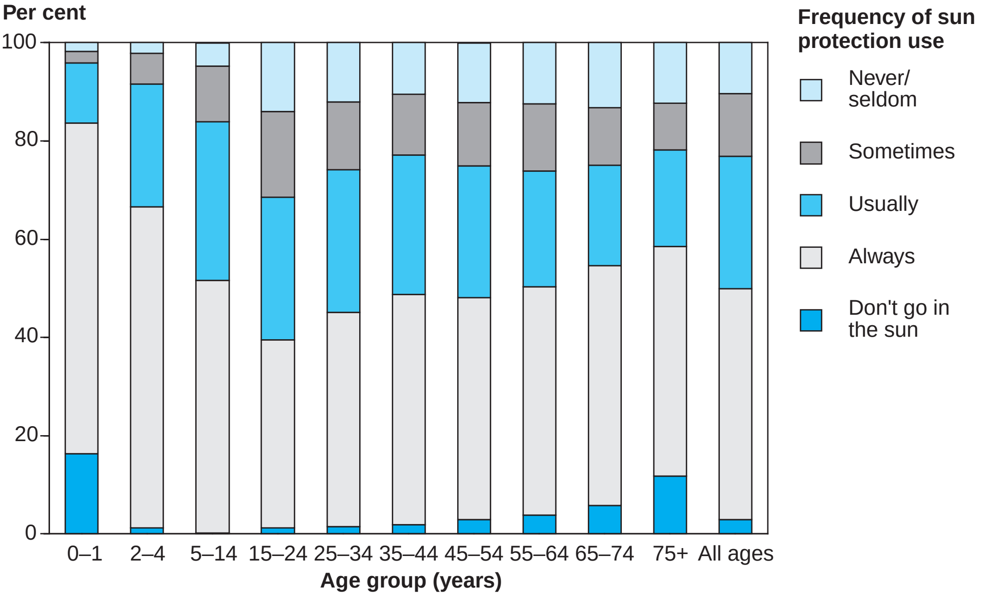
Walking increased in popularity during the 1990s with 45% of men and 53% of women walking for recreation or exercise in 1995, compared with 41% and 49%, respectively, in 1989–90. Despite this increase, the overall proportions of people undertaking physical activity at moderate intensities did not change between 1989–90 and 1995, suggesting that walking may have replaced other forms of moderate physical activity (Armstrong 1998).

In an effort to increase physical activity participation rates, a national participation strategy, Active Australia, has been established. Active Australia represents the interests of Commonwealth and State government agencies, including the sport, health and fitness sectors. The sports and physical activities that attracted most participants in 1998–99 were walking (23%), swimming (15%), aerobics (11%), golf (9%) and tennis (6%). Participation in organised sport and physical activity has increased from around 27% in 1996–97 to 30% in 1998–99 (ABS 1999a).

Sun exposure

Australia has the highest incidence of skin cancer in the world (DHFS & AIHW 1998). Skin cancer is the most common cancer in Australia and can largely be prevented by taking simple measures such as wearing protective clothing, applying sunscreens or avoiding the sun. Childhood exposure to sunlight has been shown to be an important cause of skin cancer (NHMRC 1996).

The 1995 National Health Survey found that 77% of the population were protected from exposure to the sun, by always or usually taking some sun protection measure, or by not going out in the sun (Figure 3.8). The most protected group were young children, of whom 96% aged under 2 years and 92% of those aged 2–4 years were protected or not exposed to the sun. Only 69% of persons aged 15–24 years used sun protection or were not exposed to the sun. Overall, 23% of the population never, seldom or only sometimes used any protection from exposure to the sun.



Note: See Box 3.4 for comment on the accuracy of the estimates.

Source: 1995 National Health Survey.

Figure 3.8: Use of sun protection measures, 1995

Some issues that can influence the accuracy of the survey results are discussed in Box 3.4.

In general, the type of sun protection used varied with age (Table 3.7). Hats followed by sunscreen and clothing were the most common types of protection used by children 0–14 years. For people aged 15–54 years, the most common type of protection was sunglasses followed by hats and sunscreen. Those aged 55 years and over tended to prefer hats, with sunglasses and sunscreen as the next most frequently mentioned protection measure taken.

Although there are no national trend data, results from surveys in Victoria and New South Wales suggest that the use of sun protective measures has been rising. Data from a series of sun behaviour surveys in Victoria show a rise in the use of sunscreen in people exposed to the sun between 11 a.m. and 3 p.m. on Sundays in the summer months, from 19% in 1988 to 34% in 1995 (Hill & Boulter 1996). Further, the proportion

Table 3.7: Type of sun protection used, by age group, 1995 (per cent)

Age group	Sunscreen	Umbrella	Hat	Clothing	Sunglasses	Avoid sun	Other
0–1	49	9	63	49	8	39	3
2–4	69	6	84	55	22	31	1
5–14	65	3	81	48	22	20	—
15–24	46	2	48	42	56	21	—
25–34	46	4	51	40	67	27	1
35–44	44	5	54	34	67	27	1
45–54	37	5	55	29	59	22	1
55–64	32	5	57	24	49	19	—
65–74	31	8	60	22	39	20	1
75 and over	22	8	57	17	30	19	1
Total	**45**	**5**	**59**	**36**	**49**	**23**	**1**

Source: 1995 National Health Survey.

of people who wore a brimmed hat between 11 a.m. and 3 p.m. on the previous Sunday rose from 9% in 1988 to 20% in 1995. A similar trend was observed in New South Wales: in a survey of high school adolescents the percentage using high-level sun protection, measured by a score based on protection by a hat, clothing or SPF 15+ sunscreen, increased from 39% in 1991–92 to 57% in 1994–95 (Armstrong 1996). Over this period there was an associated decline in attitudinal and normative beliefs favourable to getting suntanned: the percentage of people who believed that a suntanned person is more healthy declined from 17% in 1988 to 8% in 1995.

Box 3.4: Accuracy of sun protection estimates

Respondents in the 1995 National Health Survey were asked what protective measures they deliberately take when they go out in the sun. Such questions can result in over-estimates of actual behaviour as respondents tend to report what they like to do rather than what they actually did (Borland 1996).

It was not possible to conduct personal interviews with persons in some age groups: a parent or a responsible adult was interviewed on behalf of all children aged 0–14 years and those children aged 15–17 years where permission to interview them personally was not given.

The question listed various sun protective items, but it implied the use of hats, clothing or sunglasses to be for sun protection.

Vaccination status

Immunisation is the administration of vaccine(s) to prevent disease and so reduce death and serious illnesses, particularly in infants and children but also in adults. The potential risks of immunisation are much lower than the risks or complications from these diseases. Immunisation is recognised as a key cost-effective public health program (Freeman & Robbins 1994).

The effectiveness of immunisation was first demonstrated by Dr Edward Jenner some 200 years ago with his experiments with vaccination against smallpox. Since then, the number of vaccines has grown and the role of immunisation has expanded significantly. In the early 1970s the World Health Organization (WHO) Expanded Programme on Immunization set as a goal the universal immunisation of children against diphtheria, pertussis, tetanus, tuberculosis, poliomyelitis and measles. Goals were also set for the eradication through immunisation of smallpox (achieved in 1977), poliomyelitis (currently under way) and measles (a future possibility) (Plotkin & Orstein 1999).

In Australia, vaccine-preventable diseases are still responsible for serious illness and occasional death (Carnie 1997). The schedule of age-appropriate immunisations is set out in the *Australian Immunisation Handbook* (NHMRC 1997, 2000).

There have been a number of government strategies and programs to improve immunisation coverage in Australia. These include the National Immunisation Strategy released in 1993 (NHMRC 1993), the Immunise Australia: Seven Point Plan announced in February 1997, including the GP Immunisation Incentives Program from mid-1998, the Australian Childhood Immunisation Register (ACIR) begun in 1996 (National Childhood Immunisation Committee 1996), and most recently the Measles Control Campaign (MCC). The effectiveness of these programs will ultimately be measured by the extent of immunisation coverage and the number of new cases (incidence) of vaccine-preventable diseases.

Immunisation coverage

Immunisation coverage in Australia has been estimated in a number of ways including special surveys through the State and Territory Public Health Departments, academic organisations, ABS and other organisations (Lister et al. 1999). More recently the implementation of the ACIR has provided a means of measuring immunisation coverage at a national level for vaccines on the standard national childhood vaccination schedule. There is an ongoing use of surveys for vaccine-preventable diseases for other age groups and checks of validity of the ACIR data.

The ACIR was set up as a part of the National Childhood Immunisation Program to collect immunisation-coverage information for Australian children under 7 years of age registered with Medicare since January 1996. The ACIR performs a number of functions, including the collection of information from providers, provision of immunisation information for parents, and administration of a recall or reminder system for parents. The ACIR also provides regular reports on immunisation coverage at national, State/Territory or local level for public health authorities (National Childhood Immunisation Committee 1996).

Since 1997 and as part of the Immunise Australia program, a number of initiatives have been introduced to improve both immunisation uptake and notification of encounters. Schemes to encourage parent compliance with the Australian Standard Vaccination Schedule have included the linkage of immunisation status to the Commonwealth Child Care Rebate scheme (with the accompanying history form), the Childcare Assistance scheme, and the Maternity Immunisation Allowance. The General Practice Immunisation Incentives scheme encourages participation by general practitioners in the delivery of immunisation and reporting to ACIR of immunisation-encounter details.

ACIR coverage results are reported for birth cohorts at 1 and 2 years of age and expressed as the percentage of children immunised (O'Brien et al. 1998). The first coverage estimates for children at age 1 year were published in March 1998 for the cohort born between 1 January 1996 and 31 March 1996 (O'Brien et al. 1998). Subsequent reports have been published on a quarterly basis and have shown a progressive increase in coverage. The most recent report of immunisation coverage found that for those aged 1 year (cohort born between 1 July 1998 and 30 September 1998) 87% were fully immunised (Table 3.8) and for those aged 2 (cohort born in the 3-month period between 1 July 1997 and 30 September 1997) 74.9% were fully immunised (Table 3.9) (Communicable Diseases Network 2000).

Table 3.8: Proportion of children immunised at 1 year of age, preliminary results by disease and State for the birth cohort 1 July to 30 September 1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Number of children	22,272	15,770	12,347	6,311	4,730	1,661	1,065	848	65,004
Diphtheria, tetanus and pertussis (%)	86.5	89.1	90.5	87.3	89.0	89.3	90.0	86.9	88.3
Poliomyelitis (%)	86.6	89.1	90.5	87.3	89.0	89.3	90.0	86.9	88.3
Haemophilus influenzae type b (%)	85.7	88.6	90.6	86.9	88.6	88.7	90.2	88.9	87.9
Fully immunised (%)	84.7	88.0	89.9	85.9	88.0	88.2	89.8	83.8	87.0
Change in fully immunised since last quarter (%)	+0.5	+0.3	+1.5	–0.3	–1.0	+1.2	+0.8	+0.9	+0.5

Source: Australian Childhood Immunisation Register.

Table 3.9: Proportion of children immunised at 2 years of age, preliminary results[(a)] by disease and State for the birth cohort 1 July to 30 September 1997

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Number of children	22,876	15,840	12,688	6,516	4,778	1,605	1,073	924	66,300
Diphtheria, tetanus and pertussis (%)	81.4	83.5	84.9	81.2	84.6	82.1	87.2	75.9	82.8
Poliomyelitis (%)	81.4	83.6	84.9	81.2	84.6	82.1	87.2	75.9	82.8
Haemophilus influenzae type b (%)	80.5	83.2	85.3	80.9	83.9	80.4	86.8	81.2	82.4
Measles, mumps and rubella (%)	87.2	90.5	90.2	87.5	91.0	88.8	91.1	86.3	89.0
Fully immunised (%)	71.0	76.8	79.4	73.0	77.8	74.0	82.9	69.6	74.9
Change in fully immunised since last quarter (%)	–1.2	–0.5	–1.7	–0.4	+1.0	–3.1	–0.9	+2.5	–1.0

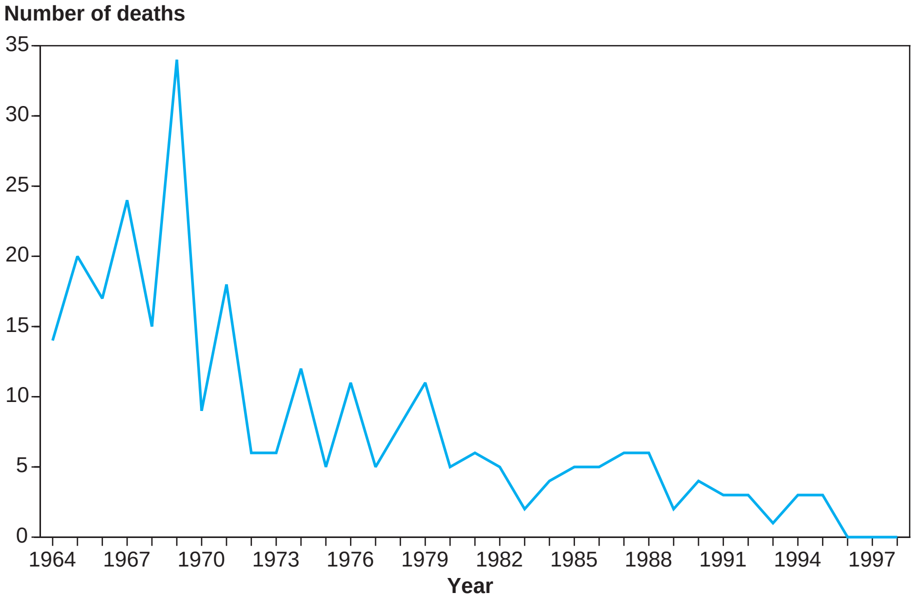
(a) The proportions shown as 'fully immunised' appear low when compared with the proportions for individual vaccines. This is at least partly due to poor identification of children on immunisation encounter forms.

Source: Australian Childhood Immunisation Register.

Measles as an example of the effectiveness of immunisation

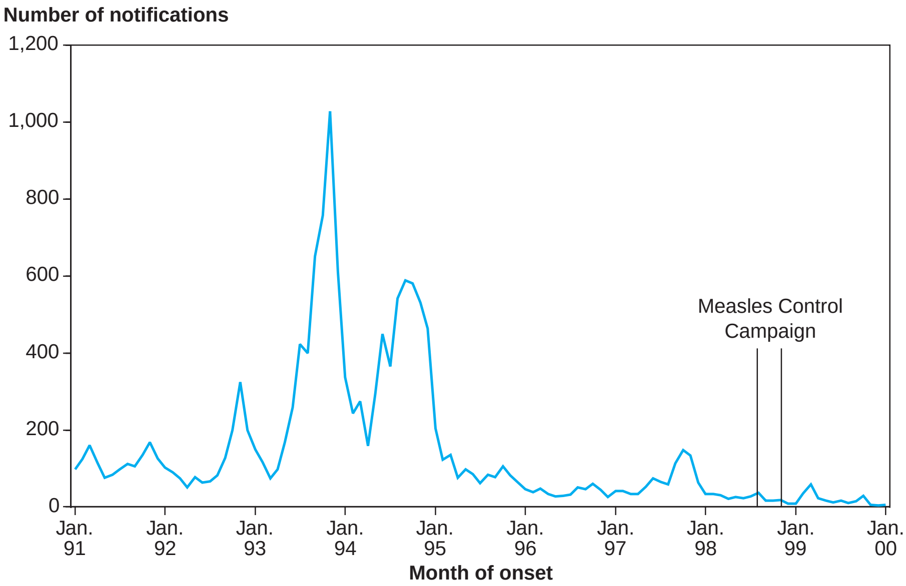
Measles is often a severe disease, sometimes complicated by otitis media (2.5% of cases) and bronchopneumonia (4%). Acute encephalitis occurs in a small number of reported cases and has a mortality of 10–15%, and 15–40% of survivors have permanent brain damage. Subacute sclerosing panencephalitis is a late complication of measles (occurring in about 1 in 25,000 cases) that causes progressive brain damage and is always fatal (NHMRC 1997).

The measles vaccine was first licensed in Australia in 1968 and was in routine use by the early 1970s, but coverage estimates from this time are not available. The introduction of the measles vaccine resulted in a decrease in the number of measles cases, the number of admissions to hospital for measles and the number of deaths due to measles (Figure 3.9). However, measles epidemics continued to occur. In 1993 and 1994, a large epidemic of measles affected Australia with over 9,000 notified cases (Figure 3.10) and a peak in the number of hospitalisations at about 1,100 (MEAC 2000a). A second dose of measles vaccination for those aged 10–16 years was implemented in 1994 by States and Territories but coverage estimates from this time are not available. Since then, the number of notified cases has decreased (Figure 3.10). Measles is now a notifiable disease in all States and Territories.



Source: AIHW National Mortality Database.

Figure 3.9: Deaths due to measles, 1964 to 1998



Source: National Notifiable Diseases Surveillance System.

Figure 3.10: Measles notifications, by month, January 1991 to January 2000

A further epidemic of measles was predicted for 1998 from serological surveys in New South Wales and South Australia that showed gaps in levels of immunity (Forrest et al. 1998). A set of recommendations was developed to prevent the predicted epidemic. The NHMRC recommended in 1998 that the second dose of the measles, mumps and rubella vaccine should be given to children when aged 4–5 years rather than at age 10–16 years. The change in scheduling was to minimise the susceptible population by shortening the interval between the first and second dose from 10 years to 3 years. More recently, the recommendation for the second dose has been updated to 4 years. The MCC followed this decision to ensure that all school children aged 5–12 years received their second dose.

The MCC was conducted from August to November 1998 with primary school children the main target for measles immunisation. About 96% (1.7 million) of all primary school children were vaccinated, with about 1.3 million vaccinated in the school program (MEAC 2000b). Overall, the MCC resulted in increased protection against measles. A serosurvey conducted after the MCC showed that 94% of children aged 6–12 years were serologically immune compared to 84% before the MCC (MEAC 2000b). The impact of the MCC on notifications of measles cases is shown in Figure 3.10. It was estimated that 17,500 cases of measles were averted (MEAC 2000b). The national immunisation coverage for measles, mumps and rubella vaccine measured by ACIR has increased from 82.5% for the first 2-year cohort of children born between 1 January 1996 and 31 March 1996 (Communicable Diseases Network 1998) to 89% for the 2-year cohort for children born between 1 July 1996 and 30 September 1996 (Communicable Diseases Network 2000).

Sexual practice

Sexual activity can carry health risks such as sexually transmitted diseases (STDs) and cancer of the cervix. It can also lead to unwanted pregnancy. The risks are mainly due to 'unsafe sex', where precautions are not taken against transmitting infections or against unintended pregnancy. 'Safe sex' does not guarantee absolute protection against STDs, and condoms may not prevent the transmission of genital herpes and warts.

Unsafe sex can lead to infections such as gonorrhoea, chlamydia, syphilis, hepatitis and HIV/AIDS, and can have serious and long-term health effects. Also, 90% of cases of cancer of the cervix are due to the sexually transmitted human papilloma virus. Unwanted pregnancy can lead to economic and social problems.

A study of the burden of disease and injury in Australia attributed 97% of the male burden and 71% of the female burden for HIV/AIDS to unsafe sex (AIHW: Mathers et al. 1999). All of the burden of other sexually transmitted diseases was attributed to unsafe sex. Table 3.10 shows the contribution of these diseases to the estimated total attributable burden of unsafe sex in Australia in 1996. HIV/AIDs accounts for 61% of the total, followed by cervical cancer (24%) and other sexually transmitted diseases (8%). In total, unsafe sex contributes about 1% to the burden of disease in Australia (1.1% for males and 0.7% for females). The burden of unsafe sex is of a similar magnitude to the burden of falls or melanoma.

Table 3.10: The attributable burden of unsafe sex by condition, 1996

Cause	Deaths	YLL[(a)]	YLD[(b)]	DALYs[(c)]	Per cent of total DALYs
HIV/AIDS	506	11,541	2,361	13,901	0.55
Other sexually transmitted diseases[(d)]	5	82	1,823	1,904	0.08
Hepatitis B	51	820	143	964	0.03
Hepatitis C	19	226	27	253	0.01
Abortion	1	22	299	321	0.01
Other maternal conditions	1	37	223	260	0.01
Cervical cancer	292	4,533	907	5,441	0.22
Total	**875**	**17,261**	**5,698**	**22,959**	**0.91**

(a) Years of life lost due to mortality.

(b) Years of 'healthy' life lost due to disability.

(c) Disability-adjusted life year.

(d) Gonorrhoea, syphilis, chlamydia and pelvic inflammatory disease.

Source: AIHW: Mathers et al. 1999.

Use of contraceptives

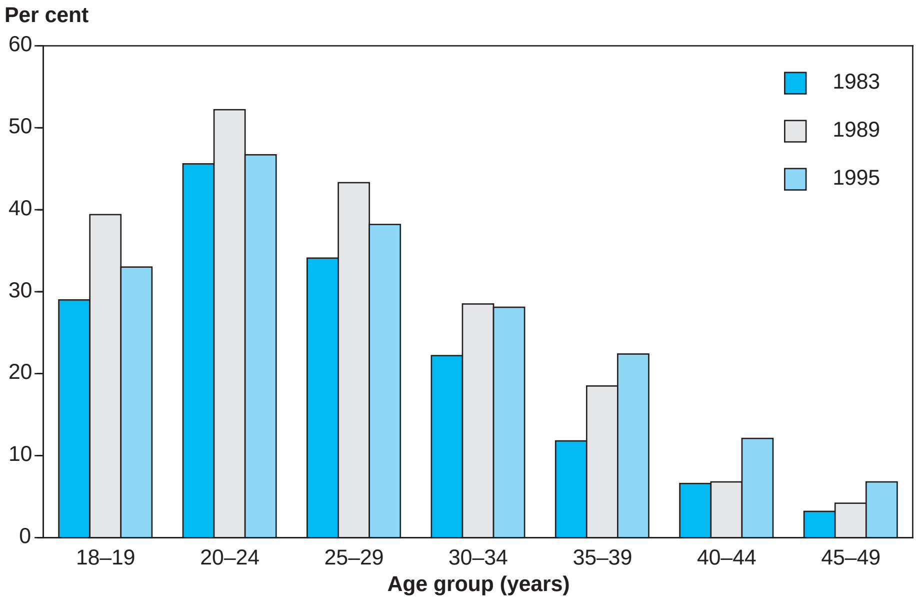
Although conclusions about sexual behaviours, including unsafe sex, cannot be drawn from contraceptive use, it does provide a context in which to consider sexual practices as a risk factor.

The 1995 National Health Survey collected information on contraceptive use by women aged 18–49 years (Table 3.11). The contraceptive pill is the most commonly used method of contraception among Australian women, used by 40% of women. Sterilisation and use of condoms were the next most frequently used contraceptive methods. There is variation in contraceptive use across age groups. Among younger women, the contraceptive pill and condoms were most commonly used, but use of these diminished with age. Sterilisation was the most frequently reported method of contraception among women aged over 40 years.

Table 3.11: Type of contraception used by women aged 18–49 years, 1995 (per cent)

	Age of users (years)							
Method	**18–19**	**20–24**	**25–29**	**30–34**	**35–39**	**40–44**	**45–49**	**Total**
Contraceptive pill	66.3	71.1	59.2	43.0	31.3	16.9	10.1	40.0
Condom	32.2	21.6	27.0	21.2	13.9	10.5	7.2	17.6
IUD	—	2.1	—	2.8	3.1	6.1	2.8	3.0
Periodic abstinence	—	—	3.6	4.2	3.9	3.0	2.4	3.0
Other temporary method	—	2.6	2.4	3.9	3.7	2.1	—	2.6
Female sterilisation	—	—	3.6	10.7	21.6	36.1	49.9	19.2
Male sterilisation	—	—	2.8	14.2	22.4	25.3	25.8	14.5
Number using contraception	111,300	441,100	428,600	453,700	476,500	448,200	392,600	2,757,900
Users as a proportion of all women	49.7	65.7	64.5	65.4	71.6	71.8	67.4	66.7

Source: ABS 1998b.



Source: ABS 1998b.

Figure 3.11: Use of the contraceptive pill, 1983, 1989 and 1995

Data on the use of the pill can be compared for 1983, 1989 and 1995 (Figure 3.11, page 163). The proportion of women aged 18–49 years using the pill increased from 24% in 1983 to 28% in 1989 but changed little to 1995 (27%). The highest usage continues to be in the age group 20–24 years.

It is estimated that over 85% of all HIV infection in Australia has been transmitted by unsafe sexual contact between men (NCHECR 1999). Of men who have sex with men, the percentage engaging in unprotected anal intercourse is the principal indicator of unsafe sexual behaviour. Surveys in Sydney during the 1990s found that, of men who have sex with men, around 30% reported unprotected anal sex with regular partners in the previous 6 months. Around 15% reported unprotected anal sex with casual partners in the previous 6 months. Surveys carried out in other capital cities show similar levels of unsafe sexual behaviour (NCHECR 1999).

3.5 Biomedical factors

Body weight

The association between overweight or obesity and health problems such as coronary heart disease, stroke, heart failure, type 2 diabetes, osteoarthritis, sleep apnoea, gallstones, and reproductive problems among women is well documented (NHLBI 1998). Overweight and obesity accounted for over 4% of the total burden of disease in Australia in 1996 (AIHW: Mathers et al. 1999).

Being underweight is also associated with poor health, including conditions such as osteoporosis, ulcers, mental conditions such as depression and eating disorders (Gilmore 1999).

Inappropriate body weight is due mainly to an imbalance between energy intake (diet) and energy expenditure (physical activity). Other factors, including genetics and environment, also play a role (Pi-Sunyer 1993).

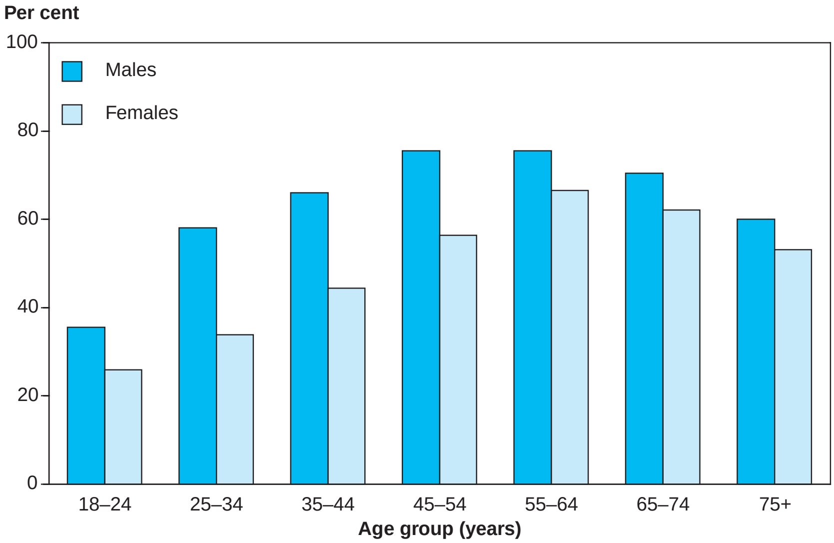
Among those who are overweight, weight loss reduces the incidence and severity of high blood pressure, high blood cholesterol, diabetes and osteoarthritis (NHLBI 1998).

Body mass index (BMI) is used to estimate the prevalence of underweight, normal weight, overweight and obesity in a population.

In 1995, just over 7.4 million adult Australians (56% of those aged 18 years and over) were overweight or obese ($BMI \geq 25$). Of these, over 2.4 million (or 19% of the adult population) were obese ($BMI \geq 30$). Men were more likely to be overweight or obese than were women, 64% compared with 49%. The proportion of overweight or obese people increased with age and peaked in the age groups 45–54 and 55–64 years for men (76%) and 55–64 years for women (67%) (Figure 3.12) (AIHW 1999c).

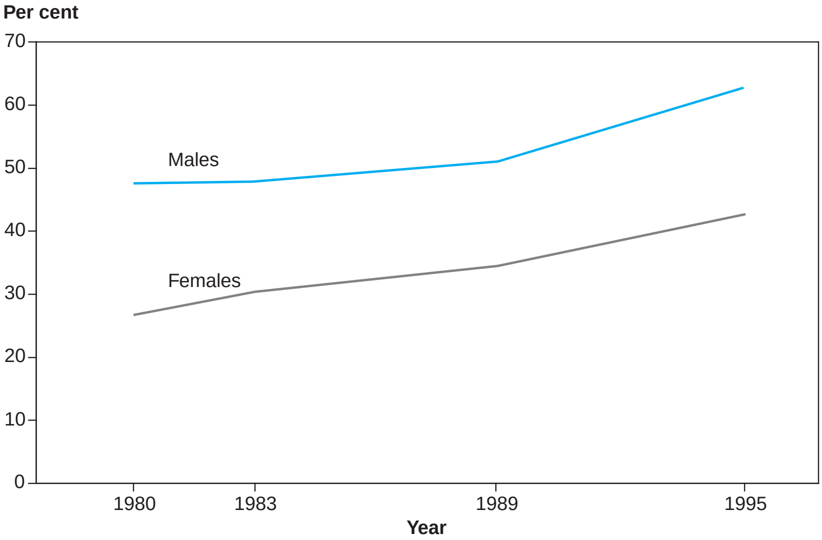
In 1995, the proportion of overweight or obese children and adolescents aged 2–17 years was 21% for boys and 23% for girls.

In 1995, the proportion of underweight ($BMI < 18.5$) women aged 18 years and over was almost 3%. However, among women aged 18–24 years the prevalence was over 6%. The proportion of underweight men aged 18 years and over was less than 1%. The proportion of underweight children and adolescents aged 2–17 years was 6% for boys and 5% for girls.



Source: AIHW analysis of the 1995 National Nutrition Survey.

Figure 3.12: Proportion of overweight or obese adults, 1995



Note: Capital cities only.

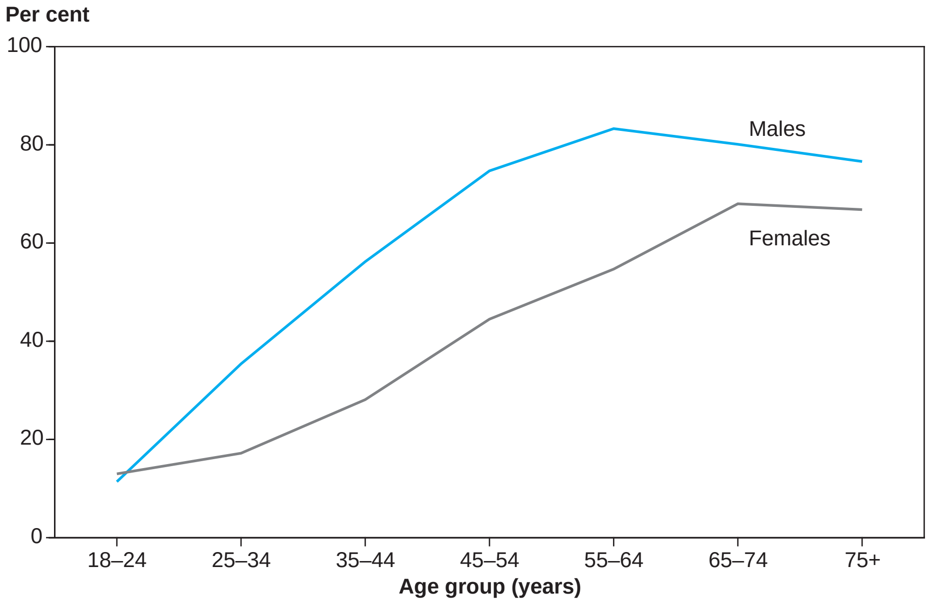
Sources: NHF Risk Factor Prevalence Surveys; ABS National Nutrition Survey.

Figure 3.13: Proportion of overweight or obese adults, 25–64 years, 1980 to 1995

There have been significant increases in the proportions of overweight and obese Australians over the last 15 years. Trend data from the Risk Factor Prevalence Surveys and the National Nutrition Survey show that the proportion of overweight or obese women aged between 25 and 64 years (living in Australian capital cities only) has increased from 27% in 1980 to 43% in 1995. Similarly, the proportion of overweight or obese men increased from 48% to 63% over this period (Figure 3.13). The proportion of obese men has increased dramatically from 8% in 1980 to 18% in 1995 and the proportion of obese women has increased from 7% to 16%. On average, women in 1995 weighed 4.8 kg more than their counterparts in 1980, and men 3.6 kg more (AIHW 1999c).

Although BMI is used as the main classification of overweight and obesity, the waist-to-hip ratio (WHR) and waist circumference are also useful measures of increased disease risk due to overweight and obesity (NHLBI 1998; WHO 1997).

Fat located in the abdominal region is associated with greater risk of diabetes, coronary heart disease and high blood pressure, independent of BMI (Albu et al. 1997; Björntorp 1992; Lemieux et al. 1996). A high WHR (WHR > 0.9 in men and 0.8 in women) is used to identify those individuals at increased risk of cardiovascular disease. In 1995, 53% of adult men and 35% of adult women could be regarded as at increased risk from cardiovascular disease due to a high WHR (ABS 1996b). For both men and women, WHR increased with age (Figure 3.14).



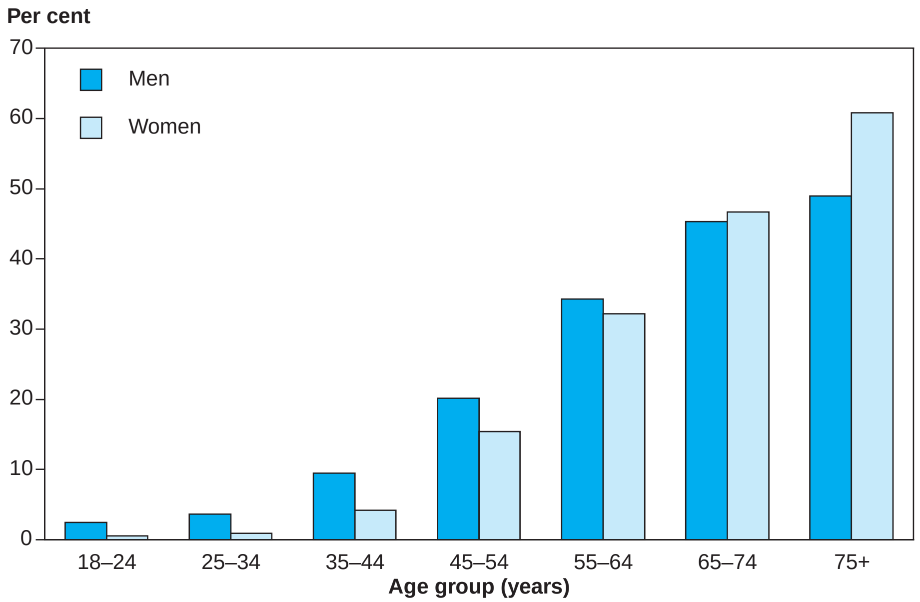
Source: AIHW analysis of the ABS 1995 National Nutrition Survey.

Figure 3.14: Proportion of adults with waist-to-hip ratio >0.9 for men and >0.8 for women, 1995

Changes in waist circumference reflect changes in risk for chronic disease, although populations differ in the level of risk associated with a particular waist circumference cut-off (Dowling & Pi-Sunyer 1993; Han et al. 1997). Although there are currently no standard cut-offs for waist circumferences that indicate increased risk, the WHO suggests that waist circumferences greater than 94 cm in men and greater than 80 cm in women indicate increased risk (WHO 1997). Waist circumferences greater than 102 cm and 88 cm for men and women respectively indicate substantially increased risk. Note that these waist circumference measures are for Caucasians. Risk cut-offs for other populations have not yet been developed. In 1995, 35% of men had a waist circumference greater than 94 cm and 37% of women had a waist circumference greater than 80 cm. Almost 19% of men had a waist circumference greater than 102 cm and 23% of women had a waist circumference greater than 88 cm. For both men and women, waist circumferences generally increased with age.

Blood pressure

High blood pressure is a major risk factor for coronary heart disease, stroke, heart failure, peripheral vascular disease and renal failure. The risk of disease increases as the level of blood pressure increases. When high blood pressure is controlled by medication, the risk of disease is reduced, but not to the levels of unaffected people (Kannel 1991). It is estimated that in 1996 high blood pressure was responsible for over 5% of the total burden of disease among Australians (AIHW: Mathers et al. 1999).



Source: ABS National Nutrition Survey, 1995.

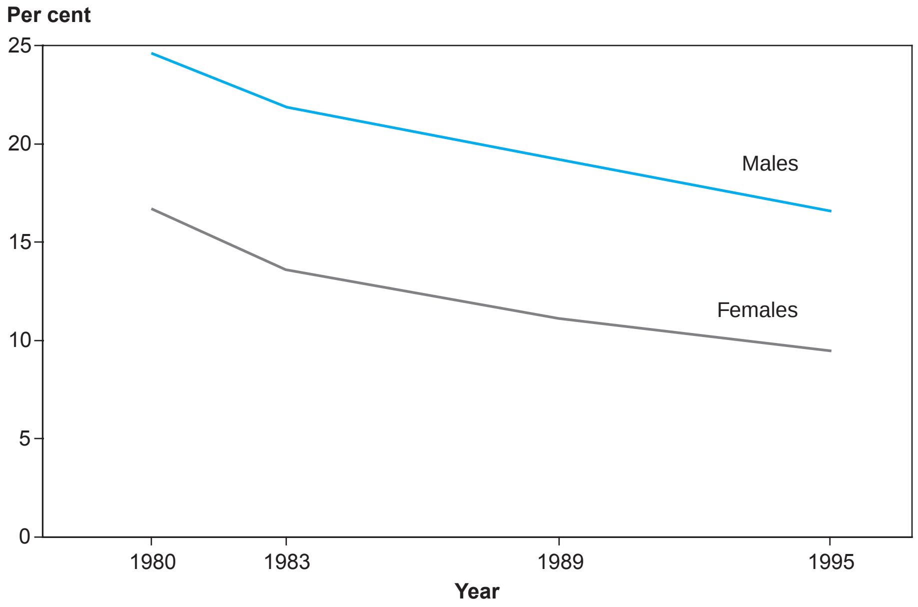
Figure 3.15: Proportion of adults with high blood pressure, 1995

In terms of predicting ill health, both systolic (SBP) and diastolic blood pressures (DBP) are predictors of cardiovascular disease. Each reduction of 10–14 mmHg in SBP and 5–6 mmHg in DBP reduces the occurrence of stroke by two-fifths, of coronary heart disease by one-sixth, and of cardiovascular disease by one-third (Chalmers 1999).

The 1995 National Nutrition Survey reported that around 2.2 million Australians aged 18 years and over had high blood pressure—17% of men and 15% of women. The proportion of men and women with high blood pressure increases with age (Figure 3.15, page 167).

Along with the decline in the proportion of people with high blood pressure and/or receiving treatment since the 1980s, there has also been a significant decline in average blood pressure levels during the same period (Figure 3.16). This decline occurred equally among those not on medication for high blood pressure as among those on medication (AIHW 1999c; Bennett & Magnus 1994).

High blood pressure was the most common problem managed by general practitioners in 1998–99, accounting for about 6% of all conditions managed (AIHW GPSCU: Britt et al. 1999).



Note: Capital cities only.

Sources: NHF Risk Factor Prevalence Surveys; ABS National Nutrition Survey.

Figure 3.16: Proportion of persons aged 25–64 years with high blood pressure, 1980 to 1995

Biomedical and lifestyle factors that are major causes of high blood pressure include excess body fat, alcohol consumption, physical inactivity, dietary salt intake and complex dietary patterns with a low intake of fruit and vegetables and high saturated fat (Puddey et al. 1987; Cutler et al. 1997; Appel et al. 1997). Stress raises blood pressure transiently but in the long term may have indirect effects by influencing eating, drinking, smoking and physical activity patterns (Beilin 1997). Cigarette smoking increases the risk of heart attack and stroke threefold in hypertensive individuals.

Box 3.5: High blood pressure

Blood pressure is the force exerted by blood on the walls of the arteries and is written as systolic/diastolic (e.g. 120/80 mmHg, stated as '120 over 80').

The continuous relationship between blood pressure levels and cardiovascular disease risk, and the 'arbitrary' nature of the definition of high blood pressure, have contributed to the variation in the definitions issued by various national and international authorities for population surveys and clinical guidelines.

For use in Australian surveys, high blood pressure has been defined as:

- *systolic blood pressure (SBP) greater than or equal to 160 mmHg and/or*
- *diastolic blood pressure (DBP) greater than or equal to 95 mmHg and/or,*
- *receiving medication for high blood pressure.*

New classifications for the clinical management of high blood pressure have recently been released by the World Health Organization (1999). These guidelines define hypertension as an SBP of 140 mmHg or greater and/or a DBP of 90 mmHg or greater in subjects who are not receiving medication for high blood pressure.

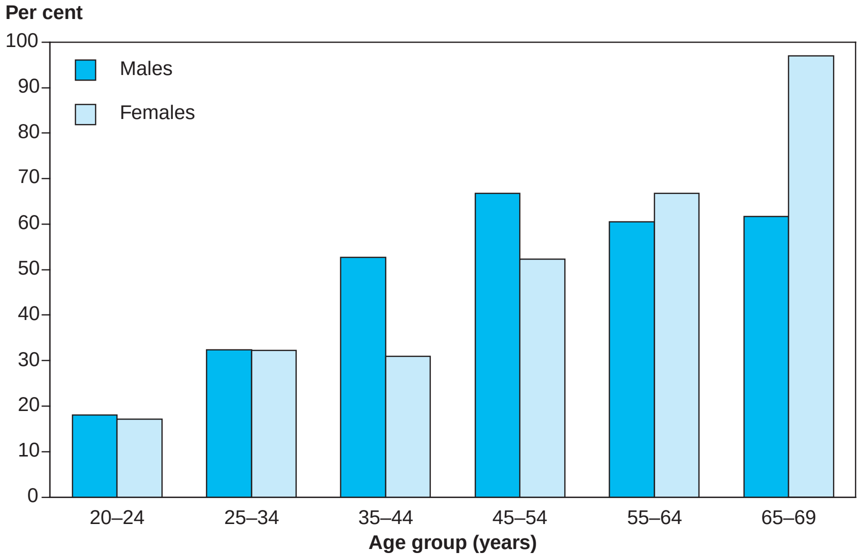
A review of the classifications of high blood pressure used in Australia will begin in 2000 to establish national standards for population surveys.

Blood cholesterol

High blood cholesterol is a major risk factor for coronary heart disease and possibly for some types of stroke. It is one of the main causes of the process by which the blood vessels that supply the heart and other parts of the body become clogged. High blood cholesterol causes nearly 3% of the total burden of disease of Australians (AIHW: Mathers et al. 1999).

For most people, saturated fat in the diet is regarded as the main factor that raises blood cholesterol levels. Cholesterol in foods can also raise blood cholesterol levels, but less than saturated fat does. Genetic factors can affect blood cholesterol—some people have high cholesterol levels regardless of their saturated fat and cholesterol dietary intake and are at increased risk from coronary heart disease (Bouchard et al. 1997).

The risk of heart disease increases steadily in a curvilinear manner from a low base with increasing blood cholesterol levels. Total blood cholesterol levels above 5.5 mmol/L are an indication of a greatly increased risk of developing coronary heart disease. Levels above 6.5 mmol/L are considered to indicate extremely high risk (NHF 1987).



Note: Capital cities only.

Source: 1989 NHF Risk Factor Prevalence Study.

Figure 3.17: Proportion of persons aged 20–69 years with raised blood cholesterol, 1989

The last national survey to measure blood cholesterol levels in Australia was conducted by the National Heart Foundation in 1989. It was estimated that over 4.5 million Australian adults (aged 20–69 years) had high-risk cholesterol levels. Over 47% of men and 39% of women had blood cholesterol levels above 5.5 mmol/L (Bennett & Magnus 1994). In men, there was a rapid increase in the prevalence of elevated total cholesterol after age 34. In women, the increase occurred a decade later, after age 44, and the level exceeded that of men after the age of 55 (Figure 3.17). In terms of those at very high risk of cardiovascular disease, over 15% of men and women aged 20–69 years had blood cholesterol levels of 6.5 mmol/L or more.

There was little change during the 1980s in Australia in average blood cholesterol levels or in the proportion of people with levels of 6.5 mmol/L or more (Bennett & Magnus 1994). There are no recent data for Australia. New Zealand reported a fall in average levels between 1989 and 1997, and a fall in the proportion of people with levels of 6.5 mmol/L or more (Russell et al. 1999).

A recent Australian study, the Long-term Intervention with Pravastatin in Ischaemic Disease (LIPID) trial, showed that the cholesterol-lowering drug treatment pravastatin reduces the risk of death from coronary heart disease by around 24% in people with established coronary heart disease (LIPID Study Group 1998). This and other international studies have clearly shown that lipid-lowering drugs are of benefit to prevent events both in people with coronary heart disease and in those without clinical manifestations of coronary heart disease.

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4 Health and determinants in population groups

This chapter presents the major health and illness issues for a number of population groups, with an emphasis on the health status and the factors affecting the health of specific populations. These issues are generally reported using such standard measures as morbidity, mortality, hospitalisations and the impact of socioeconomic status on levels of health. An important aspect of such a report is the inclusion of underlying determinants of ill health, although the reporting of a number of the social and behavioural factors is limited by the lack of reliable national data.

The section on the health of men and women aged 25 and over draws heavily on recent work in estimating the burden of disease and injury, as measured by years of life lost due to premature mortality and the equivalent years of healthy life that are lost due to disability. The burden of disease project is discussed in chapter 2.

4.1 Mothers and babies

Fertility

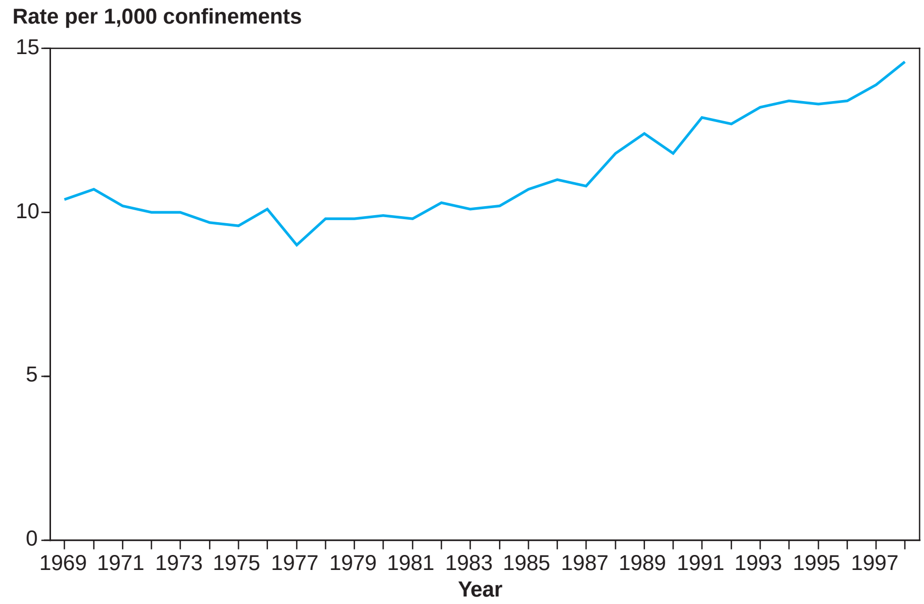
There were 249,616 live births registered in Australia in 1998 (ABS 1999d), 0.9% fewer than in 1997, and 9.7% fewer than the peak annual registration of 276,362 live births in 1972. After declining to 223,129 in 1979, the annual number of births gradually increased to 264,151 in 1992 and has since declined again each year.

The crude birth rate relates the number of live births in any one year to the total population size. This rate declined from 21.7 per 1,000 people in 1971 to 14.9 per 1,000 in 1991, and then to 13.3 per 1,000 in 1998.

Age-specific birth rates express the number of women in selected 5-year age groups giving birth in a year as a proportion of the number of women of the same age group in the population. Recent trends in these rates have differed with age. For teenagers of 15–19 years, the birth rate increased slightly each year from 20.3 live births per 1,000 women in 1988 to 22.1 live births per 1,000 in 1991 and then decreased annually to 18.5 per 1,000 women in 1998, an historical low. The birth rates for women in their twenties declined to their lowest levels ever in 1998, down to 60.0 per 1,000 for women aged 20–24 years and 111.2 per 1,000 for women aged 25–29 years. Age-specific birth rates for older women have generally increased in recent years, reflecting the trend for some women to defer child-bearing until their thirties, or even later. Women aged 30–34 years had their lowest birth rates in the mid-1970s, those aged 35–39 in the late 1970s, and those aged 40–44 in the mid-1980s (Table S2, page 366). Since then, the birth rates of women aged 35–39 years and 40–44 years steadily increased to 45.7 and 8.0 per 1,000 women, respectively, in 1998.

Multiple births

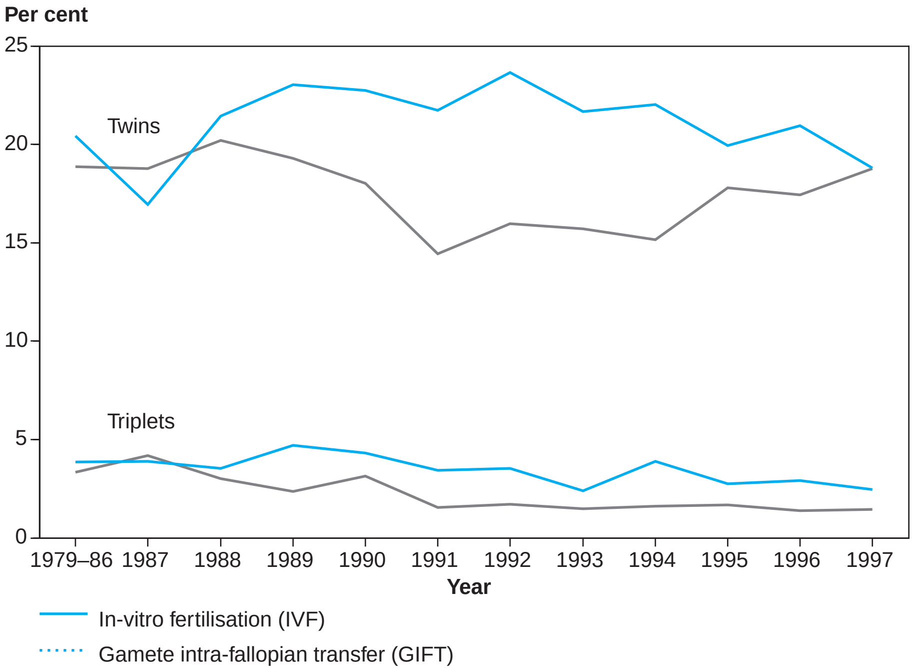
Twin confinements have increased since the mid-1970s, and reached their highest rate ever in Australia in 1998 when there were 14.6 twin confinements per 1,000. In 1998, there were 3,592 twin confinements among a total of 245,898 confinements (Figure 4.1). There were 98 confinements of triplets and higher order multiple births in 1998. Because multiple births increase with advancing maternal age up to the late thirties, rates of multiple births are influenced by changes in maternal age distribution. The increasing use of assisted conception (in-vitro fertilisation and related techniques) to treat infertile couples has also contributed to the higher rates of multiple births since the early 1980s.



Source: AIHW NPSU, derived from ABS data.

Figure 4.1: Twin confinement rates, 1969 to 1998

In 1997, assisted conception accounted for 14% of twin confinements in Australia and 36% of triplets. Among the more than 22,000 pregnancies resulting in births using assisted conception since it began in Australia in 1979, twins occurred in 18.6%, triplets in 2.4%, and other multiple births in 0.1%. These multiple births usually follow transfer of more than one embryo into the uterus, or more than one egg into the fallopian tube, in the course of the various treatment procedures. In the past decade, the policy of reducing the number of embryos or eggs transferred during assisted conception has been partly effective in reducing the incidence of multiple births (Figure 4.2) (AIHW NPSU & Fertility Society of Australia 1999). An unknown proportion of other multiple births occurs after fertility drugs are used independently of assisted conception.



Source: AIHW NPSU: Day et al. 1999a.

Figure 4.2: Multiple pregnancies of at least 20 weeks' gestation after assisted conception, Australia and New Zealand, 1979 to 1997

Termination of pregnancy

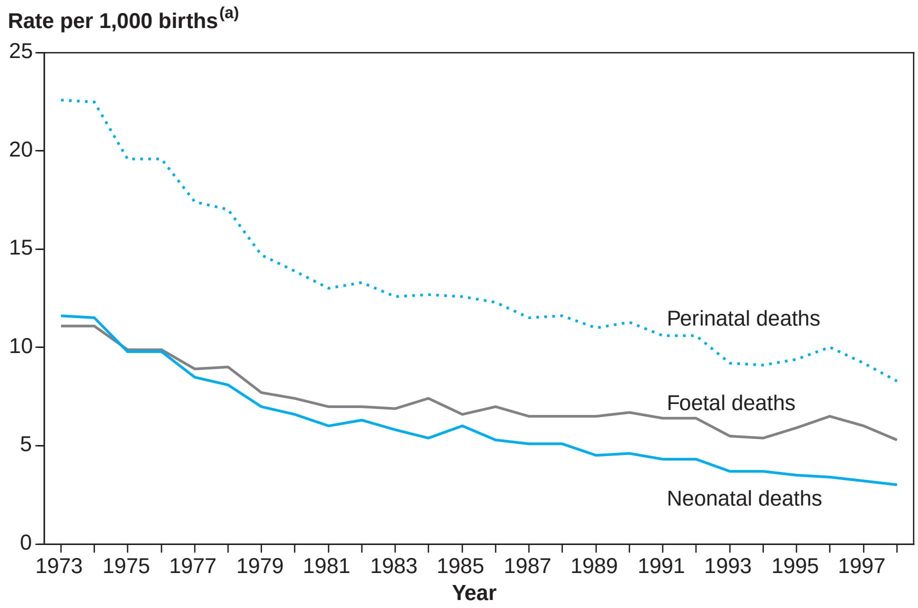
National information on fertility patterns and induced abortions is lacking because only South Australia and the Northern Territory (and Western Australia since mid-1998) collect population-based data on induced abortions. In South Australia in 1997, there were 5,605 induced abortions and 18,394 confinements; thus almost 1 in 4 (23.4%) of the 23,999 pregnancies (excluding miscarriages) resulted in abortions (Chan et al. 1999). More than half (54.4%) of all teenage pregnancies were terminated.

Maternal mortality

Maternal deaths occur infrequently in Australia. In the early 1990s, maternal mortality was reported to have declined to 10.9 per 100,000 confinements, the lowest level ever recorded (NHMRC 1998). Deaths from pregnancy complications accounted for about one-third of all maternal deaths, deaths from other pre-existing diseases for 1 in 4 maternal deaths, and other pregnancy-related deaths, where the pregnancy was unlikely to have contributed significantly to the death, accounted for about 4 in 10 maternal deaths. The main causes of maternal death include pulmonary embolism, amniotic fluid embolism, complications associated with hypertension in pregnancy, cardiovascular disease, and motor vehicle accidents.

Perinatal mortality

The perinatal death rate declined markedly in the last two decades, decreasing to 8.3 deaths per 1,000 total births in 1998, the lowest rate ever achieved (ABS 1999e) (Figure 4.3). Foetal deaths (5.3 per 1,000 total births) accounted for 63.9% of perinatal deaths, and neonatal deaths (3.0 per 1,000 live births) for 36.1%. The perinatal death rate for males (8.9 per 1,000 total births) was higher than for females (7.8 per 1,000 total births).



(a) Per 1,000 total births for foetal deaths and perinatal deaths. Per 1,000 live births for neonatal deaths.

Note: Perinatal deaths comprise stillbirths (foetal deaths) and deaths of infants within the first 28 days of life (neonatal deaths). They include infants and foetuses weighing at least 400 grams or having a gestational age of at least 20 weeks.

Source: AIHW NPSU, derived from ABS data.

Figure 4.3: Foetal, neonatal and perinatal death rates, 1973 to 1998

Birthweight

A key indicator of the health of babies born in Australia is the proportion having a birthweight of less than 2,500 grams. These low-birthweight babies have a greater risk of dying, require a longer period of hospitalisation after birth, and are more likely to develop significant disabilities. In 1997, there were 16,800 babies of low birthweight, 6.6% of all births (AIHW NPSU: Day et al. 1999a), an increase on the 6.3% of babies with low birthweight in the early 1990s. This change is at least partly attributable to an increase in the number of multiple births. Low birthweight is more common in the Northern Territory due to the relatively high proportion of Indigenous births. Of 8,151 births to Indigenous mothers nationally in 1997, 13.1% were low birthweight.

Type of delivery

Obstetric intervention may be needed if complications arise during pregnancy or labour, although there is debate about the most appropriate rate of intervention. Caesarean birth rates have increased markedly in the last few decades (AIHW NPSU 1993). In 1997, 20.3% of deliveries were by caesarean section, the highest proportion ever recorded in Australia (Table 4.1) (AIHW NPSU: Day et al. 1999a), slightly higher than the proportion recorded in 1996 (19.5%). In 1997, South Australia (23.5%) had the highest proportion of deliveries by caesarean section and New South Wales (18.2%) had the lowest. Indigenous mothers had a slightly lower proportion of deliveries by caesarean section (18.2%) than all mothers. There was also considerable variation among the States and Territories in the rates of forceps deliveries and the use of vacuum extraction (Table 4.1).

Table 4.1: Type of delivery, States and Territories, 1997

	NSW	Vic	Qld	WA	SA	Tas[(a)]	ACT	NT	Aust
					(number)				
Total confinements	86,920	61,311	47,278	24,856	18,394	5,378	4,708	3,525	252,370
					(per cent)				
Spontaneous vertex	70.4	66.3	68.1	63.3	62.5	68.3	65.4	73.1	67.6
Forceps	5.8	9.7	4.9	4.8	9.3	7.3	7.9	4.7	6.8
Vacuum extraction	4.5	2.9	4.4	9.4	4.0	2.9	5.0	—	4.5
Vaginal breech	1.1	0.9	0.6	0.5	0.7	0.6	1.0	1.4	0.8
Caesarean section	18.2	20.2	22.0	22.0	23.5	20.9	20.2	20.8	20.3
Other/unknown	—	—	0.1	—	—	—	0.4	—	—

(a) Data for Tasmania incomplete.

Source: AIHW NPSU: Day et al. 1999a.

Congenital malformations

All States and Territories notify foetuses and infants with major congenital malformations to a national monitoring system (AIHW NPSU: Hurst et al. 1999). In 1996, the malformation rate was highest in the musculoskeletal system (47.1 per 10,000 births), malformations of the heart and circulatory system (48.4), genital malformations (26.6), and chromosomal abnormalities (22.8). The major individual congenital malformations are shown in Table 4.2 (page 184).

Anencephalus, spina bifida and encephalocele are serious malformations of the brain and spine, known collectively as neural tube defects, which often result in death or major disability and handicap. In 1996, the reported malformation rate for neural tube defects among births and terminations of pregnancy was 10.6 per 10,000 births, although this may be an understatement. A randomised controlled trial by the Medical Research Council in the United Kingdom has shown that supplements of the vitamin folic acid are effective in preventing recurrence of these neural tube defects (Medical Research Council Vitamin Study Research Group 1991). Other studies indicate that supplements of folic acid also prevent many first occurrences of neural tube defects, and possibly some other birth defects. The National Health and Medical Research Council has recommended folic acid supplementation for women likely to become

Table 4.2: Selected congenital malformations, Australia, 1996

ICD-9 code	Congenital malformation	Number	Rate per 10,000 births
740	Anencephalus	42	1.6
741	Spina bifida	77	3.0
742.3	Hydrocephalus	84	3.3
745.1	Transposition of great vessels	94	3.7
745.4	Ventricular septal defect	480	18.7
749	Cleft lip and/or cleft palate	382	14.9
750.3	Tracheo-oesophageal fistula, oesophageal atresia and stenosis	64	2.5
751.2	Atresia and stenosis of large intestine, rectum and anus	82	3.2
752.6	Hypospadias	604	23.5
753.0	Renal agenesis and dysgenesis	106	4.1
754.3	Congenital dislocation of hip	469	18.2
756.6	Diaphragmatic hernia	76	3.0
758.0	Down syndrome	312	12.1

Source: AIHW NPSU: Hurst et al. 1999.

pregnant and for those with a close family history of neural tube defects, stressing the importance of commencing the supplementation before conception and continuing it for the first 3 months of pregnancy (NHMRC 1993).

4.2 Children and young people

The majority of children and young people in Australia are healthy. They have low rates of death, hospitalisation and reported illness compared with other age groups. However, some groups of young Australians do not share this good health, most notably Aboriginal and Torres Strait Islander peoples. Also, many young Australians have to face important health issues during this period of life including injury, mental health problems and asthma. In addition, factors such as diet, physical activity and drug use will affect the health of the young person not only in childhood, adolescence and young adulthood, but also later in life.

For the purposes of monitoring the health and wellbeing of this age group, recent national work in relation to child and youth health has defined children as those aged 0–14 years and young people as those aged 12–24 years. The overlap is intentional, reflecting the fact that the transition from childhood to adulthood is a gradual process, which does not occur at the same age for all individuals.

The overview of child and youth health given here is based on a comprehensive analysis using currently available data. However, it is important to note that there are gaps and deficiencies in the data which require attention.

Children

Most of this information has been drawn from the AIHW report *Australia's Children: Their Health and Wellbeing 1998* (AIHW: Moon et al. 1998), with some updates using more recent data.

Compared with children in many other parts of the world, Australian children are healthy. They have infant and child mortality rates (deaths in the first year of life and under five years respectively) well below average (UNICEF 1999:84). In 1996, the infant mortality rate in Australia was around the average for OECD countries, and lower than the rate found in the United States, New Zealand, the United Kingdom and Canada (OECD 1999). Australian children also compare well in dental health, having the lowest decay rates among OECD countries (AIHW: de Looper & Bhatia 1998).

One area in which Australian children have not compared so well internationally is in relation to vaccine-preventable diseases: Australian rates for cases of both measles and pertussis (whooping cough) (as measured by compulsory notifications) were among the highest for OECD countries in the mid-1990s. Using recent data, it has been shown that there are an average of nearly 5,000 disease notifications, nearly 1,000 hospitalisations and just over 5 deaths per year among Australian children for diseases that are preventable by vaccines. In addition, the childhood immunisation rates in Australia have tended to be lower than in many of the OECD countries (AIHW: de Looper & Bhatia 1998).

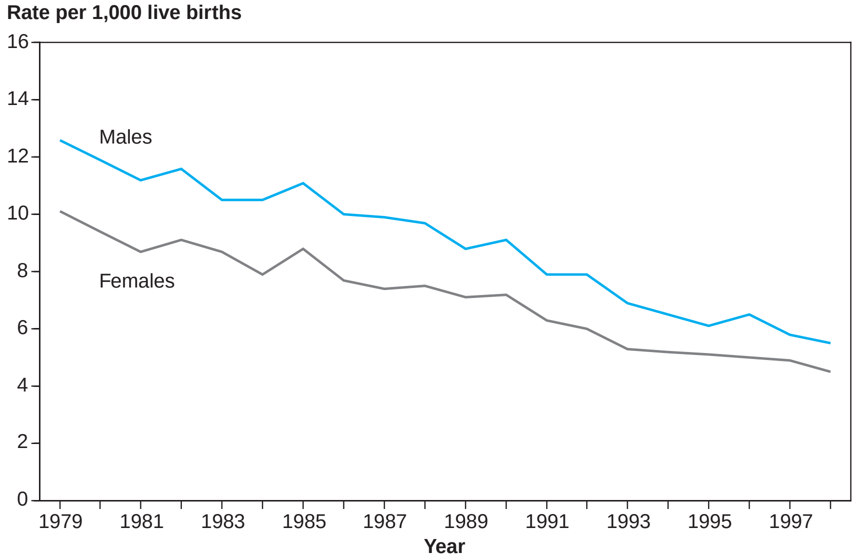
There are some indications of improvements in the proportion of children fully immunised for diphtheria, tetanus, pertussis, polio and *Haemophilus influenzae* type b (Hib) since 1997. The Australian Childhood Immunisation Register shows a rate of full immunisation of 86.5% in late 1999 (AIHW: de Looper & Bhatia 2000).

There have been substantial declines in childhood death rates in recent years. During the period 1979 to 1998, infant mortality rates more than halved for both males and females (Figure 4.4, page 186). The male infant mortality rate has remained 20–30% higher than the female rate over this period.

Although infant mortality rates include all deaths to children under the age of 1 year, the majority of these deaths occur at very young ages—in 1998, one-third of infant deaths occurred within the first day of life, more than half in the first week of life and around two-thirds of the deaths in the first 4 weeks of life (ABS 1999b:52).

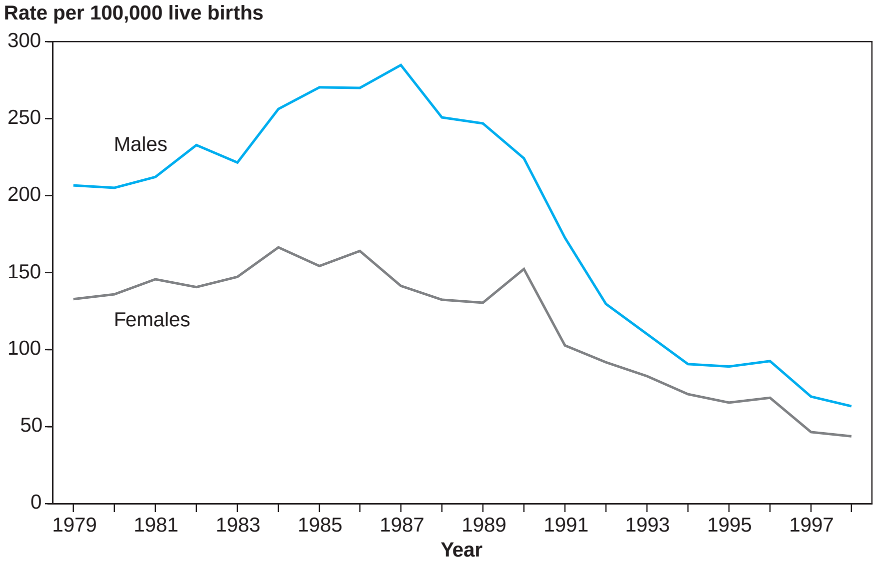
The decrease in the infant mortality rate shown in Figure 4.4 has occurred fairly equally between the neonatal period (the first 4 weeks of life) and the post-neonatal period (4 weeks to 1 year). Between 1979 and 1998, neonatal mortality decreased by 55% and post-neonatal mortality decreased by 58%.

One reason for the decline in post-neonatal mortality has been the decline in deaths from sudden infant death syndrome (SIDS). In 1998, the SIDS rate for males was less than a quarter of the 1987 rate and less than a third of the 1979 rate. For females, the 1998 rate was about one-third the 1987 rate (Figure 4.5, page 186). The decline in SIDS accounts for 57% of the fall in the male post-neonatal mortality rate and 52% of the fall in the female post-neonatal mortality rate over the period 1979 to 1998. The role played by the national prevention campaign begun in the early 1990s has been stressed by many as a likely contributor to this decline.



Source: ABS, *Deaths Australia* (ABS Cat. No. 3302.0 for 1998 and previous years).

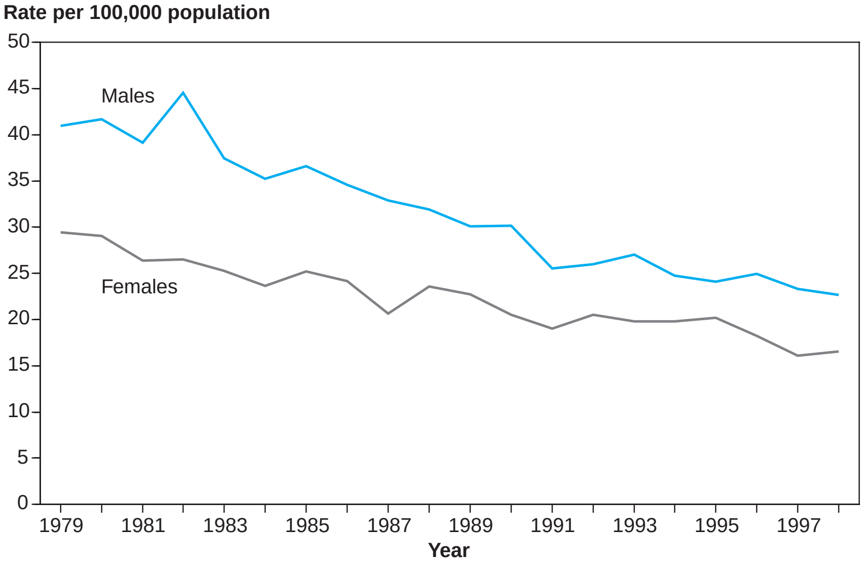
Figure 4.4: Infant mortality rate, 1979 to 1998



Source: AIHW National Mortality Database.

Figure 4.5: Mortality rate from SIDS for infants under 1 year, 1979 to 1998

There have also been large decreases in the mortality rates for children aged 1–14 years in the period 1979 to 1998, by 45% for males and 44% for females. However, the rate plateaued somewhat in the second half of the 1990s at around 25 deaths per 100,000 for males and 19 per 100,000 for females (Figure 4.6).



Source: AIHW National Mortality Database.

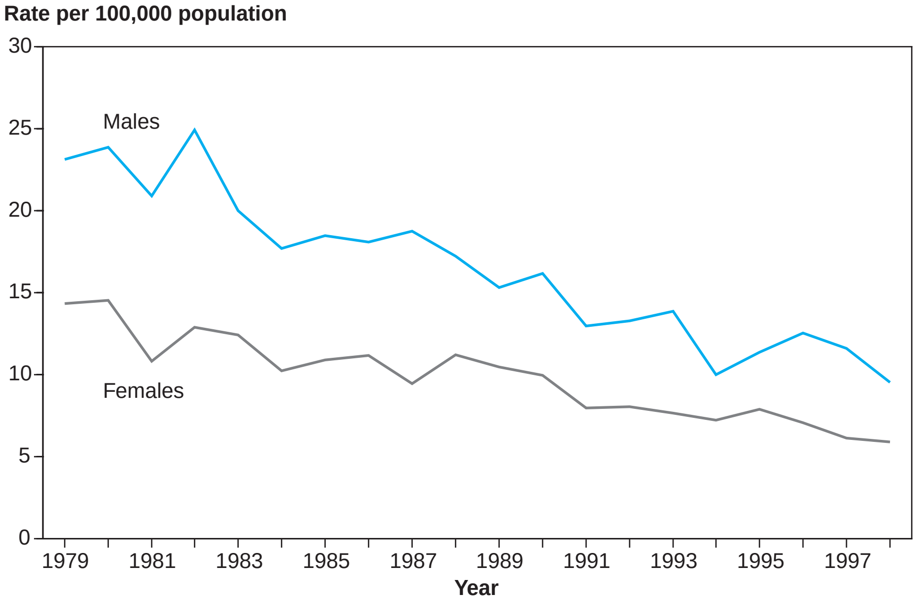
Figure 4.6: Mortality rate for children aged 1–14 years, 1979 to 1998

Injury remains the leading cause of death among Australian children aged 0–14 years. This is despite a large fall (59%) in childhood injury deaths for both males and females (Figure 4.7, page 188). The rate for boys remains 1.6 times higher than that for girls.

Drowning replaced motor vehicle accidents as the leading cause of childhood deaths from injury in 1997, and remained so in 1998 (AIHW Mortality Database). The main causes of injury deaths to children in 1998 were drowning (20% of injury deaths), motor vehicle accidents (17%) and pedestrian deaths (14%).

As well as being the leading cause of death in children, injury also accounts for a large proportion of the childhood hospitalisations—9% of hospitalisations of children in 1997–98. Injury (which includes poisoning) was the third most common reason children were hospitalised in that year, after respiratory conditions and conditions originating in the perinatal period. Within injury, accidental falls were the most common cause requiring hospitalisation.

Although injury causes the most deaths to children, asthma is the most common chronic condition. In 1995, 16% of children aged 0–14 years were reported to have asthma as a long-term condition. Asthma was also the most common reason for



Source: AIHW National Mortality Database.

Figure 4.7: Injury mortality rates for children aged 0–14 years, 1979 to 1998

hospitalisation among children in 1997–98, with a hospitalisation rate of 8.6 per 1,000 for boys and 5.1 per 1,000 for girls. As discussed in chapter 2, asthma is also the leading contributor to the burden of disease among Australian children.

Determinants of health

As well as monitoring the health status of Australian children, it is also important to monitor determinants of health, some of which may not affect health status until later in life. In relation to children, information on determinants of health is less developed than health status measures. National information available in late 1998 is contained in *Australia's Children: Their Health and Wellbeing 1998*, including information on physical activity, weight, diet and sun protection measures. In 1995, around 86% of 0–3-year-olds had been breastfed, although the proportion that had been breastfed differed by socio-economic group, with higher proportions breastfed in the higher socioeconomic groups.

As well as these behavioural and biological determinants, the family and social environment is also a major determinant of children's health, both within childhood and later in life (Centre for Community Child Health 2000). Some of the risk factors for poor health outcomes, particularly in the preschool years, include difficult temperament, harsh parenting, abuse or neglect, parental mental illness or substance abuse, family conflict, low socioeconomic status, and poor links with the community.

Health differentials

Many of the health concerns discussed above affect particular groups of children more than others. Infant mortality among Indigenous babies was found to be 3–4 times higher than among non-Indigenous babies (see section 4.6). Similar mortality differentials exist for children aged 1–14 years (ABS & AIHW 1999:132). Children from lower socioeconomic backgrounds also have a health disadvantage, generally having more long-term conditions, lower rates of breastfeeding, and higher rates of some conditions including asthma.

Young people

Most of this information has been drawn from the AIHW report *Australia's Young People: Their Health and Wellbeing 1999* (AIHW: Moon et al. 1999).

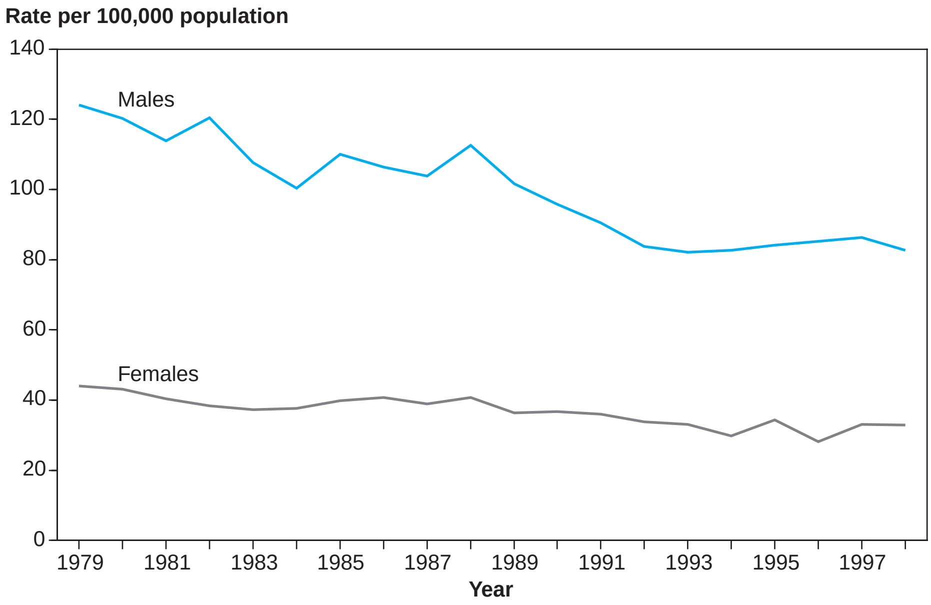
There are divergent views about the health and wellbeing of those aged 12–24 years in Australia. One opinion is that young people have better health than their older counterparts; another is that this age group is particularly vulnerable to some of the ill-effects of modern society. The evidence suggests that the actual situation is somewhere between these two opinions.

There is evidence that Australian young people are in good health. Two-thirds of young people aged 15–24 years rated their health as 'excellent' or 'very good'. Further, young people compare well in relation to other age groups. Mortality rates among people aged 15–24 years are lower than most other age groups, with the exception of children aged 1–14 years (ABS 1999b:40). Disability rates are also low in this age group: 8% of people aged 15–19 years and 9% of people aged 20–24 years self-reported as having a disability, the lowest of all age groups. In relation to weight, 67% of people aged 15–24 years were classified as being of 'acceptable weight' (compared with only 38% of those aged 25 years and over), 27% were overweight or obese and 6% were underweight.

There is also evidence that the health of young people is getting better. Notably, death rates for people aged 12–24 years have fallen over time (a 29% decline between 1979 and 1992), although there has been some levelling off in recent years (Figure 4.8, page 190). Part of the decline in death rates is due to a decline in motor vehicle accident deaths, which have fallen from 40 to 15 per 100,000 for males and 16 to 6 per 100,000 for females over the period 1979 to 1998.

There have also been reductions in both new HIV diagnoses among young people and teenage fertility rates. Among people aged 12–24 years, new HIV diagnoses in males fell from 11 per 100,000 in 1991 to 3 per 100,000 in 1998. The female rate remained consistently much lower at about 1 per 100,000. Teenage fertility rates fell from 55 births per 1,000 women in 1971 to 20 in 1997 (ABS 1977, 1998b).

Despite these improvements in youth health, there are some areas of concern. Mental health disorders (including drug dependence disorders) are the major burden of disease for this age group (AIHW: Mathers et al. 1999:71). Alcohol dependence and its harmful use, and motor vehicle accidents are the two leading specific causes of disease and injury burden in people aged 15–24 years. Of people aged 18–24 years, 27% were found to have a mental disorder in 1997 (ABS 1998c:19).



Source: AIHW National Mortality Database.

Figure 4.8: Death rates for people aged 12–24 years, 1979 to 1998

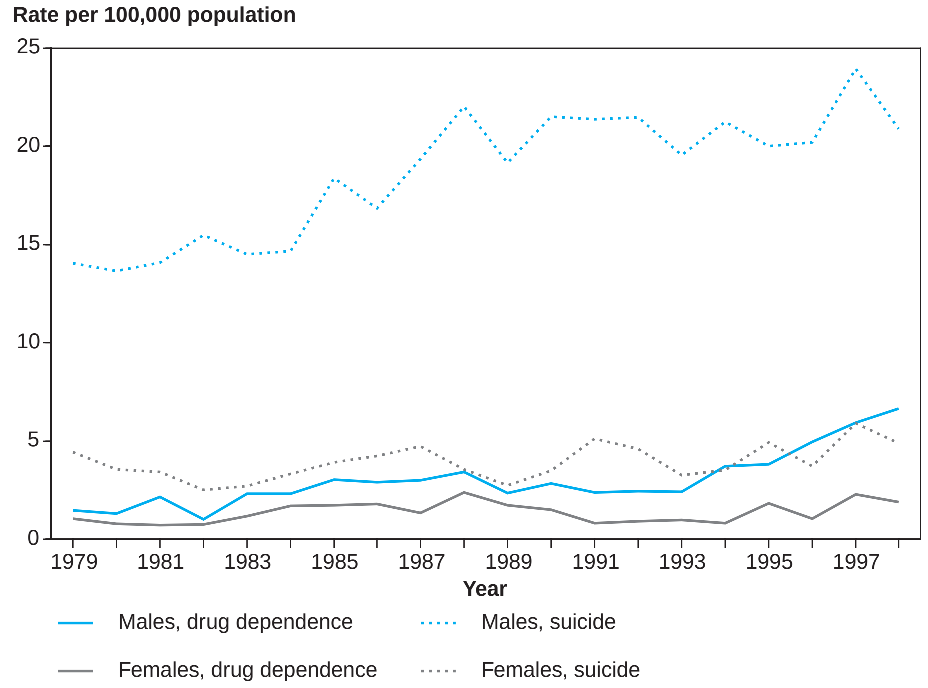
Injury is the leading cause of death for people aged 12–24 years, with two-thirds of all deaths attributed to some form of injury, including accidents and suicide.

Suicide has not followed the declines seen for most other causes of death in this age group. Over the period 1979 to 1998, the suicide rate rose by 40% (Figure 4.9). The male rate remains around 4 times higher than the female rate.

Drug dependence accounted for 7.4% of youth deaths in 1998, and has risen sharply in recent years (Figure 4.9). The death rate from drug dependence among young people in 1998 was almost 5 times the 1979 rate.

One in 5 males and 1 in 10 females in the age group 18–24 years were found to have 'substance use disorders' ('harmful use' or 'dependence' on drugs and/or alcohol). Alcohol dependence was more prevalent than drug dependence, with 12% of males having alcohol dependence compared with 9% dependent on marijuana/cannabis and/or opioids. Further, in 1998, 25% of young persons aged 14–19 years and 39% of those aged 20–24 years were regular or occasional smokers.

Chlamydia is the main sexually transmitted disease among young people: notifications for this infection increased from 105 to 292 per 100,000 over the period 1991 to 1998. Notifications for gonococcal infection also rose during the period, to 65 per 100,000, but notifications for syphilis decreased.



Source: AIHW National Mortality Database.

Figure 4.9: Suicide and drug dependency mortality rates for people aged 12–24 years, 1979 to 1998

Determinants of health

There are some areas of concern in relation to determinants of health among young people. Social and economic disadvantages (e.g. poor education and unemployment) and issues such as lack of social 'connectedness' have been shown to have negative effects on health (Resnick et al. 1997). Of concern is that 40% of year 8 students in an Australian study did not feel they had anyone who knew them well (Glover et al. 1998). In 1995, 20% of unemployed youth assessed their health status as being fair or poor, compared with 9% of employed youth and 8% of students.

The proportions of young people who reported in 1995 exercising at a 'vigorous' or 'moderate' level for sport or recreation declined with age, for males from about 61% of those aged 15–17 years to about 44% of those aged 20–24 years, and for females from 41% of those aged 15–17 years to 31% of those aged 20–24 years. Similarly, the proportion of young people who reported that they ate cereals and the proportion eating fruit on the previous day decreased with age (ABS & DHAC 1999:38).

Health differentials

There are differences in health between young males and young females. Among young Australians, there are nearly 3 male deaths to every 1 female death (ABS 1999b:38). Across all ages, the difference in death rates between males and females is highest for the age group 20–24 years (ABS 1999b:29). Higher death rates for young males from accidents and suicide account for most of this difference. For some groups of males, the comparative situation is getting worse: the gap in death rates between the lowest and highest socioeconomic status groups widened between 1985–87 and 1995–97 for males but narrowed for females.

There are also some areas where females do worse than males; for example, rates of depressive disorders are three times higher for young females than for males. The female hospitalisation rate for parasuicide (self-harm not resulting in death) was greater at all ages, despite the higher suicide rate in males.

Among young people, some groups are comparatively worse off. Using data for the period 1995–97, death rates for young Aboriginal and Torres Strait Islander peoples were found to be 2.8 times higher for males and 2.0 times higher for females than their non-Indigenous counterparts (ABS & AIHW 1999:132). The 20% of males in the lowest socioeconomic group were 1.7 times more likely to die and 1.4 times more likely to be hospitalised than the 20% of males in the highest socioeconomic group; for females, these ratios were 1.4 and 1.2 respectively.

4.3 Men and women aged 25 and over

Aspects of the health of males and females are discussed throughout this report, in particular in reviewing the major disease areas (see chapter 2). Comparisons are made where appropriate. This section provides an overview of the health of adult males and females drawing on the results of the AIHW 1996 Australian Burden of Disease and Injury Study (AIHW: Mathers et al. 1999). Disease burden includes both premature mortality (years of life lost due to premature mortality: YLL) and the impact of disability (equivalent 'healthy' years of life lost due to disability: YLD). The sum of YLL and YLD equals the total disability-adjusted life years (DALYs), a measure of total burden. One DALY is the equivalent of one lost year of 'healthy' life (see section 2.2).

Men

The overall disease and injury burden for men aged 25 years and over is largely attributable to mortality, with 61.6% of the total burden (DALYs) due to YLL (Table 4.3). The burden due to YLL increases with increasing age, from 47.1% for younger men (ages 25–44) to 70.8% for older men (aged 65 and over). Although most deaths occur at ages 65 and over, the total burden of disease at ages 25–64 is slightly higher than that at ages 65 and over.

Men aged 25–44 years

The disease and injury burden for men aged 25–44 years is dominated by mental disorders (Figure 4.10), which make up 27.3% of the total burden for this age group. Mental disorder is dominated by substance abuse disorders (alcohol and illicit drugs)

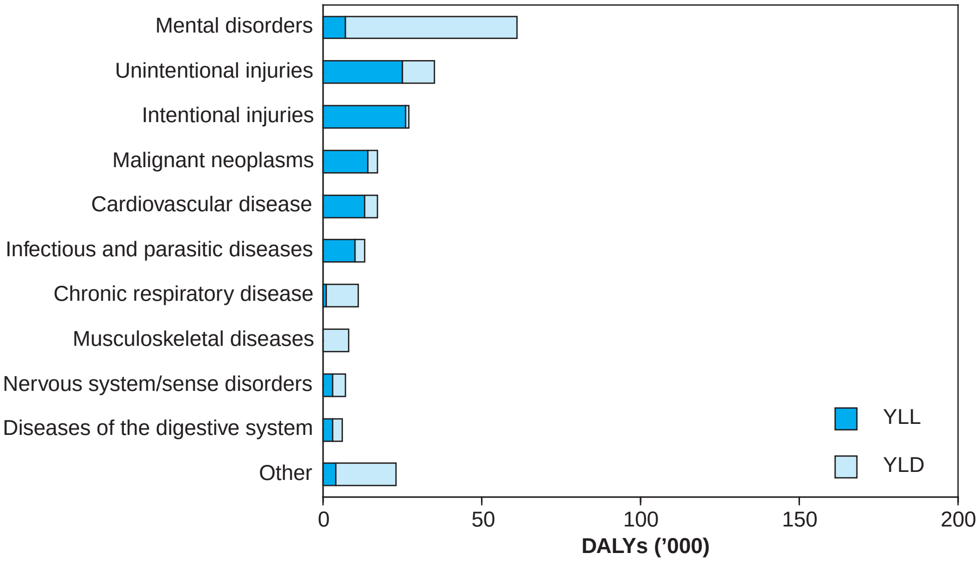
Table 4.3: The total burden of disease and injury in men aged 25 years and over, 1996

Age	YLD Value	YLD Per cent of DALYs	YLL Value	YLL Per cent of DALYs	DALYs
25–44	119,507	52.9	106,366	47.1	225,873
45–64	148,322	43.0	196,773	57.0	345,095
65 and over	152,995	29.2	370,779	70.8	523,774
Total 25 and over	**420,824**	**38.4**	**673,918**	**61.6**	**1,094,743**

Source: Australian Burden of Disease and Injury Study.

and depression, which make up 37.6% and 27.3% respectively of the burden of mental disorder. They contribute to the burden of disease mainly through disability rather than mortality.

Unintentional and intentional injuries are the second and third leading causes of disease and injury burden in this age group, accounting for 15.5% and 12.1% respectively of the total disease burden. Almost half of the unintentional injury burden comes from road traffic accidents (42.8%), and the majority of intentional injury burden comes from suicide and self-inflicted injury (85.2%). These conditions contribute mainly through mortality rather than disability.



Source: Australian Burden of Disease and Injury Study.

Figure 4.10: Leading causes of burden of disease and injury in men aged 25–44 years, 1996

The largest single cause of disease and injury burden in younger men is suicide and self-inflicted injury, which contributes 10.3% of the burden for this age group (Table 4.4). The other leading individual causes are depression (7.4%), road traffic accidents (6.6%), alcohol dependence and harmful use (5.8%), and HIV/AIDS (4.5%).

Table 4.4: Leading single causes of burden of disease and injury in men by age, 1996

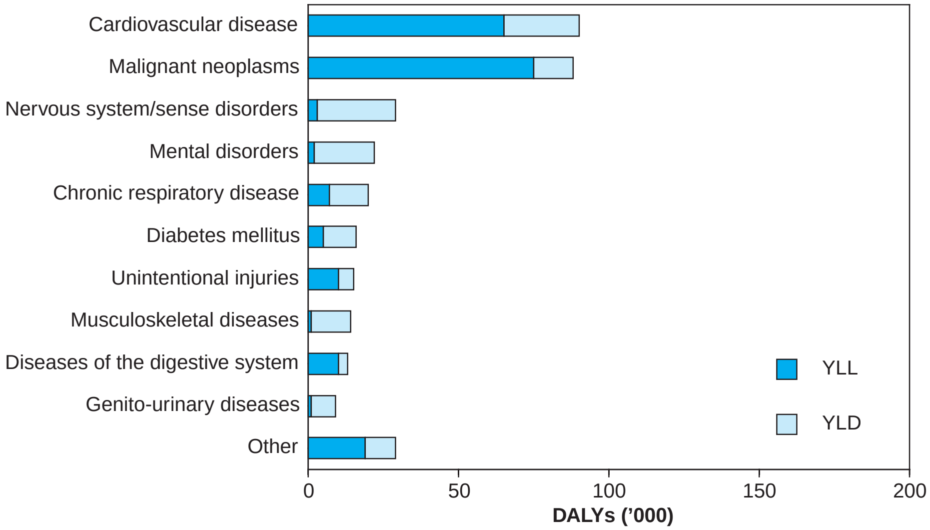
Condition	DALYs	Per cent of total
25–44 years		
Suicide and self-inflicted injuries	23,296	10.3
Depression	16,827	7.4
Road traffic accidents	14,929	6.6
Alcohol dependence and harmful use	13,026	5.8
HIV/AIDS	10,250	4.5
All causes total	**225,873**	
45–64 years		
Ischaemic heart disease	57,521	16.7
Lung cancer	22,509	6.5
Chronic obstructive pulmonary disease	16,999	4.9
Hearing loss	15,861	4.6
Diabetes mellitus	15,711	4.6
All causes total	**345,095**	
65 years and over		
Ischaemic heart disease	113,681	21.7
Stroke	45,111	8.6
Lung cancer	36,206	6.9
Chronic obstructive pulmonary disease	30,348	5.8
Alzheimer’s disease and other dementias	27,804	5.3
All causes total	**523,774**	

Source: Australian Burden of Disease and Injury Study.

Men aged 45–64 years

The two leading causes of disease and injury burden in men aged 45–64 are cardiovascular disease and cancer (malignant neoplasms) (Figure 4.11), which contribute 26.1% and 25.3% respectively of the total disease burden for this age group. The cardiovascular disease group is dominated by ischaemic heart disease (63.9%) and stroke (16.8%). The biggest contributors to the cancer group are lung cancer (25.8%) and colorectal cancer (16.0%). Both cardiovascular disease and cancer contribute mainly through mortality rather than disability.

The largest single cause of disease and injury burden in men aged 45–64 is ischaemic heart disease, which contributes 16.7% of the total disease burden for this age group (Table 4.4). The other leading individual causes of the disease burden are lung cancer (6.5%), chronic obstructive pulmonary disease (4.9%), hearing loss (4.6%) and diabetes (4.6%).



Source: Australian Burden of Disease and Injury Study.

Figure 4.11: Leading causes of burden of disease and injury in men aged 45–64 years, 1996

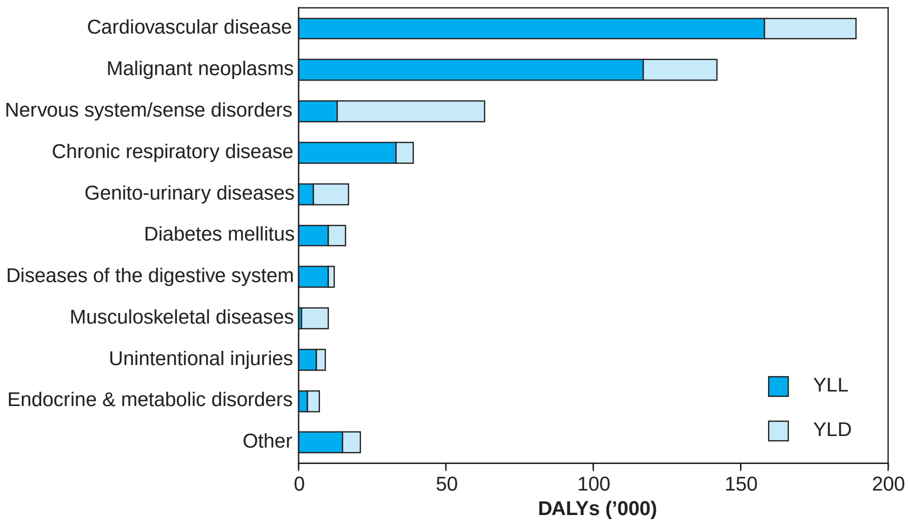
Men aged 65 years and over

Cardiovascular disease and cancer are also the two leading causes of disease and injury burden in older men (Figure 4.12, page 196), contributing 36.1% and 27.1% respectively of the total burden for this age group. Once again, the cardiovascular disease group is dominated by ischaemic heart disease (60.2%) and stroke (23.9%). The cancer group is dominated by three cancers—lung cancer (25.5%), prostate cancer (18.8%) and colorectal cancer (14.0%). Again, the contribution of cardiovascular disease and cancer is mainly through mortality rather than disability.

The largest single cause of disease and injury burden in older men is ischaemic heart disease, which contributes 21.7% of the total disease burden for this age group (Table 4.4). The other leading individual causes are stroke (8.6%), lung cancer (6.9%), chronic obstructive pulmonary disease (5.8%), and Alzheimer's disease and other dementias (5.3%).

Women

Disability is a somewhat higher contributor to the overall disease and injury burden for adult women, with only 56.2% of the total disease burden due to YLL (Table 4.5). As with men, the burden due to YLL increases with increasing age, from 26.4% for younger women (ages 25–44) to 68.9% for older women (aged 65 and over).



Source: Australian Burden of Disease and Injury Study.

Figure 4.12: Leading causes of burden of disease and injury in men aged 65 years and over, 1996

Women aged 25–44 years

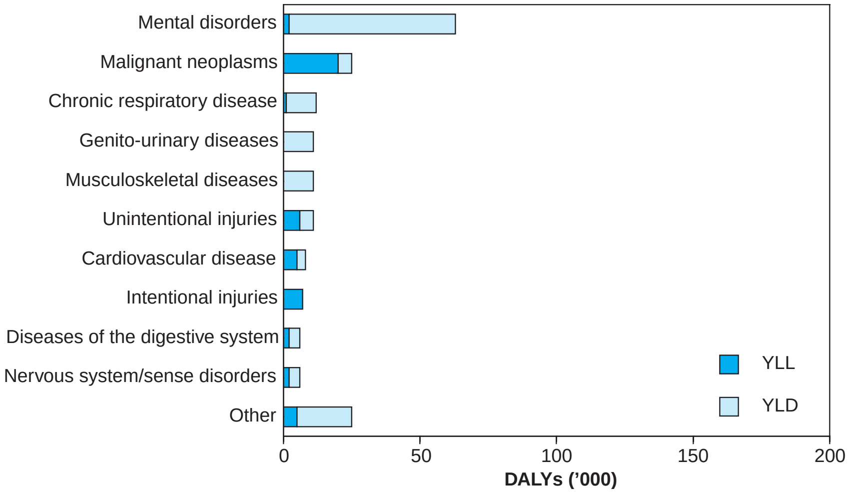
The disease and injury burden for younger women, as for younger men, is dominated by mental disorders (Figure 4.13), which make up 33.8% of the total burden for this age group. The principal mental disorders are depression and anxiety disorders, which make up 37.6% and 33.3% respectively of the burden of mental disorder. They contribute mainly through disability rather than mortality. Cancer is the second leading cause of disease and injury burden in this age group, accounting for 13.1% of the total burden. The biggest individual cancer is breast cancer, which makes up 37.1% of the cancer burden. Cancers contribute mainly through mortality rather than disability.

Table 4.5: The total burden of disease and injury in women aged 25 years and over, 1996

	YLD		YLL		
Age	Value	Per cent of DALYs	Value	Per cent of DALYs	DALYs
25–44	136,401	73.6	48,918	26.4	185,318
45–64	125,881	49.7	127,633	50.3	253,514
65 and over	170,730	31.1	378,498	68.9	549,228
Total 25 and over	**433,012**	**43.8**	**555,049**	**56.2**	**988,060**

Source: Australian Burden of Disease and Injury Study.

The largest single cause of disease and injury burden in younger women is depression, which contributes 12.7% of the total burden for this age group (Table 4.6, page 199). The other leading individual causes are generalised anxiety disorder (6.2%), breast cancer (4.9%), genito-urinary disease (4.2%) and asthma (3.5%).



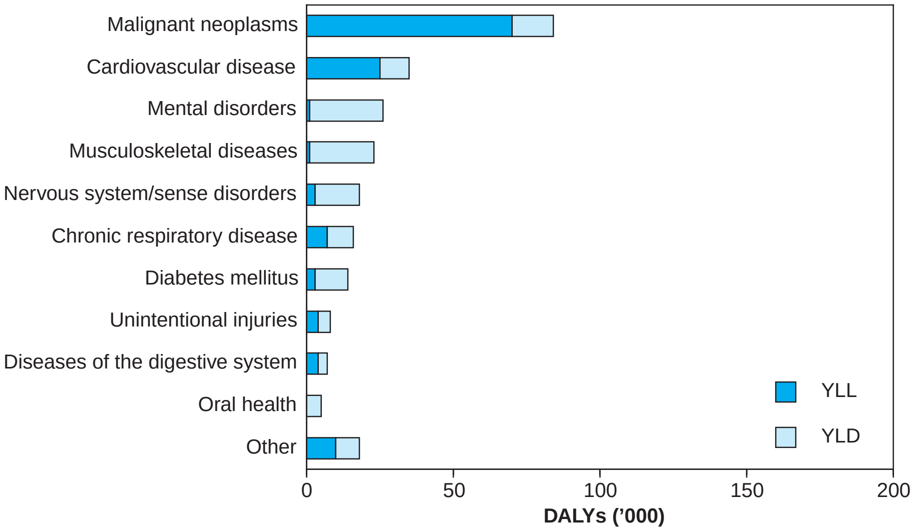
Source: Australian Burden of Disease and Injury Study.

Figure 4.13: Leading causes of burden of disease and injury in women aged 25–44 years, 1996

Women aged 45–64 years

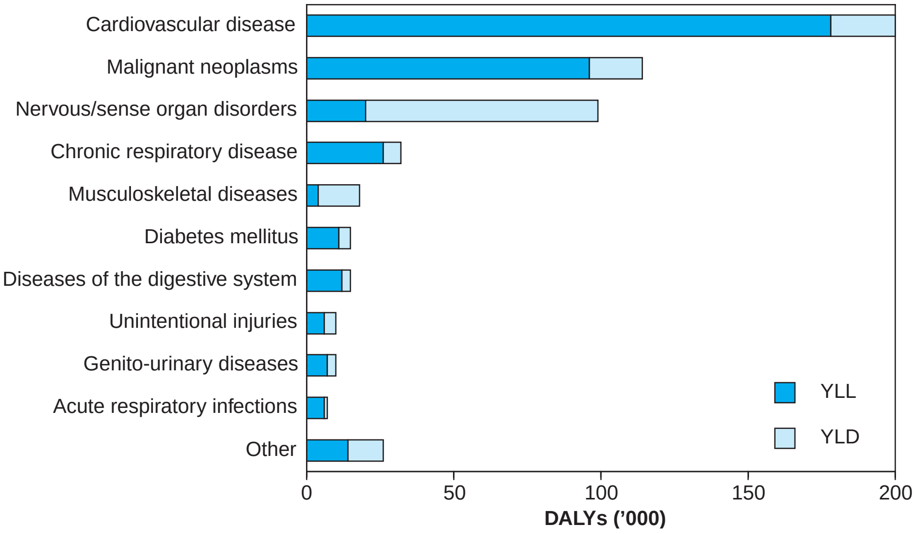
The leading cause of disease and injury burden in women aged 45–64 is cancer (Figure 4.14, page 198), which contributes 33.1% of the total disease burden for this age group. The three largest cancers in this age group are breast cancer, lung cancer and colorectal cancer, which contribute 30.3%, 14.3% and 13.0% respectively to the cancer burden. The second and third largest causes are cardiovascular disease and mental disorders, which account for 13.7% and 10.1% respectively of the total disease burden for this age group. Cardiovascular disease is dominated by ischaemic heart disease (47.0%) and stroke (28.7%) and mental disorders are dominated by depression (51.5%) and anxiety disorders (32.7%). Cancer and cardiovascular disease contribute mainly through mortality, and mental disorders contribute mainly through disability.

The largest single cause of disease and injury burden in women aged 45–64 is breast cancer, which contributes 10.0% of the total burden for this age group (Table 4.6). The other leading individual causes are osteoarthritis (6.6%), ischaemic heart disease (6.5%), diabetes (5.6%) and depression (5.2%).



Source: Australian Burden of Disease and Injury Study.

Figure 4.14: Leading causes of burden of disease and injury in women aged 45–64 years, 1996



Source: Australian Burden of Disease and Injury Study.

Figure 4.15: Leading causes of burden of disease and injury in women aged 65 years and over, 1996

Table 4.6: Leading single causes of burden of disease and injury in women by age, 1996

Condition	DALYs	Per cent of total
25–44 years		
Depression	23,546	12.7
Generalised anxiety disorder	11,529	6.2
Breast cancer	9,025	4.9
Other genito-urinary diseases	7,836	4.2
Asthma	6,548	3.5
All causes total	**185,318**	
45–64 years		
Breast cancer	25,451	10.0
Osteoarthritis	16,665	6.6
Ischaemic heart disease	16,381	6.5
Diabetes mellitus	14,232	5.6
Depression	13,237	5.2
All causes total	**253,514**	
65 years and over		
Ischaemic heart disease	111,267	20.3
Stroke	58,894	10.7
Alzheimer's disease and other dementias	48,946	8.9
Chronic obstructive pulmonary disease	21,838	4.0
Breast cancer	19,627	3.6
All causes total	**549,228**	

Source: Australian Burden of Disease and Injury Study.

Women aged 65 years and over

The three leading causes of disease and injury burden in older women are cardiovascular disease, cancer, and nervous system and sense organ disorders (Figure 4.15), which contribute 37.2%, 20.8% and 17.9% respectively to the total burden for this age group. Cardiovascular disease is dominated by ischaemic heart disease (54.4%) and stroke (28.8%). The three largest cancers are breast cancer (15.1%), colorectal cancer (16.4%) and lung cancer (15.1%). In the nervous system and sense organ disorders group, the leading causes are Alzheimer's disease and other dementias (49.7%), hearing and vision disorders (32.1%) and Parkinson's disease (12.2%). Cardiovascular disease and cancer contribute mainly through mortality, and nervous system and sense organ disorders contribute mainly through disability.

The largest single cause of disease and injury burden in older women is ischaemic heart disease, which contributes 20.3% of the total burden for this age group (Table 4.6). The other leading individual causes are stroke (10.7%), Alzheimer's disease and other dementias (8.9%), chronic obstructive pulmonary disease (4.0%) and breast cancer (3.6%).

4.4 Older people

Healthy ageing was one of the primary themes identified by the National Strategy for an Ageing Australia as part of the work undertaken in Australia for the International Year of Older Persons (1999). Declining mortality rates and increased life expectancy have led to an extended period of life which is spent in 'old age', and a growing recognition of the many different activities, opportunities and contributions which can characterise this phase of the life cycle. The National Strategy for an Ageing Australia identified a number of key areas in promoting healthy ageing and preventing illness. These include maintaining physical and mental health, engaging in physical activity, preventing falls and injury, maintaining adequate nutrition, detecting sensory loss early, managing incontinence, and evaluating alcohol and other drug usage (Bishop 1999:23). Broader social factors are also an important contributor to good health in old age. A lifetime of higher education, higher income, supportive personal and social environments, good medical care and good superannuation entitlements all contribute to better life chances in old age, and thus to a higher likelihood of maintaining good health at advanced ages.

Life expectancy at age 65

Life expectancy has increased for both men and women. Whereas most of the gains earlier in the twentieth century resulted from a reduction in death rates at younger ages, the latter decades saw an increase in life expectancy at older ages. Life expectancy for men at age 65 increased by only a single year between 1911 and 1963, and for women by less than 3 years over the same period (CBCS 1965:147). Between 1977 and 1997, life expectancy for men at age 65 increased from 13 years to 16 years, and for women from 17 to 20 years. Just under half of the life years remaining after age 65 will be spent free of disability (41% for men and 45% for women).

Disability levels

The proportion of persons with a 'disability' is relatively high among the population aged 65 and over (Table 4.7). However, it is important to understand the meaning of disability as used in the 1998 Survey of Disability, Ageing and Carers. Disability is defined in this survey by the ABS as having one or more of 17 limitations, restrictions or impairments (see Box 2.7, page 49). These range from conditions such as 'loss of speech' to 'any…long-term condition that restricts everyday activity'. Having a 'disability' does not, therefore, imply a need for assistance. The proportion of the population with a profound or severe core activity restriction is a better indicator of need for assistance, as it includes those who sometimes or always require assistance with self-care, mobility or communication. These proportions are quite low in the aged population until age 75. For those aged 65–69 years, for example, only 7.8% of men and 9.2% of women have a profound or severe core activity restriction. The proportions rise quite markedly after age 75, so that by ages 75–79, 19% of men and 25% of women reported a profound or severe core activity restriction, and at ages 80–84 the proportions had risen to 24% and 36% respectively. By age 85 and over, more than half the population reported a severe or profound core activity restriction. At these advanced ages, the degree of difference between the sexes lessens somewhat, although the proportions for women are still substantially higher than those for men (69% for women and 56% for men).

Table 4.7: Persons aged 65 years and over: disability status, by sex and age group, 1998 (per cent)

Core activity restriction	Males					Females				
	65–69	70–74	75–79	80–84	85+	65–69	70–74	75–79	80–84	85+
Profound or severe	7.8	11.8	19.0	24.2	56.0	9.2	15.1	24.9	35.5	68.8
Moderate	10.8	10.3	15.3	*7.8	*10.4	8.9	10.4	10.2	6.9	6.9
Mild	16.0	21.6	20.3	24.8	16.9	14.8	16.5	18.3	22.6	7.5
All with specific restrictions	34.6	43.7	54.6	56.9	83.3	32.8	41.9	53.3	65.0	83.2
All with disability	43.4	51.1	60.9	63.4	84.3	37.6	47.3	56.6	66.8	84.2

* Subject to a relative standard error greater than 25%.

Source: ABS 1999c:15.

Main disabling condition

The main disabling conditions of those aged 65–79 and those aged 80 and over were related to physical conditions (80.1% and 67.7% respectively). Within this category, arthritis, problems relating to the circulatory system and other musculoskeletal conditions were the major problems. Sensory problems (diseases of the eye or ear) were the second most disabling set of conditions, affecting 14.2% of those aged 65–79 and 17.4% of those aged 80 and over. Mental and behavioural problems were the main cause of disability for only 5.8% of those aged 65–79, but 14.9% of those aged 80 and over. Dementia and Altzheimer's disease were reported as the main disabling condition by 2.6% of those aged 65–79, and 12.0% of those aged 80 and over.

Main reasons for hospitalisation

There are many reasons patients are admitted to hospitals. The data presented in Tables 4.8 and 4.9 (page 202) report on the principal diagnosis and the main procedure performed on the patient while in hospital care. In 1997–98, the most common diagnosis for older Australians was dialysis (9.7% of separations), followed by cataract (5.4%). Diagnoses associated with heart disease totalled 8%. The most commonly reported procedures for older Australians during hospitalisation were other operations on vessels (including haemodialysis) (9.7%), followed by injection or infusion of other therapeutic or prophylatic substance (including chemotherapy) (5.4%) and extraction of eye lens (4.5%).

Main causes of death

The main causes of death for both men and women aged 65 and over were diseases of the circulatory system, malignant neoplasms and diseases of the respiratory system. Together, these three categories accounted for well over three-quarters of deaths among people aged 65 and over. The leading cause of death in 1998 among men aged 65–74 was malignant neoplasms (40% of all deaths) closely followed by diseases of the circulatory system (37%), and then diseases of the respiratory system (9%). Over the 1990s, age-specific death rates from circulatory diseases, previously the leading cause of death, fell markedly in this age group, whereas those for malignant neoplasms increased (Figure 4.16, page 203). Among men aged 75 and over, diseases of the circulatory system accounted for 43% of deaths, followed by malignant neoplasms

Table 4.8: Patients aged 65 and over: separations for the most frequently occurring principal diagnoses, 1997–98

Principal diagnosis	Separations	Per cent
Encounter for dialysis	166,822	9.7
Cataract	92,752	5.4
Other and unspecified procedures and aftercare	79,332	4.6
Care involving use of rehabilitation procedures	62,755	3.6
Heart failure	35,908	2.1
Other acute and subacute forms of ischaemic heart disease	34,530	2.0
Other malignant neoplasm of skin	34,150	2.0
Diseases of oesophagus	28,319	1.6
Osteoarthritis and allied disorders	27,978	1.6
Cardiac dysrhythmias	25,693	1.5
Follow-up examination	25,665	1.5
Pneumonia, organism unspecified	23,137	1.3
Angina pectoris	22,075	1.3

Source: Australian National Hospital Morbidity Database.

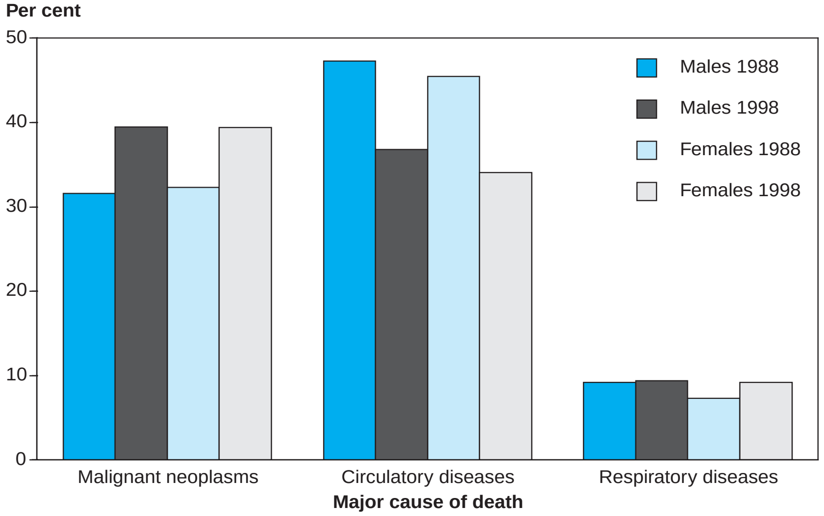
Table 4.9: Patients aged 65 and over: separations for the most frequently occurring principal procedures, 1997–98

Principal diagnosis	Separations	Per cent
Other operations on vessels	167,601	9.7
Injection or infusion of other therapeutic or prophylactic substance	92,759	5.4
Extracapsular extraction of lens by fragmentation & aspiration techniques	77,415	4.5
Diagnostic procedures on small intestine	74,203	4.3
Diagnostic procedures on large intestine	59,218	3.4
Diagnostic physical therapy	40,620	2.4
Transfusion of blood & blood components	33,754	2.0
Soft tissue X-ray of face, head and neck	32,072	1.9
Joint replacement of lower extremity	28,464	1.7

Source: Australian National Hospital Morbidity Database.

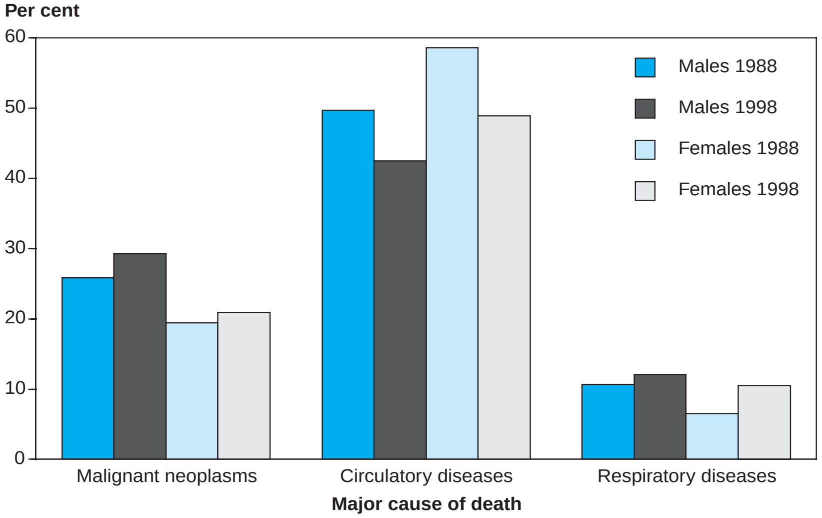
(29%) and diseases of the respiratory system (12%). Among these men, age-specific death rates for diseases of the circulatory system also fell substantially over the decade, whereas those for malignant neoplasms increased (Figure 4.17).

In 1998, for women aged 65–74, malignant neoplasms were the leading cause of death (39%), followed by diseases of the circulatory system (34%) and diseases of the respiratory system (9%) (Figure 4.16). This represents a change from the pattern a decade earlier, when circulatory diseases were the major cause of death. For women aged 75 and over, circulatory diseases continued to be the leading cause of death in 1998 (49%), although to a lesser extent than that reported a decade earlier (59%). Malignant neoplasms (21%) and diseases of the respiratory system (11%), were the next most common causes (Figure 4.17). For both age groups, the age-specific death rates for diseases of the circulatory system fell during the decade.



Source: ABS 1990, 1999b.

Figure 4.16: Deaths by major cause: men and women aged 65–74 years, 1988 and 1998 (per cent)



Source: ABS 1990, 1999b.

Figure 4.17: Deaths by major cause: men and women aged 75 years and over, 1988 and 1998 (per cent)

4.5 Overseas-born

Australia is an ethnically diverse nation. The 1998 ABS population estimates show that about 23% of Australians were born overseas. More than half of these Australian residents were born in a non-English-speaking country.

A heterogenous mix, migrants bring to Australia their own unique health profiles. The stringent health requirements for immigration ensure that most migrants enjoy good, if not better, health than the Australian-born population. This is known as the 'healthy migrant effect'. Immigrants have lower death rates and hospitalisation rates, as well as lower prevalence of certain lifestyle-related risk factors. There are also variations in the health status of migrants according to birthplace, age, socioeconomic status, fluency in the English language and satisfaction with their job and life in Australia (Kliewer & Jones 1998). Illness and disability among migrant groups, however, increases with length of residence in Australia (Young 1992).

For purposes of health comparison, immigrants may be grouped into four broad regional groups: the United Kingdom and Ireland, Other Europe, Asia and Other (Box 4.1). These regional groups exhibit significant variation in their age structures, depending on the recency of their arrival. Migrants from Asia and Other regions, for example, are mainly young, with large numbers aged between 20 and 44 years, whereas migrants from the United Kingdom and Ireland and Other Europe have median ages around 50 years. To enable meaningful comparisons to be made, variation in the health status among these populations due to different age structures has been removed by age standardisation.

Box 4.1: Country of birth categories

Countries classified according to the Australian Standard Classification of Countries for Social Statistics are grouped here into four birthplace groups:

United Kingdom and Ireland: *Form a distinct category that is not easily separated in population statistics.*

Other Europe: *Continental Europe including Eastern Europe, former USSR and Baltic States.*

Asia: *North-East, South-East and Southern Asia.*

Other: *Middle East, Northern and Southern Africa, the Americas, New Zealand and the Pacific region. New Zealand is the largest source country, constituting around 30% of this group.*

Mortality

Table 4.10 compares the death rates for the overseas-born with the Australian-born for the period 1996–98 using standardised mortality ratios (SMRs). The SMRs for all causes are lower for both males and females in all four birthplace categories. Death rates among migrants from the United Kingdom and Ireland were closest to the rates for

Australian-born persons. In comparison, migrants from the Asian region have much lower SMRs, with death rates 46% lower among Asian-born males and 38% lower among Asian-born females than their Australian-born counterparts.

Table 4.10: Mortality differentials by birthplace, cause of death and sex, persons aged 15 years and over, 1996–98

	Males					Females				
		Standardised mortality ratio[a] (Australian-born = 1.0)					Standardised mortality ratio[a] (Australian-born = 1.0)			
ICD-9-CM	**Total**	**UK and Ireland**	**Other Europe**	**Asia**	**Other**	**Total**	**UK and Ireland**	**Other Europe**	**Asia**	**Other**
Infectious	2,558	*0.79	1.01	*1.39	*1.39	1,742	*0.84	*1.36	*1.52	*1.24
AIDS[b]	1,005	*0.84	*0.76	*0.49	*1.44	95	0.95	*0.58	1.32	1.61
Cancers	58,685	*0.94	*0.90	*0.64	*0.84	45,508	*1.05	*0.85	*0.71	*0.94
Lung	14,092	*1.16	*1.07	*0.68	*0.91	6,139	*1.49	*0.66	*0.83	0.95
Skin	2,489	*0.42	*0.34	*0.10	*0.45	1,326	*0.63	*0.40	*0.10	*0.68
Prostate	7,592	*0.80	*0.64	*0.42	*0.83	n.a.	n.a.	n.a.	n.a.	n.a.
Breast	n.a.	n.a.	n.a.	n.a.	n.a.	7,731	*1.09	*0.86	*0.61	*1.05
Cervix	n.a.	n.a.	n.a.	n.a.	n.a.	861	1.03	*0.87	*1.23	*1.19
Diabetes mellitus	4,340	*0.83	*1.27	*1.18	*1.27	4,183	*0.76	*1.74	*1.54	*1.56
Cardiovascular	76,319	*0.88	*0.86	*0.61	*0.90	79,851	*0.87	*0.84	*0.70	*0.95
Ischaemic	46,251	*0.89	*0.88	*0.58	*0.92	39,287	*0.89	*0.85	*0.65	*0.94
Stroke	14,759	*0.84	*0.83	*0.71	*0.85	21,889	*0.85	*0.80	*0.88	*0.94
Respiratory	18,980	*0.95	*0.64	*0.58	*0.67	16,462	*1.03	*0.56	*0.58	*0.83
Digestive	5,892	*0.86	*0.84	*0.63	*0.71	5,719	0.99	*0.74	*0.65	*0.86
Injury and poisoning	15,631	*0.89	*0.84	*0.58	*0.90	6,393	1.05	0.96	0.94	1.04
Motor vehicle	3,663	*0.79	*0.79	*0.69	0.99	1,495	1.10	*1.21	*1.20	*1.16
Suicide	6,155	*0.93	*0.74	*0.40	*0.79	1,544	0.95	0.92	*0.83	0.97
Homicide	603	*0.79	*1.53	*1.44	*1.63	286	1.08	1.31	0.98	0.83
All causes	**195,135**	***0.88**	***0.82**	***0.54**	***0.79**	**176,626**	***0.93**	***0.81**	***0.62**	***0.86**

* Significantly different from 1.00 at the 5% level.

(a) The standardised mortality ratio (SMR) is a measure of death from a specific condition in the overseas-born population relative to the Australian-born population. The ratio for Australian-born is 1.00, and ratios that exceed 1.00 indicate a relatively greater mortality in that population than for the Australian-born. Likewise, ratios less than 1.00 indicate a lower death rate for a given cause of death than for the Australian-born.

(b) All deaths where AIDS is mentioned on the death certificate, regardless of whether it is identified as the primary cause of death.

Note: Age standardised to the Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Mortality by cause of death shows significant variation between overseas-born population groups. Table 4.10 shows that migrant groups in Australia have lower levels of cardiovascular mortality compared with the Australian-born population. However, studies show that rates tend to increase after the migrants' first 10 years of residence in Australia (NHF 1996). Research also indicates that physical inactivity, a risk factor for cardiovascular disease, is more common among people from southern, northern and eastern Europe, Asia, the Middle East and North Africa in comparison with their Australian-born counterparts. Exercise levels are reported to increase with length of stay in Australia (NHF 1996).

Deaths from cancers also show variation. Death rates from lung cancer for both males and females born in the United Kingdom and Ireland, and for males born in Other Europe were higher than for males and females born in Australia. Females born in the United Kingdom and Ireland had higher death rates for breast and cervical cancer. Cervical cancer death rates among women born in Asia and Other countries were higher than among Australian-born women. However, Australian-born males had higher death rates for prostate cancer across all birthplace groups. Immigrants from all regions have much lower death rates for skin cancer compared with Australian-born persons. Smoking, diet, sun exposure, alcohol consumption, and utilisation of health-care services such as screening programs all play a role in creating the differentials related to cancer risk. Culturally appropriate models of preventive health care delivery are currently being developed to overcome access and equity concerns regarding the health of overseas-born persons (DHFS & AIHW 1998).

SMRs for diseases of the respiratory system and diseases of the digestive system among persons born overseas are lower than in the Australian-born population across all regions, except for females born in the United Kingdom and Ireland. Mortality rates for diabetes are higher for those born in Other Europe, Asia and Other countries relative to the Australian-born population. The prevalence of diabetes is high for certain immigrant groups compared with the Australian-born group, particularly among persons of European, Pacific Islander and Asian origin (DHAC & AIHW 1999a). It has been suggested that there is a need to provide information and education for effective self-management of diabetes, since poor glycaemic control is common and more marked among migrant groups (FECCA 1997).

Motor vehicle accident and suicide death rates are higher among Australian-born males. Note, though, that in 1992 approximately 25% of all suicide deaths were among migrants, with 40% of these among persons from English-speaking countries (DHAC 1998).

Hospitalisation

Hospitalisation rates for 1997–98 for overseas-born persons generally reflect the corresponding mortality patterns and indicate lower morbidity in comparison to Australian-born persons for both males and females (Table 4.11).

Asian-born migrants had the lowest hospitalisation rates in 1997–98. However, the hospitalisation rates for tuberculosis among Asian-born migrants were much higher than for other population groups. The hospitalisation rates for cancer of the cervix among females from Asia and Other countries were also higher than for the Australian-born females. Lung cancer among females born in the United Kingdom and Ireland was the only other principal diagnosis among immigrant groups having a significantly higher rate than the Australian-born population.

One of the most notable differences was for melanoma, for which the hospitalisation rate for the Australian-born population was more than double that for the overseas-born. Risk factors for melanoma include increased exposure to sun early in life, fair complexion, freckles and ease of sunburn.

Table 4.11: Standardised hospital separation ratios by principal diagnosis, birthplace and sex, persons aged 15 years and over, 1997–98

	Males					Females				
		Standardised hospital separation ratio(a) (Australian-born = 1.0)					Standardised hospital separation ratio(a) (Australian-born = 1.0)			
ICD-9-CM	Total	UK and Ireland	Other Europe	Asia	Other	Total	UK and Ireland	Other Europe	Asia	Other
Infectious	21,339	*0.72	*0.74	1.00	*0.92	22,027	*0.86	*0.75	*0.80	*0.83
Tuberculosis	419	1.01	*1.65	*14.89	*2.68	372	*0.64	1.18	*21.50	*2.39
Cancers	178,688	*0.70	*0.69	*0.44	*0.69	188,233	*0.79	*0.76	*0.61	*0.83
Skin	3,764	*0.40	*0.31	*0.10	*0.45	3,158	*0.56	*0.44	*0.09	*0.42
Lung	11,636	0.99	*1.04	*0.68	*0.77	5,252	*1.20	*0.64	*0.50	*0.78
Prostate	11,682	*0.70	*0.59	*0.39	*0.71	n.a.	n.a.	n.a.	n.a.	n.a.
Breast	n.a.	n.a.	n.a.	n.a.	n.a.	17,730	*0.96	*0.79	*0.59	*0.91
Cervix	n.a.	n.a.	n.a.	n.a.	n.a.	1,994	0.95	*0.79	*1.24	*1.52
Diabetes mellitus	11,809	*0.68	*0.81	*0.49	*0.66	10,150	*0.67	*0.92	*0.58	*0.78
Mental	104,173	*0.68	*0.68	*0.33	*0.67	119,847	*0.79	*0.59	*0.31	*0.81
Cardiovascular	244,185	*0.77	*0.88	*0.58	*0.92	187,274	*0.81	*0.92	*0.60	*0.94
Ischaemic	104,882	*0.78	*0.86	*0.64	1.00	54,944	*0.82	*0.86	*0.64	*0.97
Stroke	26,894	*0.69	*0.81	*0.58	*0.82	24,909	*0.74	*0.77	*0.78	*0.88
Respiratory	111,499	*0.72	*0.71	*0.52	*0.79	108,301	*0.81	*0.59	*0.45	*0.78
Asthma	11,253	*0.71	*0.51	*0.54	*0.93	21,948	*0.79	*0.38	*0.43	*0.80
Digestive	297,254	*0.76	*0.79	*0.56	*0.80	318,327	*0.79	*0.81	*0.54	*0.79
Injury and poisoning	190,734	*0.72	*0.62	*0.38	*0.74	144,288	*0.83	*0.71	*0.47	*0.77
All causes	**2,231,442**	***0.74**	***0.82**	***0.60**	***0.84**	**2,778,141**	***0.79**	***0.83**	***0.66**	***0.91**

* Significantly different from 1.00 at the 5% level.

(a) The standardised hospital separation ratio is a relative measure of hospital use between the overseas-born and Australian-born populations. The ratio for Australian-born is 1.00, and ratios that exceed 1.00 indicate relatively greater hospital use in that population than for the Australian-born. Likewise, ratios less than 1.00 indicate less hospital use due to a given cause than for the Australian-born population.

Note: Age standardised to the Australian population at 30 June 1991.

Source: AIHW National Morbidity Database.

4.6 Aboriginal and Torres Strait Islander peoples

Australia's Aboriginal and Torres Strait Islander peoples continue to experience much poorer health than the general Australian population (see ABS & AIHW 1999 for a more detailed report). Despite the relative lack of good-quality national health statistics for Australia's Indigenous population, evidence from those jurisdictions and collections where the data are considered to be of reasonable quality indicates large differences between the health of Indigenous and non-Indigenous populations across a range of health status measures. This health disadvantage begins at an early age and continues throughout the life cycle. It reflects the broader social and economic disadvantages faced by Aboriginal and Torres Strait Islander Australians.

It is difficult at present to measure precisely the magnitude of this health disadvantage and the changes over time. The main factors limiting the quality and availability of data include incomplete identification of Aboriginal and Torres Strait Islander peoples in administrative data collections (such as death registrations, hospital records, cancer registries and communicable disease notifications); uncertainties in estimating the size and composition of the Indigenous population; and a relative lack of high-quality survey data about this comparatively small population group (ABS & AIHW 1999). A number of recent initiatives in information development, such as the National Aboriginal and Torres Strait Islander Health Information Plan (ATSIHWIU 1997), may result in some improvements to the quality and availability of data in the future. Some data-quality problems may take a great deal of time to overcome, if indeed they are solvable.

Life expectancy

Life expectancy at birth for Indigenous Australians in the period 1991–96 was estimated to be 56.9 years for males and 61.7 years for females, considerably lower than the all-Australian estimates of 75.2 years for males and 81.1 years for females (ABS & AIHW 1999). The figures for the Australian Indigenous population are similar to those for Australians born at the beginning of the twentieth century, when life expectancy was 55 years for Australian males and 59 years for Australian females.

Mortality

Information on mortality comes from deaths that occurred among usual residents of the Northern Territory, Western Australia and South Australia during calendar years 1995–97 and were registered by the end of 1998. Despite efforts to improve data quality, the level of completeness of identification of Indigenous deaths in other jurisdictions was not considered adequate during this time period to allow for reporting (ABS 1998a; ABS & AIHW 1999; Cunningham & Paradies 2000), although Queensland was considered to have adequate data quality for 1998 (ABS 1999b). Even in the three jurisdictions reported here, however, there may be underestimation of Indigenous deaths due to incomplete identification on death certificates.

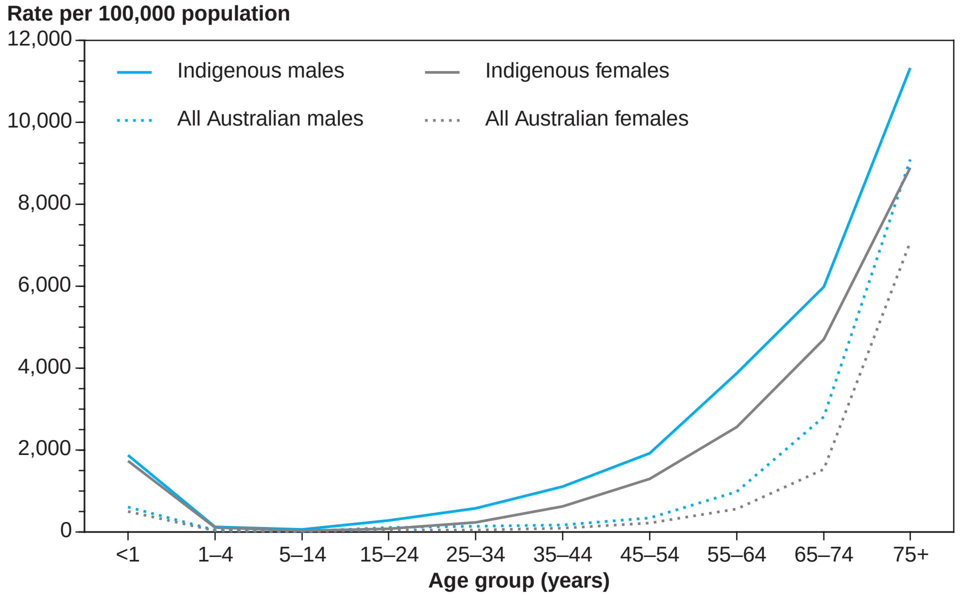
Overall mortality

In 1995–97, in Western Australia, Northern Territory and South Australia combined, there were about three times as many deaths among Indigenous people as there would have been if the Indigenous population had the same age-specific death rates as the total Australian population (Cunningham & Paradies 2000). The death rates for Indigenous people exceeded those for all Australians in every age group (Figure 4.18), but the differences were greatest, in relative terms, among those aged 35–54 years.

There are no reliable data at present to determine whether and to what extent the death rates for the Indigenous population have been changing in recent years.

Age at death

The higher age-specific death rates and the lower life expectancy at birth for Aboriginal and Torres Strait Islander peoples are reflected in the younger age distribution of Indigenous deaths. In 1995–97, more than half (53%) of the deaths of Indigenous males and 41% of the deaths of Indigenous females were of people aged less than 50 years.



Note: Data are for deaths which occurred in 1995–97 and were registered by the end of 1998. Indigenous data are for usual residents of Western Australia, South Australia and the Northern Territory combined.

Source: Cunningham & Paradies 2000.

Figure 4.18: Age-specific death rates, 1995–97

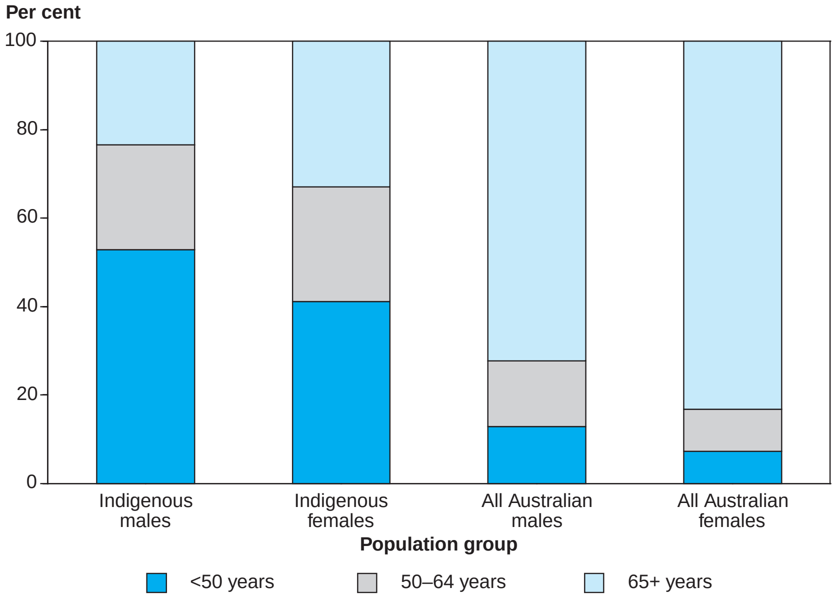
This is in stark contrast to the age distribution for all Australian deaths, with the vast majority (72% of male deaths and 83% of females deaths) occurring among people aged 65 years or more (Figure 4.19, page 210).

Causes of death

The major causes of deaths among Indigenous people were cardiovascular diseases, injury, respiratory diseases, cancer (neoplasms), and endocrine diseases (such as diabetes), which together accounted for about three-quarters of all Indigenous deaths (Cunningham & Paradies 2000). While these same causes were also the most important for the Australian population overall, deaths from these and most other causes occurred at greater rates in the Indigenous population than among other Australians (Figure 4.20, page 211).

Birth outcomes for Indigenous mothers

Despite reductions in infant and maternal mortality among Indigenous Australians over the past 30 years (see, for example, Thomson 1991), there are still considerable differences in birth outcomes between the Indigenous and non-Indigenous populations. Low-birthweight babies, stillbirths and neonatal deaths (those occurring in the first 28 days of life) are all about twice as common among births to Indigenous mothers than among births to other mothers. In 1994–96, about 12% of babies born to Indigenous



Note: Indigenous data are for deaths of usual residents of Western Australia, South Australia and Northern Territory combined.

Source: Cunningham & Paradies 2000.

Figure 4.19: Age at death, 1995–97

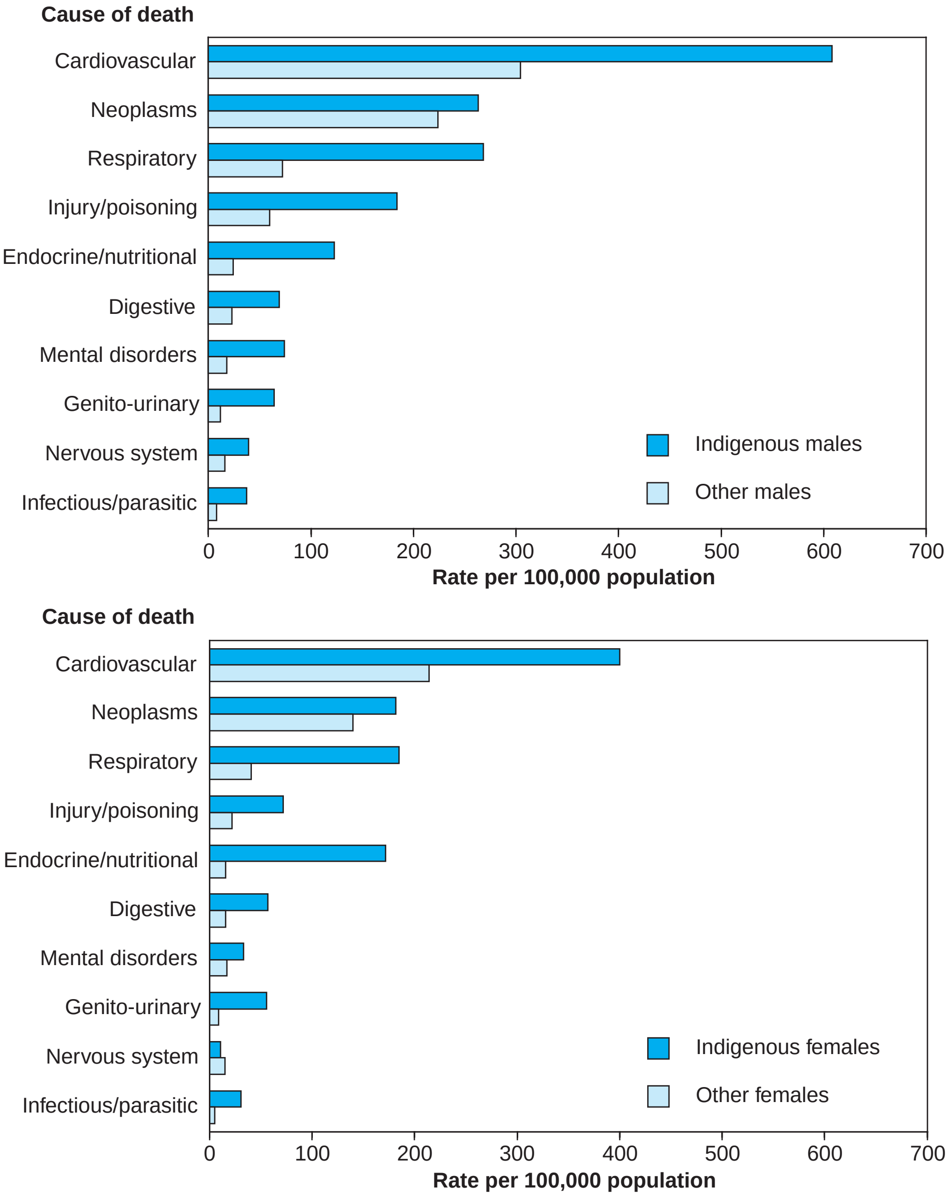
mothers were below 2,500 grams at birth, compared with about 6% of other babies. The perinatal mortality rate (stillbirths and neonatal deaths) in the same period was almost 22 per 1,000 births for babies born to Indigenous mothers, compared with just under 10 per 1,000 for other babies (AIHW NPSU: Day et al. 1999b)(Figure 4.21).

Infant mortality (death in the first year of life) was also higher for Indigenous children than for other children. In 1995–97, in the Northern Territory, Western Australia and South Australia combined, the infant death rates were 3.1 times as high for Indigenous males (1,873 per 100,000) as for all Australian males (605) and 3.5 times as high for Indigenous females (1,731) as for all Australian females (495) (Cunningham & Paradies 2000).

Morbidity

Hospitalisation

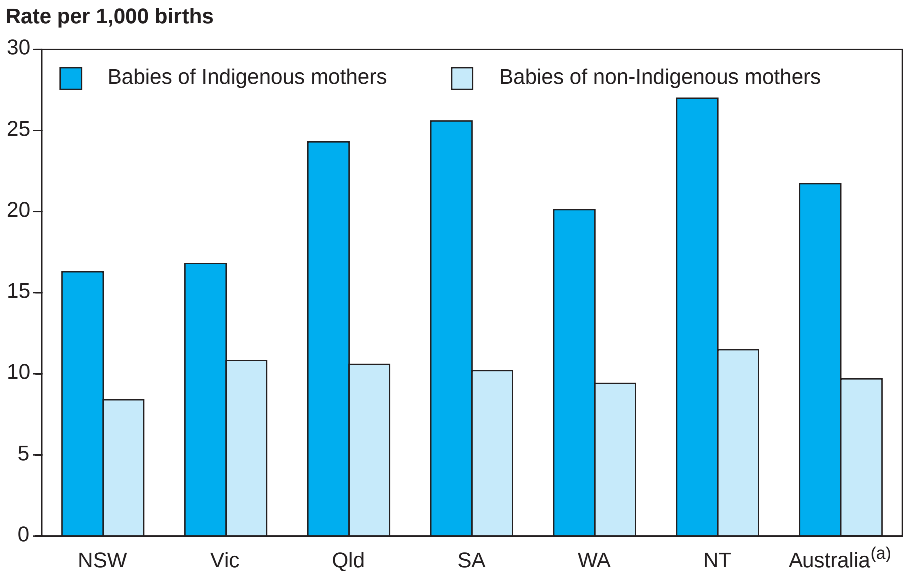
As with mortality and many other types of data, the rates of hospitalisation among Indigenous people are underestimated to the extent that the identification of Indigenous people in hospital records is incomplete. The level of under-identification is likely to vary from hospital to hospital and from State to State. Although the quality of identification has been assessed in a small number of hospitals, where coverage ranged from 55% to 100% (ATSIHWIU 1999), this has not yet occurred at a national or jurisdictional level, except in the Northern Territory (Condon et al. 1998).



Note: Data are for deaths of usual residents of Western Australia, South Australia and Northern Territory which occurred in 1995–97 and were registered by the end of 1998. Rates are age standardised to the Australian population at 30 June 1991.

Source: Cunningham & Paradies 2000.

Figure 4.20: Age-standardised death rates for selected causes, 1995–97



(a) Australian figures include Tasmania and Australian Capital Territory.

Note: Data for Tasmania and Australian Capital Territory are not presented due to small numbers and data quality concerns. Perinatal deaths include stillbirths and deaths within the first 28 days of life.

Source: AIHW NPSU: Day et al.1999a; ABS & AIHW 1999.

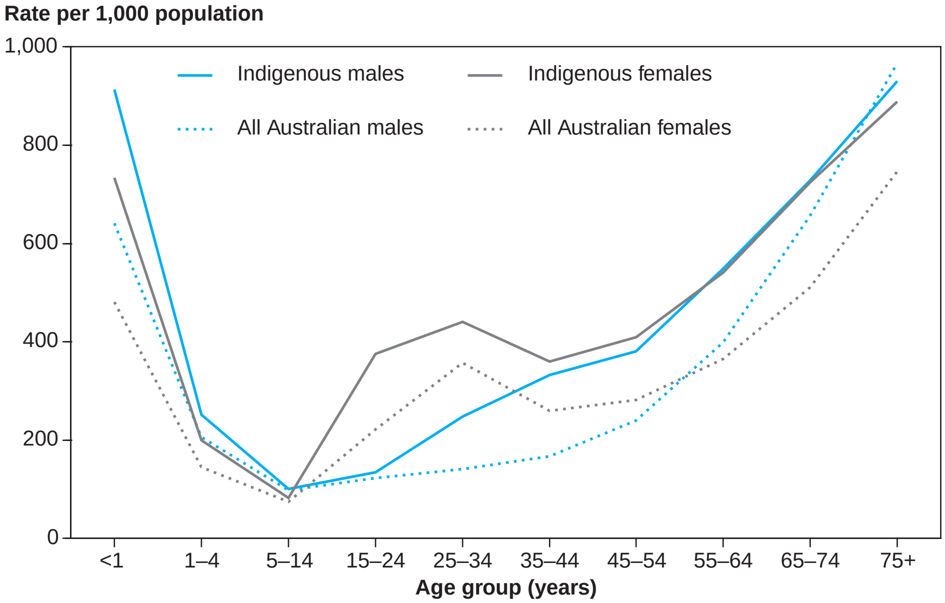
Figure 4.21: Perinatal death rates, 1994–96

In 1997–98, the age-standardised rate of hospitalisation for the total Australian population was 291 per 1,000. The age-standardised rate of hospitalisation for patients identified as Indigenous was almost twice as high, at 540 per 1,000 for all States and Territories combined (AIHW 1999). Thus a large difference was apparent despite significant undercounting of Indigenous people in hospital records because of the identification issues mentioned previously.

The rates of hospitalisation were much higher among Indigenous people than among all Australians in every age group (Figure 4.22).

Among Indigenous males, the most common causes of admission to hospital were kidney dialysis (25%), injury (13%) and respiratory diseases (12%). Among Indigenous females, the leading causes of hospitalisation were dialysis (25%), pregnancy and childbirth (17%), respiratory diseases (9%) and injury (8%) (Cunningham & Beneforti 2000). Most of the admissions for dialysis occurred as part of ongoing treatment of people with end-stage kidney failure, with individual patients accounting for as many as three admissions per week.

For most types of conditions and diseases, there were between 1.3 and 3 times as many hospitalisations as there would have been if the Indigenous population had experienced the same age-specific rates as the total Australian population (Cunningham & Beneforti 2000).



Note: Data from public and private hospitals, except in the Northern Territory (public hospitals only).
Source: Cunningham & Beneforti 2000.

Figure 4.22: Hospital separation rates, all causes excluding dialysis, 1997–98

Dialysis accounted for over 40% of all procedures performed in hospital on patients identified as Indigenous (44% among Indigenous males and 41% among Indigenous females), compared with about 9% of procedures on other patients (12% among other males and 7% among other females) (Cunningham & Beneforti 2000).

Use of general practitioners

Not all health problems are treated in hospital, but there is little national information about the use of other health care services by Indigenous people. The Bettering the Evaluation And Care of Health (BEACH) survey provides the first opportunity to examine the use of general medical practitioners (GPs) by Aboriginal and Torres Strait Islander Australians.

About 1.2% of the encounters recorded in the first year of the survey (1998–99) were with patients identified as Indigenous. As 2.1% of the population is Indigenous, this shows clearly the relative under-utilisation of GPs in private practice by Indigenous peoples. The most commonly managed problems for Indigenous patients were upper respiratory tract infections (9% of encounters), acute bronchitis/bronchiolitis (5%), diabetes (5%), acute otitis media/myringitis (5%), asthma (5%) and hypertension (4%). In contrast, the most commonly managed problems among patients overall were hypertension (8% of encounters), upper respiratory tract infections (7%), immunisation/vaccination (5%) and depression (4%) (AIHW GPSCU: Britt et al. 1999).

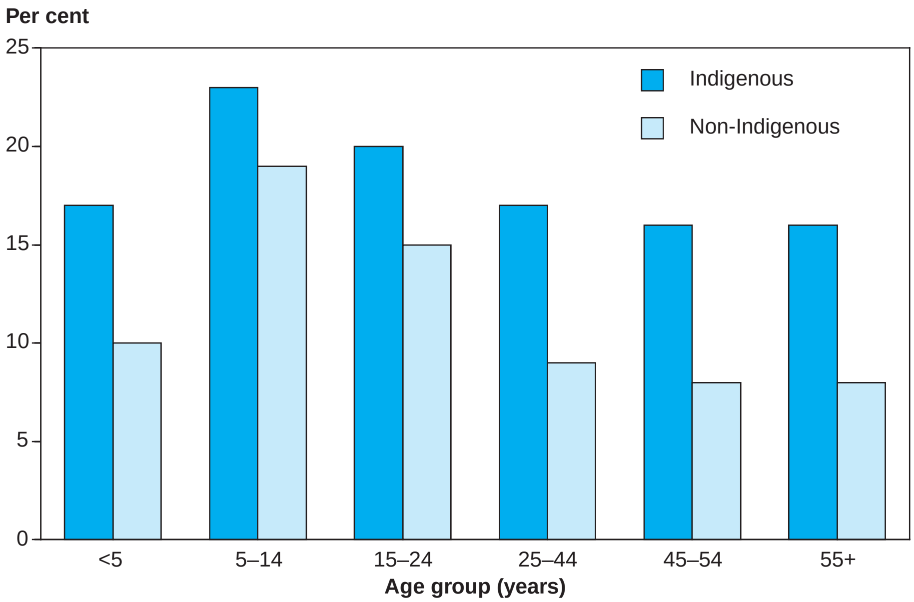
No comparable information is available about the use of other primary health care providers, such as Aboriginal health workers and nurses, or about GP-like interactions in which they are involved.

Ill health in the community

The use of health services does not necessarily indicate the prevalence or incidence of illnesses and conditions in the Indigenous population, but sources of more exact indicators of incidence or prevalence at the national level are limited.

Some information was collected about self-reported illnesses and conditions as part of the ABS National Health Survey, which in 1995 included an enhanced sample of Aboriginal and Torres Strait Islander peoples. Although information was collected from Indigenous people living in urban, rural and remote areas, there were concerns about the quality of some data for some groups of Indigenous people, especially those living in remote areas and/or who spoke a language other than English at home (ABS 1999a). People living in remote areas are excluded from the following analysis.

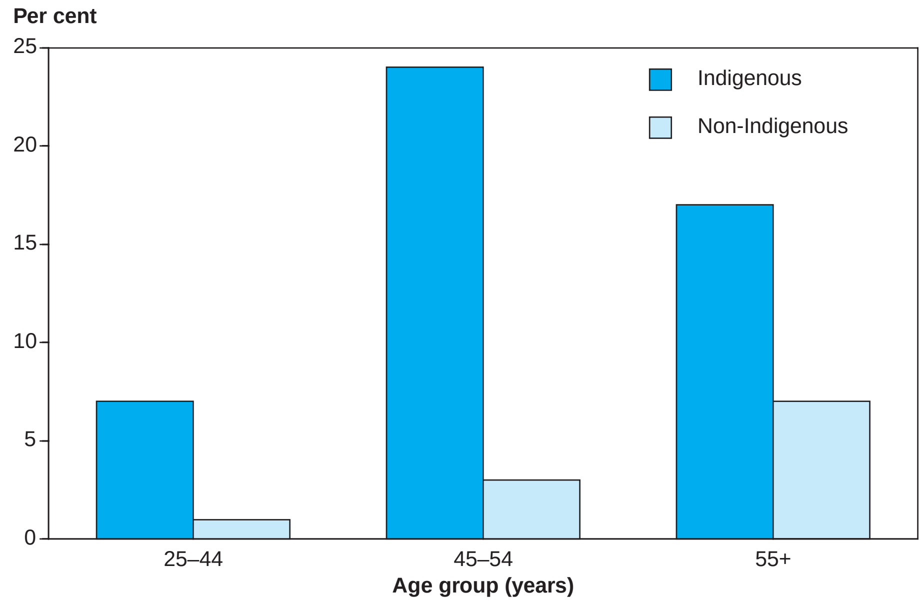
After adjusting for age differences, Indigenous people were more likely than non-Indigenous people to report a range of chronic diseases and conditions, such as asthma (Figure 4.23) and diabetes (Figure 4.24) (ABS 1999a).



Note: Excludes persons living in remote areas.

Source: ABS 1999a.

Figure 4.23: Reported asthma, 1995



Note: Excludes persons living in remote areas.

Source: ABS 1999a.

Figure 4.24: Reported diabetes, 1995

The reported use of medications for asthma and diabetes was correspondingly high (ABS & AIHW 1999), but the most commonly reported type of medication, for both Indigenous and non-Indigenous people, was pain relievers (ABS 1999a).

Health risk factors

Some of the differences in health status can be explained by differences in the health risk factors to which people are exposed, such as low socioeconomic status, poor living conditions, poor nutrition, the use of harmful substances, and violence. As a group, Indigenous people are more likely than other Australians to be exposed to such health risk factors.

Social and economic factors

Compared with other Australians, Indigenous people are less likely to be employed and less likely to have post-school educational qualifications. They also have lower personal and household incomes. At the time of the 1996 Census, the unemployment rate for those aged 15 years or more was about 23% for Indigenous people, compared with about 9% for other Australians. About 2% of Indigenous people aged 15 years or more reported a Bachelor degree or higher in 1996, compared with 11% of other Australians. The median weekly personal income of Indigenous people in 1996 was $218, below the median weekly income recorded for the total population ($294). Median weekly household income was also lower for Indigenous households ($540) than for other households ($632), despite the larger size of Indigenous households (ABS 1998a).

Housing and living conditions

Indigenous people are much less likely than other Australians to live in a home that is owned or being purchased by its occupants, which is generally taken as indicative of security of tenure. In the 1996 Census, about 31% of Indigenous households owned or were purchasing their home, compared with 71% of other households (ABS 1998a). Among households renting their dwelling, the majority of Indigenous households (53%) rented their home from either a government agency or a community/cooperative housing agency, whereas most other renter households (67%) rented from a private owner (ABS 1998a).

Indigenous households in the 1996 Census were larger than other households (3.7 versus 2.7 people on average) and were much more likely to live in crowded dwellings. About 2% of all Indigenous households (and almost 7% of Indigenous people) lived in dwellings with 10 or more people, compared with only 0.04% of other households (and 0.14% of other people). Almost half (49%) of all private dwellings in Australia with 10 or more people living in them were occupied by Indigenous households. Among large households (that is, with 10 or more people), Indigenous households were more likely than other households to live in smaller dwellings. The majority (70%) of large Indigenous households lived in dwellings with three or fewer bedrooms. In contrast, there were five or more bedrooms in almost half (46%) of the dwellings occupied by other large households (ABS 1998a; ABS & AIHW 1999).

Indigenous households counted in the Census were more likely than other households to live in improvised dwellings, such as sheds, humpies or other rough accommodation. Almost a third (31%) of all households counted in improvised dwellings were Indigenous households (ABS & AIHW 1999), even though Indigenous households account for less than 2% of all Australian households (ABS 1998a). Indigenous people were also more likely than other Australians to use the Supported Accommodation Assistance Program, which provides services to people who are homeless or at risk of being homeless (AIHW 1997).

Nutritional status

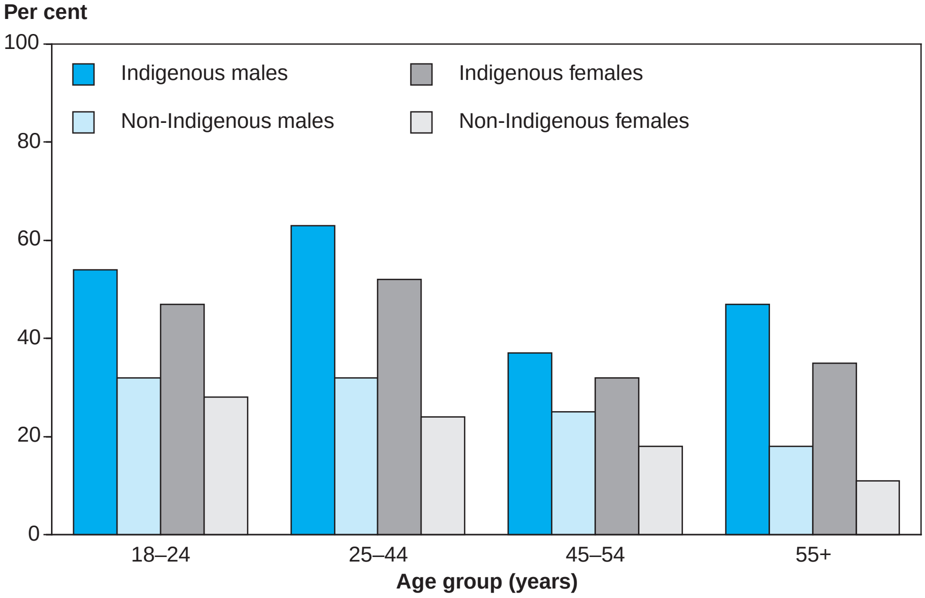
Adequate consumption of nutritious foods is important for good health, but little information is currently available at the national level about the food intake of Indigenous people. However, it is likely that the economic and geographic disadvantages faced by the Indigenous population are reflected in nutritional disadvantages as well.

One aspect of nutritional status for which national information does exist is relative weight. Indigenous people are more likely than other Australians to be classified as obese based on their body mass index (BMI). Among Indigenous adults aged 18 years or more who were measured in the 1994 National Aboriginal and Torres Strait Islander Survey, about 28% of females and 25% of males were classified as obese (BMI greater than 30). This compares unfavourably with figures for all Australians from the 1995

National Nutrition Survey, in which 19% of females and the same proportion of males aged 19 years and over were classified as obese, based on BMI derived from measured height and weight (Cunningham & Mackerras 1998).

Drugs and other harmful substances

Indigenous adults are about twice as likely to smoke cigarettes as non-Indigenous adults (Figure 4.25), which puts them at increased risk of heart disease, cancer, respiratory disease and other conditions. Although Indigenous people are more likely than non-Indigenous people to abstain from alcohol, those who do drink are more likely to drink at unsafe levels. The use of illicit drugs and other harmful substances (such as leaded petrol) is also of concern among the Indigenous population (ABS & AIHW 1999). For example, a recent study in Western Australia highlighted the rapid increase in first-time hospital admission rates for Indigenous people for illicit-drug problems, especially cannabis and amphetamines, during the first half of the 1990s (Patterson et al. 1999).



Note: Excludes people living in remote areas.

Source: ABS 1999a.

Figure 4.25: Smoking prevalence by age group, 1995

Exposure to violence

Although it is difficult to quantify precisely the extent of the impact of violence on the health and wellbeing of Indigenous Australians, there is strong evidence that Indigenous people as a group are at increased risk of being exposed to violence.

Deaths from intentional injury are more common for Indigenous people than for other Australians. In 1995–97 in the Northern Territory, Western Australia and South Australia combined, there were about seven times as many deaths among Indigenous females and almost eight times as many deaths among Indigenous males as would have been expected if the all-Australian rates had applied (Cunningham & Paradies 2000). In the period 1989 to 1996, it was estimated that about 20% of victims and 22% of offenders in intimate-partner homicides were Indigenous (Carcach & James 1998).

Indigenous females are grossly overrepresented in hospitalisations recorded as being due to intentional injury. Of all hospitalisations among females in 1997–98, almost half (46%) of those classified as being due to intentional injury were among females identified as Indigenous. It is possible that some intentional injuries to non-Indigenous females were coded as another type of injury, such as 'accidental falls', but this cannot completely explain the disparity between the two groups because the rates of hospitalisation were higher for Indigenous females than for non-Indigenous females for almost every type of injury. Indigenous males were also at much greater risk of hospitalisation for intentional injury compared with their non-Indigenous counterparts, but the differences were not as extreme (Cunningham & Beneforti 2000).

Although death registrations and hospital statistics on intentional injury point to a heavy burden of violence among Indigenous people, they do not tell the whole story. Not all victims of violence are admitted to hospital or killed, and not all the results of violence are physical. However, there is little good statistical information about other aspects of violence, such as those relating to mental and emotional wellbeing.

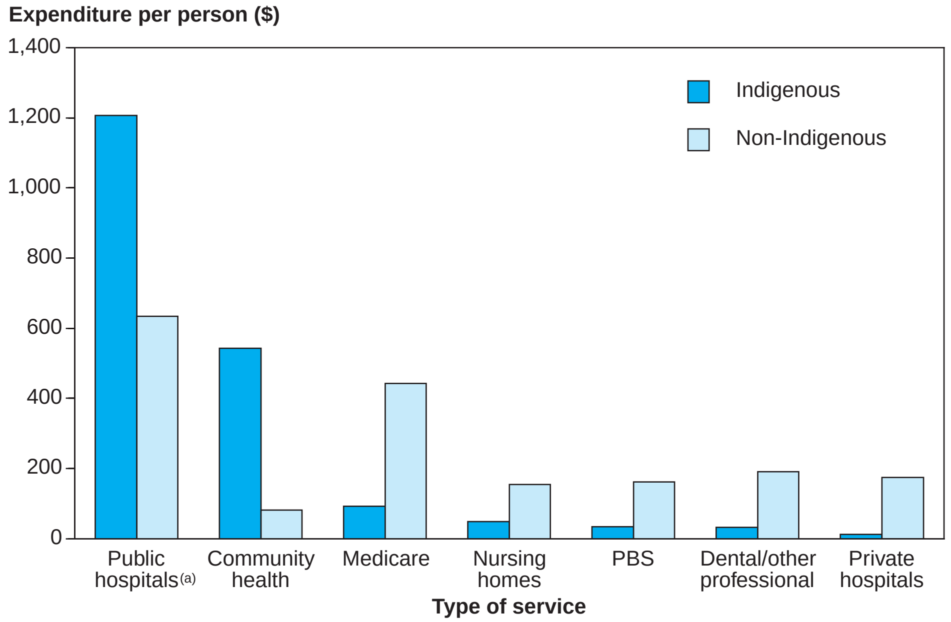
Health services and expenditure

Appropriate health services are necessary help reduce disparities in health status between population groups. According to an analysis of health expenditure in the financial year 1995–96, about $2,320 per person was spent on health services to Indigenous people, compared with $2,163 for services to non-Indigenous people (Deeble et al. 1998). This difference in expenditure (8%) is much smaller than the differences for many of the health status measures shown above.

Aboriginal and Torres Strait Islander peoples appear to have a different pattern of service use from that for the rest of the population (Figure 4.26), with higher estimated per person expenditure for Indigenous people for public hospital services and community health services, and lower per person expenditure for Medicare, the Pharmaceutical Benefits Scheme, nursing homes, dental and other professional services, and private hospitals (Deeble et al. 1998).

4.7 Socioeconomically disadvantaged

There has been considerable focus in Australia and overseas on the association between socioeconomic disadvantage and health. The relationship between increasing mortality and morbidity with decreasing socioeconomic status has been well demonstrated (Turrell et al. 1999). Similarly, many of the differences in health between groups, such as between men and women, between Indigenous people and non-Indigenous persons, and between urban and rural residents, also show a relationship with socioeconomic factors (AIHW:



(a) Includes inpatient and outpatient.

Source: Deeble et al. 1998.

Figure 4.26: Estimated per person health expenditure by type of service, 1995–96

Mathers 1994a). However, the reason for the relationship is not clear and requires further work. A range of risk factors, as well as the social and economic elements, affect health. Health inequalities are caused by a complex interplay of these factors.

There are a number of elements that contribute to socioeconomic status, including income, level of education, employment status and occupation. These elements by themselves, however, do not provide an ideal measure, and their use often depends on the age group being analysed. Health information by socioeconomically graded areas of residence provides a useful way to analyse information for children, retired people and, in some cases, women, where data on occupation, education and income are not always available or not relevant (AIHW: Mathers 1994a). The most common measure of socioeconomic status by area of residence is the Index of Relative Socioeconomic Disadvantage (IRSD), derived by the Australian Bureau of Statistics from population census data (Box 4.2, page 220).

Analyses of inequalities in health were conducted in the first half of the 1990s by the National Health Strategy (1992) and the Australian Institute of Health and Welfare using mortality data for 1985 to 1987, data from the 1988 Survey of Disabled and Aged Persons, the 1989–90 National Health Survey, and the 1989 National Heart Foundation Risk Factor Prevalence Survey. These studies found that people of a low socioeconomic status generally have higher rates of mortality and are most likely to suffer from disability, to have serious chronic illnesses or suffer recent illnesses, and to report being in only fair or poor health as opposed to good or excellent health. The analysis conducted by the AIHW demonstrated substantial inequalities in health by all measures of socioeconomic status (education level, employment status, occupation, occupational prestige, family income and areas of socioeconomic disadvantage) and for all age groups. People with lower socioeconomic status had higher death rates and reported higher levels of illness and reduced activity due to illness (AIHW: Mathers 1994a, 1994b, 1995, 1996).

These analyses also demonstrated that the socioeconomically disadvantaged make greater use of primary and secondary health services such as doctors, hospitals and outpatient clinics, but are less likely to use preventive health services such as dentists, immunisation and cancer screening tests (e.g. mammograms and Pap smears).

More recently, mortality and morbidity data and data from the 1995 National Health Survey have been analysed with regard to socioeconomic status. The findings are reported in the following paragraphs.

Box 4.2: Measures of inequality

Index of Relative Socioeconomic Disadvantage (IRSD). *The IRSD is one of a group of measures developed by the Australian Bureau of Statistics to categorise small geographic areas according to their social and economic characteristics (ABS 1998d). This measure was used to group people into quintiles of socioeconomic disadvantage according to the IRSD for their statistical local area of usual residence, with the first quintile corresponding to the group with the highest socioeconomic status and the fifth quintile the lowest.*

YLL and YLD rate ratios. *These are the age-standardised YLL (years of life lost due to premature mortality) or YLD (years of life lost due to disability) rate per 1,000 population for the least socioeconomically disadvantaged quintile divided by the corresponding age-standardised rate for the most socioeconomically disadvantaged quintile. This provides a measure of the excess mortality or disability among the most disadvantaged which is independent of variations in age and sex distribution between groups with different socioeconomic status. Rate ratios greater than 1 indicate higher mortality or disability for the most disadvantaged.*

Gini coefficient. *This is a summary measure of the degree of inequality in some characteristic within the population (Wagstaff et al. 1991). In this case the coefficient is calculated for cause-specific YLL and YLD. Its values range from 0 (perfect equality) to 1 (perfect inequality) and measure the degree of mortality or disability inequality across the quintiles of socioeconomic disadvantage as measured by the IRSD.*

Excess burden. *This measure identifies the burden of mortality or disability which may be attributed to socioeconomic disadvantage (Kunst 1997). It is presented as the percentage of YLL or YLD which could potentially be avoided if all quintiles had the same age-standardised YLL or YLD rate as the least disadvantaged quintile.*

Mortality

The most complete data on socioeconomic status and the burden of disease and injury is available for mortality. Variability in the mortality burden with socioeconomic status can be examined using three measures: the YLL rate ratio, the Gini coefficient and the excess mortality burden (see Box 4.2).

For all deaths registered for the years 1995–97, classified into quintiles of socioeconomic disadvantage according to the IRSD (see Box 4.2) for their statistical local area of usual residence (AIHW: Mathers et al. 1999), there is a marked gradient in the mortality burden across these quintiles. The YLL rate ratio shows that the burden in the most disadvantaged group is 41% higher for males and 26% higher for females (Table 4.12, page 222). Looking at specific causes of death, the differentials in mortality burden are smaller for infectious diseases and cancers but larger for cardiovascular disease, chronic respiratory conditions, digestive system diseases and injuries.

The Gini coefficient indicates that the overall mortality burden for males is 50% higher than females (with Gini coefficients of 0.06 and 0.04 respectively). A similar difference between males and females is shown in the excess mortality burden, with 19% of the mortality burden for males associated with socioeconomic status compared with 12% of the burden for females.

This inequality in mortality burden is also reflected in the age-specific probability of death, which is higher at all ages for people in the most disadvantaged quintile compared with the least disadvantaged quintile.

Analysis of mortality for 1997 and 1998 found that males in the most disadvantaged quintile had 12% higher mortality than the average Australian male, and 30% higher than males in the least disadvantaged quintile. For females, those in the most disadvantaged quintile had a 16% higher level of mortality than those in the least disadvantaged quintile (ABS 1999b).

Consistent with these results, analysis of 1995–97 mortality data by AIHW found that among those aged 15–24 years death rates of males in the most disadvantaged quintile were 70% higher than males in the least disadvantaged quintile, with death rates of 112 and 65 per 100,000 population, respectively. Similarly, females in the most disadvantaged quintile had death rates 40% higher than those in the least disadvantaged quintile (35 compared with 26 per 100,000 population) (AIHW: Moon et al. 1999).

This analysis also found that there is a 3.6-year gap in life expectancy at birth for males between the top and bottom quintiles of socioeconomic disadvantage, and a 1.9-year gap for females. That is, the most socioeconomically disadvantaged in society have lower life expectancies than the least socioeconomically disadvantaged, losing 35% more years of life in 1996 (AIHW: Mathers et al. 1999).

In interpreting these results, it should be borne in mind that the IRSD relates to the average disadvantage of all people living in a geographic area. Hence any variability between groups based on the IRSD will probably be smaller than if the variability had been measured between individuals. In other words, these measures of inequality will in most cases understate the level of inequality in mortality burden by socioeconomic disadvantage between individuals.

Table 4.12: Differentials in the burden of disease and injury between top and bottom quintiles of socioeconomic disadvantage, age-standardised YLL, YLD and DALYs per 1,000 population, 1996

	Males	Females	Persons
YLL ratio[(a)]	1.41 (1.38–1.45)	1.26 (1.22–1.29)	1.35 (1.32–1.37)
YLD ratio[(a)]	1.32 (1.13–1.46)	1.29 (1.05–1.53)	1.30 (1.09–1.44)
DALY ratio[(a)]	1.37 (1.28–1.43)	1.27 (1.14–1.41)	1.32 (1.22–1.39)
Excess burden (per cent)[(b)]	18.7 (15.1–21.5)	15.4 (9.3–19.6)	17.1 (13.7–19.4)

(a) Ratio of age-standardised rate per 1,000 population for bottom (5th) quintile of IRSD to the age-standardised rate per 1,000 population for the top (1st) quintile. Range given in brackets is the estimated 95% confidence or uncertainty interval.

(b) Percentage of total burden (DALYs) that would be avoided if all quintiles had the same age-standardised DALY rate as the least disadvantaged (1st) quintile. Range given in brackets is the estimated 95% confidence or uncertainty interval.

Source: AIHW: Mathers et al. 1999.

Disability

There are no data to measure socioeconomic inequality in YLD for the whole population, but this inequality can be examined for mental disorders. The 1997 National Survey of Mental Health and Wellbeing collected data on mental disorders among the Australian population aged 18 years and over. Survey respondents were classified into quintiles of socioeconomic disadvantage using the IRSD to classify place of usual residence.

The YLD burden due to mental disorders in the most disadvantaged quintile is 45% higher for males and 41% higher for females than the burden in the least disadvantaged quintile. The Gini coefficients show similar levels of inequality for both males and females (with coefficients for the burden of mental disorders of 0.07 and 0.06 respectively). The excess disability burden from mental disorders is slightly larger for women, with 20.0% of the disability burden for mental disorders among women associated with socioeconomic status compared with 17.5% of the burden among men (AIHW: Mathers et al. 1999).

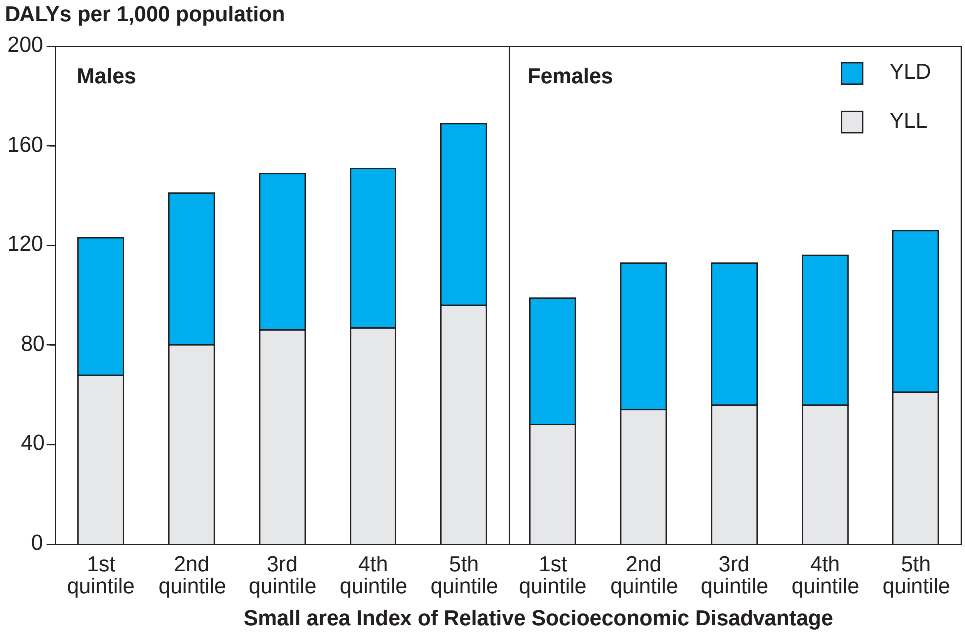
Total disease burden

The lack of data on the burden of disability means that a comprehensive analysis of the total disease burden associated with inequalities in socioeconomic status cannot be completed. However, modelling techniques can be used to derive provisional total burden estimates (Figure 4.27).

The total burden (DALY) for the most disadvantaged is 37% higher for males and 27% higher for females than the total burden for the least disadvantaged (Table 4.12). The proportion of total burden associated with inequalities in socioeconomic disadvantage is 18.7% for males and 15.4% for females.

Findings from the 1995 National Health Survey reveal that a greater proportion of both males and females in the areas of greatest disadvantage rated their health as fair or poor (rather than good, very good or excellent) than did those from other areas. There was a clear gradient of more negative assessment of health with greater disadvantage of area.

Among all people aged 15 years and over, 17% rated their health as fair or poor, with this percentage ranging from 12% in the least disadvantaged areas to 22% of those in the most disadvantaged areas (ABS 1999f).



Source: AIHW: Mathers et al. 1999.

Figure 4.27: Estimated burden of disease and injury (age-standardised DALYs per 1,000 population) by quintile of area of socioeconomic disadvantage, by sex, 1996

Of the fifteen most common non-minor illnesses recorded in the survey, five were more common in the most disadvantaged areas, including arthritis, asthma, bronchitis/ emphysema, ulcer and diabetes. As found in earlier studies, the more socioeconomically disadvantaged also made greater use of doctors and outpatient/casualty services, but were less likely to use preventive health services (ABS 1999f).

4.8 Rural and remote populations

The health of populations living in rural and remote areas of Australia is worse than of those living in capital cities and other metropolitan areas (AIHW 1998). Mortality and illness levels increase as the distance from metropolitan centres increases. Relatively poor access to health services, lower socioeconomic status and employment levels, exposure to comparatively harsher environments and occupational hazards contribute to and may explain most of these inequalities. Also, a large proportion of the population in the more remote parts of Australia are Aboriginal and Torres Strait Islander peoples, who generally have poorer health status.

The geographical basis of reporting in this section is the Rural, Remote and Metropolitan Areas (RRMA) classification which is outlined in Table 4.13. This classification is based mainly on population numbers and an index of remoteness (DPIE & DHSH 1994).

Demographic and environmental factors

About 29% of the Australian population (including 64% of the Indigenous population) live in rural and remote Australia. Although Aboriginal and Torres Strait Islander peoples constitute about 2.1% of the total Australian population, they make up 1% of the capital city population and 20% of the population of the remote zone. The remote zone also has a low or negative population growth rate, higher fertility rates, more children and fewer old people (AIHW 1998), and Year 12 high school completion rates tend to be 10% lower than in capital cities (SCRCSSP 1997). The Index of Relative Socioeconomic Disadvantage tends to increase with increasing remoteness (AIHW 1998).

Table 4.13: Population distribution by Rural, Remote and Metropolitan Areas classification

	Population (1998)		Population growth 1991–96	Indigenous population (1996)[(a)]	
RRMA category	**Number**	**Per cent**	**(per cent)**	**Number**	**Per cent**
Metropolitan					
Capital cities	11,952,545	63.8	1.2	117,103	1.0
Other metropolitan centres	1,421,040	7.6	1.8	22,880	1.7
Rural					
Large rural centres	1,119,312	6.0	1.5	33,435	3.1
Small rural centres	1,218,495	6.5	1.2	34,009	2.8
Other rural areas	2,466,695	13.2	0.9	63,807	2.6
Remote					
Remote centres	224,168	1.2	0.1	27,530	12.6
Other remote areas	345,549	1.8	–0.3	87,088	25.9
Total	**18,747,804**	**100.0**	**1.2**	**385,852**	**2.1**

(a) 1998 estimates of the Indigenous population by statistical local area (SLA) were not available.

Source: AIHW, derived from ABS SLA population estimates.

Risk factors

Personal health risk factors tend to be worse in remote areas than in metropolitan areas. For example, a higher proportion of males in remote areas self-report high alcohol consumption (8.0% compared with 4.4% in capital cities). Also, in remote areas a higher proportion of people smoke (approximately 10 percentage points higher for both sexes) and a lower proportion of men walk for exercise (AIHW 1998). Based on self-reported measures of height and weight, a higher proportion of women from remote areas are overweight.

Mortality and morbidity

Death rates show a graduated increase with increasing remoteness. Death rates vary according to age and sex grouping, but overall the rates for the Indigenous population are two to three times higher than those of the non-Indigenous population. The higher death rates in remote areas for the population overall can be largely explained by the high proportion of Indigenous peoples living in those areas (Table 4.14).

The death rate for Indigenous people in the remote zone was about 10% higher than for Indigenous people in the metropolitan zone. A major reason for this was the higher rates of death from respiratory disease and injury in the remote zone.

The death rates for non-Indigenous males and females in the remote zone were lower than in the metropolitan zone, even though rates of injury-related death were higher in the remote zone.

Indigenous males in the rural zone have a similar death rate to their metropolitan counterparts, and Indigenous females have a death rate 10% lower than their metropolitan counterparts (Table 4.14). Death rates for non-Indigenous people were similar or only slightly higher for the rural zone compared with the metropolitan zone.

Table 4.14: Mortality rates for the Indigenous and non-Indigenous populations by geographic zone, 1994–98 (per 100,000 population)

	Indigenous status	Death rate 1994–98			
		Metropolitan	Rural	Remote	Total
Males	Indigenous	1,763	1,721	1,916	1,825
	Non-Indigenous	773	*800	746	778
	Total males	**779**	***809**	***948**	**805**
Females	Indigenous	1,215	1,097	1,361	1,286
	Non-Indigenous	507	502	*454	505
	Total females	**511**	**509**	***649**	**524**

* Significantly different from the metropolitan zone at the 5% level.

Notes

1. Age standardised to the Australian population at 30 June 1991.
2. Based on data for South Australia, Western Australia and the Northern Territory.

Source: AIHW 1998a.

Recent data indicate that the health of those in remote areas is generally poorer in each of the National Health Priority Areas:

- Mortality from heart, stroke and vascular disease is marginally higher in remote areas than in metropolitan areas. Mortality from rheumatic heart disease is almost three times higher in remote areas, reflecting the high rate in the Indigenous population. The hospital admission rate for coronary heart disease is 1.4 times higher, and the admission rates for stroke are 1.4 times higher for males and 1.6 times higher for females in remote areas than in metropolitan areas (DHAC & AIHW 1999b).
- Whereas rural and metropolitan death rates from diabetes are similar, death rates in remote areas are approximately twice as high, reflecting the high rate in Indigenous people. Hospital admission rates for rural residents are a little higher, and admission

rates for remote residents are more than 2.5 times higher than those for their metropolitan counterparts (DHAC & AIHW 1999a).

- Cancer mortality is similar in metropolitan, rural and remote areas. People living in the remote zone show higher cervical cancer and slightly lower melanoma incidence and death rates (AIHW 1998).
- Death rates and hospital admissions due to injury are moderately higher in rural areas, but two to three times higher in remote areas compared with capital cities (AIHW 1998a). In remote areas, approximately 30% of these extra injury deaths are attributable to motor vehicle accidents, 20% to suicide and 10% to interpersonal violence.
- There are few comparative data available on mental health; however, higher suicide rates, particularly in young men from rural and remote areas, may indicate higher levels of depression (DHAC & AIHW 1999c). In 'other remote areas', the male suicide rate is one-and-a-half times the capital cities rate, and the suicide rate of males aged 15–24 years is almost twice that of their capital city counterparts.
- Asthma death rates are up to twice as high in more remote areas compared with metropolitan centres (AIHW 1998).

Children and youth

Death rates for children aged less than 15 years are higher with increasing remoteness. Half of all deaths in this age group are due to injury, with smaller proportions due to cancer and asthma. In the remote zone, where the death rate is almost double that for metropolitan children, over 60% of these extra deaths were due to injury, and of these half were as a result of motor vehicle accidents and a third were due to drowning (with boys having higher rates than girls for all these causes). Death rates for all children from the rural zone fall between the rates for metropolitan and remote zones (AIHW: Moon et al. 1998).

Death rates for Indigenous children in the metropolitan and remote zones were approximately double those for non-Indigenous children in those zones. Indigenous children from the remote zone had death rates double that of metropolitan and rural zone Indigenous children.

Hospital admission rates for girls and boys were higher in the remote zone (172 and 227 per 1,000 population respectively) than in the rural zone (113 and 156 per 1,000 population respectively) and in the metropolitan zone (113 and 156 per 1,000 population respectively).

Death rates for young adults (those aged 15–24 years) increase with increasing remoteness. The death rate for young adult males in 'other remote areas' was twice that for their capital city counterparts. Death from motor vehicle accidents was three times more likely for young adults in remote areas compared with those living in capital cities. Young males from remote areas are almost twice as likely to commit suicide compared with young males from capital cities. Injury death rates for young adults fell substantially in the last decade in all three zones, with rates for motor vehicle accident deaths decreasing by about 40%. However, rates for suicide death increased by about 16% in the last decade.

Death rates for young Indigenous adults (15–24 years) are double the rate for all young Australian adults in this age group across all three zones. The death rate for young Indigenous males in the remote zone was twice that of their metropolitan zone Indigenous counterparts, but for young Indigenous females there was no significant difference between death rates in each zone. Almost 70% of these Indigenous deaths were due to injury as for all young adults.

Hospital admission rates for young adults increase with increasing remoteness. Females were admitted at twice the rate of males (though this difference was greater in more remote areas). In 'other remote areas' the hospital admission rate for males and females respectively were one-and-a-half times and two-and-a-half times the admission rate of their capital city counterparts. Of the leading causes for male admission, only injury showed a clear and strong trend for significantly higher rates (three times higher) in 'other remote areas' compared with capital cities. Females in 'other remote areas' were admitted for pregnancy-related reasons at a rate 2.5 times higher and for injury at a rate 4 times higher than their capital city counterparts.

Oral health

Major differences in oral health exist between the metropolitan, rural and remote areas. Variations in tooth loss indicate differing historical treatment patterns between urban, rural and remote locations.

Table 4.15: Complete tooth loss among adults aged 18 years and over, 1994–96 (per cent)

Age group	Metropolitan	Rural	Remote	Australia
18–24 years	0.1	0.2	0.0	0.1
25–44 years	1.4	2.1	*2.2	1.8
45–64 years	11.7	21.5	*14.8	14.2
65+ years	36.6	50.0	43.2	40.3
Total	**9.3**	**16.2**	**9.4**	**10.9**

* Estimate has a relative standard error greater than 25%.

Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

Complete tooth loss increases with increasing age (Table 4.15). In total, less than 2% of adults aged less than 45 years had lost all their natural teeth, but this increased to more than one in five rural adults in the 45–64 age group. Adults aged 65 years and over from rural areas had a higher rate of complete tooth loss than adults from remote or metropolitan areas.

See page 285 for information on the use of dental services by persons in urban, rural and remote areas.

Health workforce

The number of healthcare professionals in an area is an important factor in influencing both health status and access to care. The availability of healthcare professionals across the geographic areas is described in section 5.4 (page 260)

Expenditure and access

There are 65% more public hospital beds available per person in the rural zone compared with capital cities. The per person amount spent on hospitalisation (as measured by average cost weight and ignoring length of stay) is similar for residents of metropolitan and rural zones (AIHW 1998). Hospital admission rates are 20–40% higher for remote zone residents (due to higher rates of medical admission) compared with residents of capital cities, but rates of admission for remote area residents requiring specialist medical practitioners and equipment are lower, being 70–90% of capital city rates (AIHW 1998).

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5

Health resources and use of services

The focus of this chapter is on:

- the resources or inputs (money, personnel, facilities) used in the delivery of health services; and
- use of these inputs to produce outputs (patients treated, health services delivered).

Resources provide the means by which health interventions are carried out, and these interventions produce outputs and outcomes which may contribute to health and wellbeing.

Clinical interventions can occur in a diverse range of settings such as large health establishments (hospitals), other health establishments (nursing homes, hospices, rehabilitation centres), community centres, small health clinics, ambulatory care services, the private rooms of health professionals, and the patient's home or workplace. Increasingly, telemedicine services and the Internet are being used to communicate information about health services. At the personal level, individuals may also choose to use information from reference material to self-manage minor medical conditions.

Public, occupational and environmental health interventions may be delivered in several ways: through information in the media; regulation; improved water, sewerage, and transport infrastructure; and infectious disease identification and containment programs.

5.1 Health services funding and expenditure

The health expenditure statistics examined here relate largely to expenditure on health services provided to people who are ill and services provided within the health sector aimed at health promotion and illness prevention. They do not include expenditures that have a 'health' outcome but which are undertaken outside the health sector, such as expenditure on building safer transport systems.

Box 5.1: Health services expenditure to GDP ratio

From November 1998, the Australian Bureau of Statistics (ABS) upgraded gross domestic product (GDP) measures in line with the recommendations of the revised international standard for the System of National Accounts 1993 (SNA93). This increased the estimate of GDP by an average of 3.0%. In 1997–98, the GDP was revised upwards by $16.9 billion, of which $15.9 billion was due to the SNA93 recommendations. These changes have resulted in a reduction of about 0.3% in the health services expenditure to GDP ratios for all years.

For further details see the 1998 ABS publication Upgraded Australian National Accounts, *ABS Cat. No. 5253.0.*

Health services expenditure is looked at in terms of total health expenditure, expenditures on the different components of the health care system, and the sources of funding for health services. Some factors contributing to changes in health services expenditure are examined and a comparison is made of health services expenditure by the State and Territory Governments. Australia's expenditure on health services is also compared with that of other Organisation for Economic Co-operation and Development (OECD) member countries.

Funding health services in Australia

In 1997–98, total health services expenditure, including expenditure by both the government and the non-government sectors, was $47,030 million. Health services expenditure as a proportion of gross domestic product (GDP) almost doubled over the last four decades of the twentieth century, from 4.3% in 1960–61 to 8.3% in 1997–98 (Table 5.1, page 234). The preliminary estimate for 1998–99 is $50,335 million. Most of this increase was in the 'pre-Medibank' period, from 1960–61 to 1974–75, and the first year of Medibank, and was largely due to reclassification of expenditure by States as they moved towards cost-sharing of hospitals with the Commonwealth. Since the introduction of Medibank in 1975, health expenditure as a proportion of GDP has increased from 6.3% to 8.3%.

More than two-thirds of the funding for health expenditure in 1997–98 was provided by governments (68.6%). Of this, the Commonwealth Government provided 45.2% and State and local governments 23.4%. The non-government sector provided the remaining 31.4% of the total funding (Table 5.2, page 235).

The way health services are funded, particularly by the Commonwealth and the non-government sector, was quite different in 1997–98 from what had prevailed in 1960–61. Despite similarities in the overall proportions of expenditure—the Commonwealth Government was responsible for 39.2% of total expenditure in 1960–61 and 45.2% in 1997–98—there were major differences in the way that funding was provided. In 1960–61, tax expenditures accounted for 30.0% of Commonwealth Government expenditure on health services. In 1997–98, tax expenditures made up only 1.6% of Commonwealth health services expenditure. Similarly, tax expenditures by the Commonwealth greatly reduced the net expenditure by non-government sources in 1960–61, but this was not the case in 1997–98.

Between 1960–61 and 1997–98, real expenditure by the Commonwealth Government grew at an average of 6.4% per year (Table 5.3, page 236). At the same time, State and local government real expenditure grew at an average of 4.7% per year, and the non-government sector at 4.0% per year. The rapid rate of growth in the Commonwealth's expenditure was largely due to the influence of Medibank in permanently changing the distribution of responsibility for the funding of hospital and medical services.

The relative share of responsibility for funding healthcare services in Australia over the last quarter of the twentieth century was very largely influenced by the introduction of Medibank and its modifications (1975 to 1984) and Medicare (from 1984).

With the introduction of Medibank in 1975, the Commonwealth took over responsibility for funding half the operating costs of the States' public hospitals and assumed most of the responsibility for funding medical services. This increased the Commonwealth's

Table 5.1: Total health expenditure and GDP (current prices), 1960–61 to 1997–98

Year	Total health expenditure ($ million)	GDP ($ million)	Total health expenditure as percentage of GDP
1960–61	692	15,946	4.3
1963–64	870	19,546	4.5
1966–67	1,139	24,941	4.6
1969–70	1,627	33,547	4.8
1974–75	4,233	67,138	6.3
1975–76	5,684	79,313	7.2
1976–77	6,557	91,276	7.2
1977–78	7,408	99,395	7.5
1978–79	8,166	112,815	7.2
1979–80	9,000	128,287	7.0
1980–81	10,130	145,665	7.0
1981–82	11,681	166,475	7.0
1982–83	13,026	179,649	7.3
1983–84	14,802	202,571	7.3
1984–85	16,371	224,857	7.3
1985–86	18,394	247,681	7.4
1986–87	20,881	271,672	7.7
1987–88	23,053	309,942	7.4
1988–89	25,795	350,753	7.4
1989–90	28,800	383,494	7.5
1990–91	31,270	396,236	7.9
1991–92	33,087	406,890	8.1
1992–93	34,993	427,772	8.2
1993–94	36,787	450,050	8.2
1994–95	38,967	474,646	8.2
1995–96	41,783	508,246	8.2
1996–97	44,482	533,709	8.3
1997–98	47,030	565,963	8.3

Sources: AIHW Health Expenditure Database; ABS *Australian National Accounts—National Income, Expenditure and Product, June quarter*, various years (Cat. No. 5206.0).

share of total expenditure from 40.6% in 1974–75 to 49.0% in the next year. At the same time, the State and local governments' share, which had risen rapidly in the period immediately preceding Medibank, fell from 33.6% to 25.2%. The non-government sources' share of expenditure was essentially unchanged. This was due mainly to a large reduction in Commonwealth health-related tax expenditures associated with the introduction of Medibank.

The various changes to Medibank between 1975–76 and 1981–82 brought about substantial changes in the relative shares of expenditure of the different funding sources. Between 1975–76 and 1977–78, the Commonwealth's share fell from 49.0% to 36.2%—this reduction impacted largely on the non-government sector as a source of funding, which increased from 25.8% to 38.3%. State and local governments' share of funding increased only marginally, from 25.2% to 25.5%.

Table 5.2: Government and non-government sector expenditure as a proportion of total health services expenditure, 1960–61 to 1997–98 (current prices) (per cent)

	Government sector				
Year	Commonwealth[(a)]	State and local	Total	Non-government sector[(a)]	All sectors total
1960–61	39.2	23.3	62.5	37.5	100.0
1963–64	40.6	22.1	62.7	37.3	100.0
1966–67	41.7	22.5	64.3	35.7	100.0
1969–70	41.3	28.6	69.9	30.1	100.0
1974–75	40.6	33.6	74.3	25.7	100.0
1975–76	49.0	25.2	74.2	25.8	100.0
1976–77	42.2	25.1	67.3	32.7	100.0
1977–78	36.2	25.5	61.7	38.3	100.0
1978–79	35.6	26.7	62.3	37.7	100.0
1979–80	34.9	26.6	61.5	38.5	100.0
1980–81	35.6	27.1	62.7	37.3	100.0
1981–82	38.9	27.3	66.1	33.9	100.0
1982–83	37.7	27.1	64.8	35.2	100.0
1983–84	38.0	26.4	64.4	35.6	100.0
1984–85	45.8	25.8	71.6	28.4	100.0
1985–86	45.5	25.9	71.4	28.6	100.0
1986–87	44.1	26.3	70.4	29.6	100.0
1987–88	43.8	25.9	69.7	30.3	100.0
1988–89	42.5	25.7	68.2	31.8	100.0
1989–90	42.2	26.1	68.3	31.7	100.0
1990–91	42.2	25.5	67.7	32.3	100.0
1991–92	42.8	24.6	67.4	32.6	100.0
1992–93	43.7	23.4	67.1	32.9	100.0
1993–94	45.3	21.4	66.7	33.3	100.0
1994–95	45.0	21.7	66.7	33.3	100.0
1995–96	45.6	22.2	67.7	32.3	100.0
1996–97	44.6	22.4	66.9	33.1	100.0
1997–98	45.2	23.4	68.6	31.4	100.0

(a) Proportions for Commonwealth Government and non-government sector expenditure are calculated after adjusting for tax expenditure (see Box 5.3, page 237).

Sources: 1960–61, 1963–64 and 1966–67: Senate Select Committee on Medical and Hospital Costs 1970; 1974–75: WD Scott & Co. Pty Ltd 1978; 1975–76 to 1997–98: AIHW Health Expenditure Database.

The next significant event affecting the relativities between the different sectors was the introduction of Medicare in February 1984. Medicare raised the Commonwealth's share of expenditure from 38.0% in 1983–84 to 45.8% in 1984–85. This was almost completely offset by the fall in the share met by the non-government sector, which dropped from 35.6% to 28.4%. Once again there was only a marginal impact on the share of expenditure met by State and local governments, which fell slightly, from 26.4% to 25.8%.

Box 5.2: Constant price estimates

In previous editions of Australia's Health, *the Australian Institute of Health and Welfare included estimates of expenditure at 'constant (average 1989–90) prices'. These were, in the main, calculated using implicit price deflators (IPDs) that were, in turn, based on fixed-weighted indexes (1989–90 base). The ABS has now ceased calculating constant price expenditure estimates based on such fixed-weighted indexes and has moved to annually reweighted chain volume measures. In the tables that follow, wherever 'constant price' estimates are shown they are intended to reflect changes in volume expressed in terms of current prices in the reference year – 1997–98 in this publication. These estimates are calculated using IPDs that are derived from the new series of annually reweighted chain volume indexes produced by ABS.*

These new IPDs are considered to be superior to those used previously in that they lessen the effect of compositional change.

A full discussion of chain volume measures can be found in the 1997 ABS publication Chain Volume Measures in the Australian National Accounts, *ABS Cat. No. 5248.0.*

Table 5.3: Total health services expenditure, constant prices[(a)], and annual growth rates, by source of funds, 1960–61 to 1997–98

	Government sector				Non-government sector[(b)]		All sectors total	
	Commonwealth[(b)]		State and local					
Year	Amount ($m)	Rate of growth (%)	Amount ($m)	Rate of growth (%)	Amount ($m)	Rate of growth (%)	Amount ($m)	Rate of growth (%)
1960–61	2,024	. .	1,952	. .	3,337	. .	7,313	. .
1963–64	2,466	6.8	2,127	3.1	3,902	5.4	8,505	5.2
1966–67	2,928	5.9	2,459	4.8	4,623	5.8	10,010	5.6
1969–70	3,482	6.0	3,482	14.1	5,078	3.2	12,275	7.0
1974–75	5,445	9.4	6,015	10.1	7,247	7.4	18,707	8.6
1975–76	9,943	82.6	5,214	–13.3	6,266	–13.5	21,423	14.5
1983–84	10,017	0.1	6,683	3.3	9,890	6.0	26,681	2.8
1984–85	12,406	3.8	6,690	0.1	8,334	–6.5	27,429	2.8
1988–89	14,020	3.1	8,269	5.4	10,829	6.8	33,118	4.8
1992–93	16,608	4.3	8,867	1.8	12,829	4.3	38,304	3.7
1997–98	21,411	5.2	10,990	7.8	14,628	2.7	47,030	4.9
Average annual growth rates								
1960–61 to 1974–75		7.3		8.4		5.7		6.9
1975–76 to 1997–98		3.5		3.4		3.9		3.6
1984–95 to 1988–89		4.3		3.9		4.4		4.2
1960–61 to 1997–98		6.4		4.7		4.0		5.0

(a) See Box 5.2 for explanation of constant price estimating method.

(b) Commonwealth Government and non-government sector expenditure adjusted for tax expenditure (see Box 5.3).

Source: AIHW Health Expenditure Database.

Box 5.3: Health-related tax expenditures

Tax expenditures refer to financial benefits that individuals and businesses derive from taxation concessions of various kinds. These concessions are usually delivered by tax exemptions, tax deductions, tax rebates or reduced tax rates. Tax expenditures lower the tax burden by either reducing or delaying the collection of taxation revenue, and the benefits provided by them could equally be delivered in the form of direct expenditures. Tax expenditures are, therefore, regarded as an expenditure by the Commonwealth Government and are offset against the non-government sector's total funding of health services. Because health-related tax expenditures can relate to the whole range of areas of expenditure, it is not possible to adjust Commonwealth Government and non-government expenditure on individual areas for tax expenditures.

In the area of health services expenditure the main tax expenditures have been:

Before 1975–76 *Taxation deduction on medical expenses (including any part refunded by private health insurance funds): 1960–61, $80m; 1963–64, $100m; 1966–67, $139m; 1969–70, $206m; 1974–75, $452m.*

1975–76 to 1980–81 *Taxation rebate on medical expenses (not including any part refunded through private health insurance): 1975–76, $87m; 1976–77, $46m; 1977–78, $7m; 1978–79, $11m; 1979–80, $13m; 1980–81, $17m.*

1981–82 to 1982–83 *Taxation rebate on medical expenses (not including any part refunded through private health insurance) plus rebate on contributions to private health insurance: 1981–82, $477m; 1982–83, $591m.*

1983–84 to 1997–98 *Taxation rebates on medical expenses: 1983–84, $21m; 1984–85, $27m; 1985–86, $28m; 1986–87, $34m; 1987–88, $37m; 1988–89, $44m; 1989–90, $61m; 1990–91, $85m; 1991–92, $82m; 1992–93, $91m; 1993–94, $95m; 1994–95, $91m; 1995–96, $141m; 1996–97, $137m; 1997–98, $350m.*

Under Medicare, the Commonwealth and each of the States and Territories entered into health services financing agreements. This led to the Commonwealth's share of hospital funding increasing and the States' share decreasing. However, the States' share of all health funding decreased only marginally.

During the first set of Medicare agreements, 1984–85 to 1987–88, the Commonwealth's share of health funding fell consistently each year (from 45.8% to 43.8%) while the proportion met by State and local governments generally remained at just under 26.0%. The share of funding borne by non-government sources increased from 28.4% to 30.3% to make up for the fall in the Commonwealth's share of funding.

The introduction of Medicare also led to a major increase in Commonwealth funding for private medical services provided out of hospitals.

Health services expenditure 1960–61 to 1997–98

Between 1960–61 and 1997–98, real expenditure on health services more than doubled. Measured in 1997–98 prices, health services expenditure grew from $7,313 million in 1960–61 to $47,030 million in 1997–98 (Table 5.3). This represented a real average annual increase of 5.0%. The population grew by 75.4%, at an average of 1.5% per year over the period. Consequently, real per person health services expenditure increased at an average rate of 3.6% per year (Table 5.5, page 241). This reflected the combined effects of change in the intensity of use of health service resources by individuals and the quality of the services provided.

Health services expenditure as a proportion of GDP increased from 4.3% in 1960–61 to 7.2% in 1975–76. Except for one year (1986–87) it fluctuated between 7.0% and 7.5% until 1989–90. In 1990–91 it increased to 7.9% and then to 8.1% in 1991–92. From 1992–93 to 1997–98 it remained reasonably steady at between 8.2% and 8.3% (Table 5.1, page 234).

The increases that occurred in the health services expenditure to GDP ratio in 1990–91 and 1991–92 were largely due to the recession in this period. Although growth in health services expenditure was not significantly higher during that time, real GDP declined between 1989–90 and 1990–91 and increased marginally (0.3%) between 1990–91 and 1991–92. As a consequence, the health services expenditure to GDP ratio increased over those two years.

Between 1984–85, the first year of the first Medicare agreement, and 1988–89, the first year of the second agreement, the Commonwealth's share of funding for institutional health care fell from 46.0% to 40.9% (Table 5.4). This was partly taken up by the States and Territories, whose share rose from 33.5% to 36.8% and partly by the non-government sector, whose share increased from 20.5% to 22.4%.

Table 5.4: Shares of total recurrent expenditure on institutional health services, current prices, 1960–61 to 1997–98 (per cent)

	Government				
Year	Commonwealth	State and local	Total	Non-government sector	Total
1960–61	26.6	46.0	72.6	27.4	100.0
1963–64	28.0	43.4	71.4	28.6	100.0
1966–67	24.9	42.6	67.4	32.6	100.0
1969–70	26.3	45.5	71.8	28.2	100.0
1974–75	21.8	51.4	73.2	26.8	100.0
1975–76	42.3	36.3	78.7	21.3	100.0
1983–84	38.7	35.5	74.2	25.8	100.0
1984–85	46.0	33.5	79.5	20.5	100.0
1988–89	40.9	36.8	77.6	22.4	100.0
1992–93	41.9	33.4	75.3	24.7	100.0
1997–98	43.2	32.9	76.0	24.0	100.0

Sources: 1960–61, 1963–64 and 1966–67: Senate Select Committee on Medical and Hospital Costs 1970; 1974–75: WD Scott & Co. Pty Ltd 1978; 1969–70 and 1975–76 to 1997–98: AIHW Health Expenditure Database.

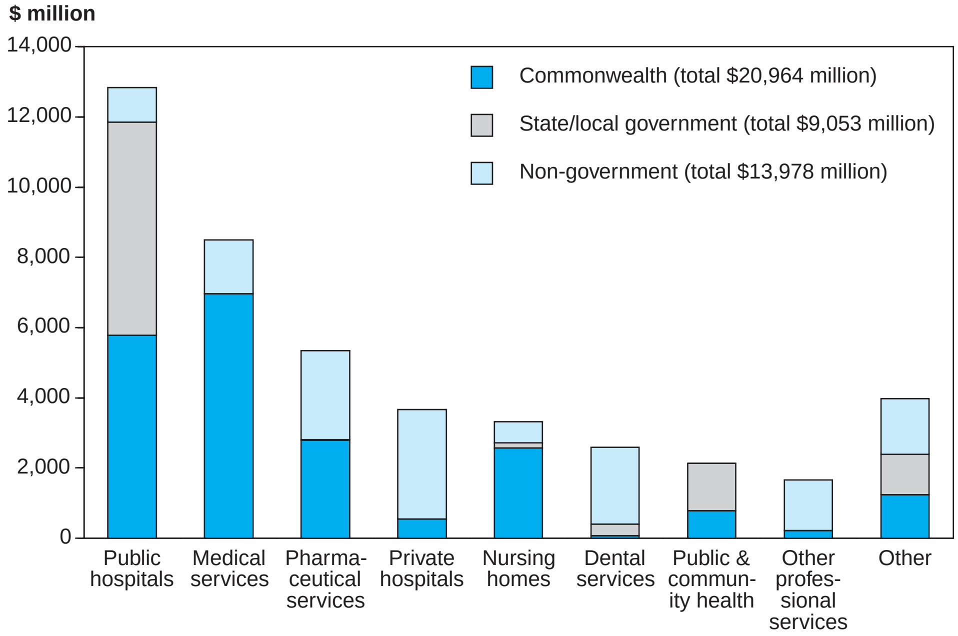
Expenditure during the period of the second Medicare agreement was influenced by the 1990–91 recession. State and local governments' expenditure on health services contracted, resulting in a fall in their share from 25.7% in 1988–89 to 23.4% in 1992–93 (Table 5.2, page 235). As a consequence, the shares of both the Commonwealth and non-government sources of funding increased during this period.

Over the period of the third Medicare agreement, the Commonwealth Government's share of funding again increased, from 43.7% in 1992–93 to 45.2% in 1997–98 (Table 5.2, page 235). The proportion met by State and local governments was the same in both years at 23.4%, while the non-government sector's share of funding fell from 32.9% to 31.4%.

Recurrent expenditure by area of health expenditure

Recurrent expenditure on health services in 1997–98 (the latest year for which detailed data are available) was $43,994 million. This represents 93.5% of the total expenditure on health services in that year ($47,030 million). Expenditure on hospitals was $16,900 million, made up of $12,852 million on public hospitals (recognised public hospitals and repatriation hospitals), $3,658 million on private hospitals, and $390 million on public psychiatric hospitals (Table S41, page 404).

In 1997–98, expenditure on nursing home care totalled $3,320 million (7.5% of recurrent health services expenditure), medical services $8,503 million (19.3%), pharmaceuticals $5,335 million (12.1%) and dental services $2,591 million (5.9%). A further $1,653 million (3.8%) was spent on other health professional services, such as physiotherapy, chiropractic and podiatry.



Source: AIHW Health Expenditure Database.

Figure 5.1: Proportional split of recurrent health expenditure by area of expenditure and source of funds (current prices), 1997–98

The significance of each of the major sources of funding for health services varies according to the type of service (Figure 5.1, page 239). The Commonwealth Government provides most of the funds for nursing homes and medical services. Public hospitals and community and public health services are funded jointly by the Commonwealth and State Governments, while funding for pharmaceuticals is shared between the Commonwealth and the non-government sector. Private hospitals are mostly funded from the non-government sector, with a small contribution by the Commonwealth Government in the form of payments made by the Department of Veterans' Affairs for eligible veterans and their dependants using private hospitals.

Between 1960–61 and 1975–76, the proportion of recurrent expenditure devoted to hospital services increased from 37.9% to 46.1% (Table S40, page 403). From 1975–76 the proportion steadily declined to 37.5% in 1995–96. By 1997–98, hospitals accounted for 38.4% of total recurrent health expenditure. Much of the decline since 1975–76 was concentrated in the public hospitals. Expenditure on recognised public hospitals fell from 34.8% of recurrent expenditure in 1975–76 to 29.2% in 1997–98. Expenditure on repatriation hospitals, which accounted for 1.8% in 1975–76, had all but ceased in 1997–98, following the disposal by the Department of Veterans' Affairs of most of its repatriation hospitals.

Although expenditure on private hospitals continued to grow for much of the period, its rate of growth was greater under Medicare than it had been under Medibank. No data are available to allow a comparison with the earlier years. Expenditure on private hospitals in 1975–76 represented 4.5% of recurrent expenditure and this had increased to 5.6% in 1984–85. By 1997–98 it accounted for 8.3% of recurrent health expenditure.

There were increases in the proportions of most types of services in the non-institutional area. Expenditure on medical services rose from 15.4% of recurrent expenditure in 1960–61 to 18.2% in 1975–76. By 1992–93, it was 19.6% of recurrent expenditure and remained at about that level until 1997–98. Expenditure on dental services in 1960–61 is not available. Between 1974–75 and 1992–93 it increased from 4.3% to 5.9% and remained at that general level until 1997–98. In 1975–76, other professional health services accounted for 1.8% of recurrent health expenditure. This had risen to 4.0% by 1988–89 and remained at between 3.4% and 3.9% thereafter.

Expenditure on pharmaceuticals decreased between 1960–61 and 1984–85, and since 1984–85 has grown each year. It was 12.1% of recurrent expenditure in 1997–98.

The changes in proportions of recurrent expenditure are due to the different growth rates for particular areas of expenditure over the period. Recognised public hospitals, repatriation hospitals and public psychiatric hospitals all experienced low or negative average growth between 1975–76 and 1997–98 (3.1%, –13.0% and –3.9%, respectively). Expenditure on private hospitals, medical services and pharmaceuticals, on the other hand, had relatively high rates of growth over the period (6.8%, 4.3% and 4.3%, respectively) (Table S42, page 405).

Health services expenditure per person

In 1997–98, the average rate of per person expenditure was $2,523 (Table 5.5). The average annual real rate of growth in per person health expenditure from 1960–61 to 1997–98 was 3.6%.

Table 5.5: **Health services expenditure per person, current and constant prices[(a)], and annual growth rates, 1960–61 to 1997–98**

	Amount ($)		Average annual growth (%)	
Year	**Current**	**Constant**	**Current**	**Constant**
1960–61	65	688	. .	. .
1963–64	77	754	5.8	3.1
1966–67	95	838	7.3	3.6
1969–70	129	970	10.5	5.0
1974–75	306	1,354	19.0	6.9
1975–76	407	1,534	32.9	13.3
1983–84	956	1,723	11.3	1.5
1984–85	1,044	1,749	9.2	1.5
1988–89	1,546	1,914	10.3	2.3
1992–93	1,990	2,102	6.5	2.4
1997–98	2,523	2,523	4.9	3.7
Average annual growth rates				
1960–61 to 1974–75				5.0
1975–76 to 1997–98				2.3
1984–95 to 1988–89				2.3
1960–61 to 1997–98				3.6

(a) See Box 5.2 (page 236) for explanation of constant price estimating method.

Source: AIHW Health Expenditure Database.

Aboriginal and Torres Strait Islander health services expenditure

The first comprehensive analysis of expenditure on health services for Aboriginal and Torres Strait Islander peoples was released in July 1998 (DHFS 1998), following a study conducted by the Australian Institute of Health and Welfare (AIHW) in conjunction with the National Centre for Epidemiology and Population Health. The main focus was on public sector expenditure in 1995–96, although preliminary estimates of total expenditure were also made. In the next phase, 1998–99 data will be analysed, with a report scheduled for release in November 2000.

Total recurrent health services expenditure for Aboriginal and Torres Strait Islander peoples for all services and from all sources of funds, government and private, in 1995–96 was estimated at $853 million (Table 5.6, page 242), or 2.2% of total Australian recurrent health expenditure. Total spending for and by Aboriginal and Torres Strait Islander peoples was $2,320 per person, about 8% higher than for non-Indigenous Australians.

Expenditure on health services for Aboriginal and Torres Strait Islander peoples in 1995–96 through government-subsidised programs was estimated at $822 million, mainly through State and local government programs.

On a per person basis, gross expenditure on Aboriginal and Torres Strait Islander peoples through government-subsidised programs was $2,235, 44% higher than the amount for non-Indigenous Australians. State and local government spending per head on Indigenous peoples was more than twice that for non-Indigenous Australians. On the other hand, total gross expenditure through Commonwealth-subsidised programs was significantly less per head for Indigenous peoples, mainly because the per person

Table 5.6: Gross expenditures[a] on health services for Indigenous and non-Indigenous people, by sector, 1995–96

Delivery	Total expenditure on Indigenous peoples ($m)	Per person expenditure on Indigenous peoples ($)	Per person expenditure on non-Indigenous people ($)	Indigenous: non-Indigenous[b]
Through State and local governments[c]	649	1,763	806	2.19:1
Through Commonwealth programs	173	472	748	0.63:1
Through Medicare and the PBS[d]	47	128	535	0.24:1
Through Aboriginal health organisations and other Commonwealth programs	126	344	213	1.62:1
Total through government-subsidised programs	*822*	*2,235*	*1,554*	*1.44:1*
Through private sector organisations	31	85	594	0.14:1
All sector total	**853**	**2,320**	**2,148**	**1.08:1**

(a) Gross expenditures include all private out-of-pocket payments and funding from non-government organisations. Services not covered are private hospitals, dentistry, optometry, private ancillary services (e.g. physiotherapy, chiropractic) and over-the-counter pharmaceuticals.

(b) Ratio of per person Indigenous expenditures to expenditures for non-Indigenous Australians.

(c) Includes Commonwealth Government transfers and expenditure funded by patient contributions.

(d) Pharmaceutical Benefits Scheme.

Source: DHFS 1998.

Medicare and Pharmaceutical Benefits Scheme (PBS) expenditures were one-quarter of expenditures through Medicare and PBS for non-Indigenous Australians. Government expenditure per person on health services for Aboriginal and Torres Strait Islander peoples appears to be similar to that for non-Indigenous Australians with similarly low incomes, but their need for services is greater due to the poorer health of Indigenous peoples.

For further information, see *Australia's Health 1998*, pages 38–40.

Health services expenditure by States and Territories

The largest single area of health services expenditure by State and Territory Governments is public hospitals. In 1997–98, State and Territory Governments spent $6,437 million or 58.6% of their total health expenditure in meeting the operating costs of public hospitals. In addition, a large proportion of the State and Territory Governments' $1,400 million capital expenditure and $538 million capital consumption related to public hospitals (Table S41, page 404).

There was a 7.0% increase in real terms in total health services expenditure per person by State and Territory Governments from $551 in 1996–97 to $590 in 1997–98. Tasmania and the Australian Capital Territory recorded declines in real expenditure of –19.7% and –8.3%, respectively, while New South Wales (1.2%), and the Northern Territory

Box 5.4: State and Territory expenditure data sources

Statistics of health services expenditure by State and Territory Governments are available from a variety of central agency sources, including the Australian Bureau of Statistics (ABS) public finance database, State and Territory health authorities' annual reports, State and Territory Budget papers, and the Commonwealth Grants Commission (CGC). In addition, the AIHW Health Expenditure Database substitutes data from its own Australian Hospital Statistics collection for expenditure on public acute hospitals and public psychiatric hospitals in Australia.

The different bodies involved in collecting State and Territory health expenditure data have adopted different practices for defining and measuring that expenditure and this has resulted in differences in statistics reported at the State level. There is also a lack of detail in the information collected. For example, the CGC database, one of the better databases on State health services expenditure for recent years, includes Commonwealth grants to States. Also, it reports only recurrent expenditure, excluding both capital expenditure and capital consumption (depreciation).

At the individual State level there are some marked annual differences between the ABS and CGC data. One way such differences occur is from the manner in which interstate payments are treated. The aim of the CGC is to give each State 'the capacity to provide the average standard of State-type public services, assuming it does so at an average level of operational efficiency and makes an average effort to raise revenue from its own sources' (CGC 1997:1). Its statistical collations are, therefore, geared to determining the level of expenditure required by States to provide for the needs of their populations. The needs of States' populations are assessed in terms of the expenditure involved in providing services to them, irrespective of whether or not those services are provided within the State concerned. The ABS, on the other hand, is responsible for recording expenditure incurred by each State and Territory within its own jurisdiction. For example, services provided in Victoria to a person who is a resident of New South Wales would be counted by the CGC as New South Wales expenditure and by the ABS as Victorian expenditure.

In addition, the CGC and the ABS treat revenues differently, with the CGC including only patient-related revenues.

State and Territory expenditure data used in this publication are derived from the AIHW Health Expenditure Database.

(0.8%) both had rates of growth that were below the national average. Western Australia had the highest rate of growth (18.6%), followed by Queensland (17.0%), Victoria (13.1%) and South Australia (12.3%) (Table 5.7, page 244).

In terms of the relative order of State and Territory Governments' real expenditure per person, Northern Territory was the by far the highest spender in both 1996–97 and 1997–98, with the Australian Capital Territory ranked second. The Victorian Government was consistently the lowest spending jurisdiction over the period, just below South Australia. Tasmania, which was the third highest spender in 1996–97, exchanged places with Queensland, which went from being the third lowest spender to the third highest in 1997–98.

Table 5.7: **State and Territory government acute hospital and total health services expenditure per person, 1996–97 to 1997–98, constant prices[(a)] ($ per person)**

State/Territory	1996–97	1997–98	Change 1996–97 to 1997–98 (%)
Acute hospital services			
NSW	350	390	11.6
Vic	294	310	5.6
Qld	265	269	1.4
WA	273	330	20.9
SA	206	256	24.3
Tas	201	150	–25.2
ACT	408	450	10.3
NT	301	296	–1.5
Australia	298	320	7.3
Total health services			
NSW	572	579	1.2
Vic	459	519	13.1
Qld	536	627	17.0
WA	554	658	18.6
SA	473	531	12.3
Tas	714	574	–19.7
ACT	742	681	–8.3
NT	1,219	1,229	0.8
Australia	551	590	7.0

(a) See Box 5.2 (page 236) for explanation of constant price estimating method.

Source: AIHW Health Expenditure Database.

Medicare levy

Almost all Commonwealth government funding for health services comes from general revenue sources. However, when Medicare was introduced in 1984 it replaced some existing Commonwealth government programs and expanded eligibility to others. Its introduction was also associated with the abolition of an existing tax rebate on contributions to basic health insurance. A levy of 1.0% of taxable earnings was introduced to help offset any additional costs to government of Medicare. In the first full year of operation of Medicare, 1984–85, the levy raised $1,223 million or 2.3% of total taxation revenue. The levy has been increased several times since 1984 and the basic rate is currently set at 1.5% of taxable income. Total revenue collected by the Commonwealth through the Medicare levy in 1998–99 was $4,100 million (Table 5.8).

Since October 1997, high-income earners who do not have private insurance cover for hospitals paid an additional surcharge of 1.0% of taxable income.

Table 5.8: Commonwealth government receipts from the Medicare levy and total taxation revenue, current prices, 1984–85 to 1998–99 ($ million)

Revenue type	1984–85	1991–92	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99
Medicare levy	1,223	2,385	2,415	2,870	3,030	3,350	3,664[(a)]	3,760	4,100
Total taxation revenue	53,208	87,970	89,435	94,024	105,687	116,386	125,815[(b)]	132,217	139,202
Medicare levy as a proportion of total taxation	2.3%	2.7%	2.7%	3.1%	2.9%	2.9%	2.9%	2.8%	2.9%

(a) Does not include an estimated $486 million in special surcharge levied for the purpose of buying back certain firearms from the public.

(b) Includes an estimated $486 million in special surcharge levied for the purpose of buying back certain firearms from the public.

Source: Commonwealth of Australia 1999.

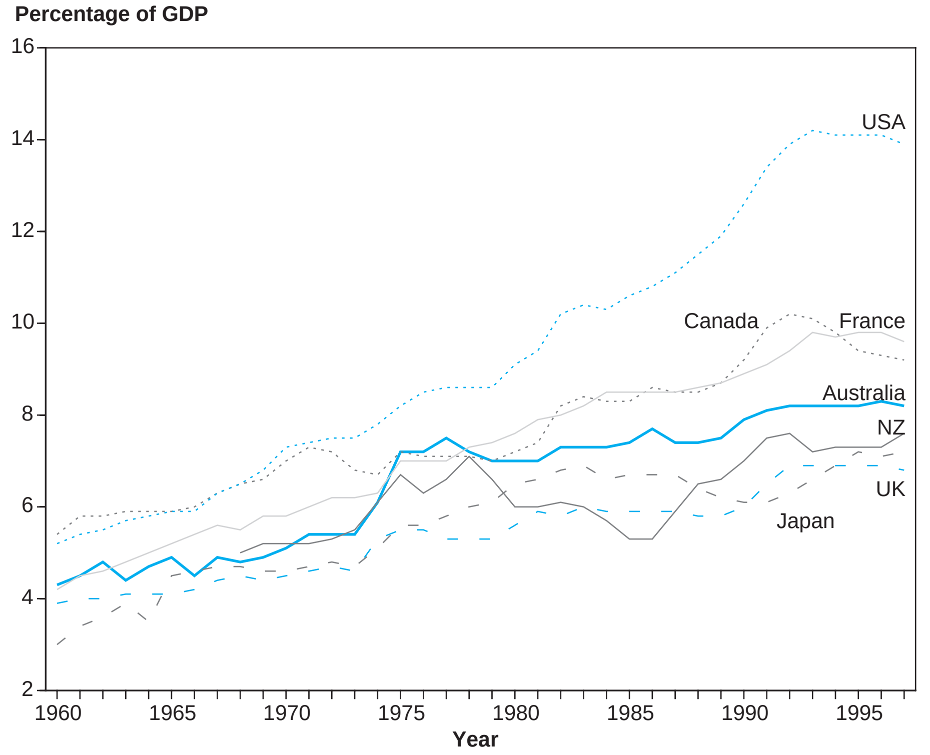
Health services expenditure internationally

This section compares Australia's health services expenditure with that of other members of the OECD. The countries included are Canada, France, Germany, Japan, New Zealand, the United Kingdom and the United States of America. The comparison, which looks at the period 1960 to 1997, provides an indication of the relative efforts being undertaken to meet the need for health services in countries with similar economic and social structures or with which Australia has important economic and social links. Differences between countries in terms of what is included as 'health services' complicate the comparison to some extent, and caution is therefore necessary when comparing the data presented here. Note that there is no definitive relationship between what a country spends on health services and the health status of its population.

Health services expenditures of different countries can be compared as a proportion of GDP. This measure gives an indication of the proportion of a nation's productive effort that is spent on funding its health services. However, fluctuations in the health-to-GDP ratio can be misleading because they may be as much indications of movements in GDP as of changes in health services expenditure. For this reason it is also important to look at what has happened in terms of per person expenditure on health.

In looking at both the health expenditure to GDP ratio and per person expenditure on health, it is useful to consider the weighted means for the group in order to see where Australia fits vis-a-vis the 'average of the group'. Because of the size of both its economy and population, the United States dominates the averages for the eight countries. For this reason, weighted means, including and excluding the United States, are used for comparisons.

Between 1960 and 1997, the United States generally spent the most on health services, measured as a proportion of GDP (Table S45, page 408, and Figure 5.2, page 246). Apart from the early 1960s when its health expenditure was second only to Canada, expenditure on health services by the United States was the highest in the group. It spent 5.4% of its GDP on health in 1961, increasing to 14.2% by 1993, but then dropped slightly to 13.9% in 1997. The United Kingdom, on the other hand, tended to have the lowest health-to-GDP ratio—4.0% in 1961 rising to 6.8% in 1997.



Source: AIHW from OECD data.

Figure 5.2: Health expenditure as a proportion of GDP, Australia and selected OECD member countries, 1960 to 1997

Australia was ranked fifth behind the United States, Canada, France and Germany for much of the period. Australia spent 4.3% of its GDP on health in 1961, which was below the average for the eight selected OECD nations and almost the same as France (4.5%). It was around the average when the influence of the United States was removed. Australia's health-to-GDP ratio was below the average for the whole group throughout the period 1961 to 1997.

Health spending for the group increased substantially. The average for the eight countries, weighted according to GDP, rose from 4.9% in 1961 to 11.0% in 1997. This was greatly influenced by the United States, which grew from 5.4% to 13.9%. Even without the influence of the United States, the weighted average still almost doubled from 4.3% to 8.4%.

Expenditure on health per person is another way of comparing health expenditure of countries. This method removes the complicating effect of GDP, which is inherent in comparisons that are based on health expenditure to GDP ratios. It is calculated allowing for different purchasing power per dollar in different countries.

The rankings of most countries, in terms of per person health expenditure, were similar to those based on expenditure as a share of GDP. The United States was again the highest spending country. Its per person health spending in 1997 was 72% higher than the next highest spending country, Japan, and more than double that of Australia (Table 5.9). In 1997, Australia had the fifth highest per person expenditure on health services.

Table 5.9: Total health services expenditure per person, Australia and other selected OECD member countries, current prices, 1960 to 1997[(a)] (A$)

Year(a)	Australia	Canada	France	Germany(b)	Japan	NZ	UK	USA
1960	66	109	50	80	12	65	48	132
1965	96	143	94	111	37	n.a.	67	188
1970	148	248	145	198	79	106	88	316
1975	407	394	343	362	192	220	174	460
1980	684	684	819	725	520	376	473	956
1985	1,157	1,605	1,144	1,776	1,074	515	675	2,571
1986	1,294	1,789	1,675	1,928	1,646	699	871	2,874
1987	1,406	1,901	1,933	1,946	1,896	926	1,017	2,949
1988	1,546	1,975	1,879	1,902	1,956	1,084	1,091	2,926
1989	1,700	2,214	1,891	1,900	1,858	1,063	1,087	3,202
1990	1,820	2,410	2,388	2,050	1,868	1,149	1,310	3,580
1991	1,902	2,633	2,448	2,049	2,138	1,172	1,446	3,886
1992	1,990	2,756	2,942	2,487	2,575	1,202	1,702	4,453
1993	2,071	2,830	3,128	2,702	3,324	1,337	1,634	5,115
1994	2,169	2,508	3,054	2,703	3,541	1,444	1,662	4,981
1995	2,296	2,468	3,483	2,939	3,965	1,624	1,772	5,096
1996	2,403	2,365	3,293	2,928	3,339	1,645	1,738	5,025
1997	2,502	2,471	3,085	3,191	3,209	1,771	2,000	5,527

(a) Australian data relate to the year ending 30 June; data for France and Germany relate to the calender year indicated; data for New Zealand before 1990 relate to the year commencing 1 April in the year indicated, and data for 1990 onwards refer to the year ending 30 June; data for Canada, Japan and the United Kingdom relate to the year commencing 1 April in the year indicated; United States data relate to the year ending 30 September.

(b) Data up to and including 1990 relate to West Germany only; data for 1991 onwards refer to the unified Germany.

Note: Expenditures converted to Australian dollar (A$) values using GDP purchasing power parities.

Sources: AIHW Health Expenditure Database; OECD unpublished data.

Factors contributing to the growth in health services expenditure are inflation (both general inflation and excess health inflation), and change in the level of services used, either from population growth or from more intensive per person use of services. The general rate of inflation is an indication of price pressures that apply throughout the economy, and the rate of excess health inflation indicates additional price rises specific to the health services sector. The ability of a nation's health financing system to control health prices is an important factor in controlling growth in total expenditure on health services.

Even in countries with fairly similar approaches to health services provision, rates of health inflation can vary markedly. At one end is New Zealand with a very high excess health inflation rate—averaging 3.6% between 1968 and 1996. At the other extreme is France, which had a negative excess health inflation rate of –0.5% (Table S46, page 408). Australia had an excess health inflation rate of 0.5%, the third lowest for the group.

In order to compare the level of expenditure without the complication of different rates of population growth, it is useful to examine real growth in per person health services expenditure. Australia and the United Kingdom (0.9%) had the second lowest average real growth in per person expenditure between 1960 and 1997. Japan experienced the highest growth of 5.3% per year, and New Zealand's per person health expenditure fell dramatically—a drop of 4.2% in real terms.

5.2 Cost of diseases

This section describes the way total direct healthcare expenditure is distributed among specific disease and injury groups, and by age groups and sex. The AIHW has analysed direct health system costs of disease and injury in Australia for 1993–94, using disease and injury groups defined according to the International Classification of Diseases, 9th Revision (see Box 5.7, page 274). The estimates were derived using a methodology that ensures that they add across disease, age and sex groups to the total Australian health system expenditure by health sector for 1993–94. They provide a description of the utilisation and costs of health services in Australia, as well as a reference source for planners and researchers interested in the costs and utilisation patterns for a particular disease group.

The disease cost estimates allocate over 90% of the total recurrent health expenditure in 1993–94, or just over $31 billion in total. The main components of health expenditure not yet included in the disease cost estimates are capital expenditure, community health services (apart from specialised mental health services) and public health programs (apart from four cancer public health programs). The estimates have been revised since their inclusion in *Australia's Health 1998*.

The six disease groups that account for the most health expenditure in Australia, in descending order, are:

• cardiovascular diseases	$3.7 billion (11.8% of total health system costs)
• digestive system diseases	$3.7 billion (11.8%)
• mental disorders	$3.0 billion (9.6%)
• musculoskeletal problems	$3.0 billion (9.6%)
• injury and poisoning	$2.6 billion (8.3%)
• respiratory diseases	$2.5 billion (8.0%).

Digestive system diseases are the second most expensive group in part because of the large expenditure on dental services ($1.8 billion).

The AIHW has published detailed estimates of costs for specific diseases and injuries within four of the six national health priority areas: cardiovascular diseases, cancer, injury and diabetes (AIHW: Mathers et al. 1998, 1999a, 1999b).

Health system costs for mental disorders in 1993–94 are shown in Table 5.10. Including specialised community mental health services, drug and alcohol residential centres and public health expenditure under the National Campaign Against Drug Abuse, the total health system costs of mental disorders are estimated at $3.0 billion or 9.6% of total health expenditure.

Table 5.10: Mental health: health system costs by health sector, 1993–94 ($ million)

	Hospital[(a)]	Medical[(b)]	Pharma-ceuticals	Other health services[(c)]	Other[(d)]	All sectors	Per cent of total
Dementia	110	11	2	9	582	714	23.6
Substance abuse disorders	136	46	12	18	136	348	11.5
Schizophrenia	275	26	8	106	40	454	15.0
Other non-drug psychoses	63	5	1	6	53	128	4.2
Affective disorders	217	141	68	70	148	644	21.3
Anxiety disorders	24	102	51	25	37	239	7.9
Personality disorders	24	7	1	12	9	53	1.8
Stress and adjustment disorders	28	27	7	31	19	112	3.7
Mental retardation	16	1	0	3	5	26	0.9
Disorders of psychological development	2	2	0	3	10	16	0.5
Eating disorders	14	3	0	1	4	22	0.7
Disorders of childhood and adolescence	10	9	1	19	16	55	1.8
Behavioural syndromes and other mental disorders	17	53	45	9	50	174	5.8
Unspecified mental disorders, prevention and screening	5	6	2	23	1	37	1.2
Total	**941**	**438**	**199**	**334**	**1,110**	**3,022**	**100.0**

(a) Public and private acute hospitals, repatriation hospitals and psychiatric hospitals. Excludes public hospital non-admitted services.

(b) Medical services for private patients in hospitals are included under Hospitals.

(c) Includes hospital non-inpatient services, specialised community mental health services, residential and non-residential treatment services run by non-government organisations, and allied health services.

(d) Includes National Drug Strategy funding for prevention, research expenditure and other institutional, non-institutional and administration expenditure. Does not include expenditure for other public health services, non-specialised community health services, ambulances, or medical aids and appliances.

Source: AIHW analysis of health expenditure data.

Asthma is the most recent addition to the list of national health priority areas. Provisional analysis of health system costs for asthma in 1993–94 indicate that it cost $478 million, of which $199 million was for pharmaceuticals.

Table 5.11: Diseases and injuries in NHPAs(a) and musculoskeletal disorders: health system costs(b) by health sector, 1993–94 ($ million)

	Hospital(c)	Medical(d)	Pharma-ceuticals	Other	All sectors
Ischaemic heart disease	574	88	105	127	894
Hypertension(e)	55	217	476	84	831
Accidental falls	501	112	32	166	810
Dementia	119	11	2	582	714
Back problems	239	133	62	266	700
Diabetes mellitus(f)	201	98	136	247	681
Affective disorders	287	141	68	148	644
Stroke	283	31	13	303	630
Osteoarthritis	301	80	58	185	624
Disorders of muscles, tendons and soft tissue	165	127	60	167	519
Asthma	94	102	199	82	478
Schizophrenia	381	26	8	40	454
Heart failure	157	47	45	162	411
Adverse effects of medical treatment(g)	300	38	23	43	403
Road traffic accidents	232	56	16	68	372
Substance abuse disorders	154	46	12	136	348
Chronic obstructive pulmonary disease(h)	112	61	66	61	300
Skin cancers	141	112	5	41	298
Anxiety disorders	49	102	51	37	239
Cardiac dysrhythmias(i)	114	36	31	43	224
Peripheral arterial disease	134	17	9	49	209
Colorectal cancer	171	11	3	19	205
High serum cholesterol	6	42	135	16	199
Breast cancer	80	11	16	77	184
Neck problems	54	25	18	62	160
Lung cancer	81	7	3	17	107
Prostate cancer	66	14	8	13	101
All causes	**14,062**	**5,640**	**4,042**	**7,653**	**31,397**

(a) The six National Health Priority Areas are cardiovascular disease, cancer, mental health, injury, diabetes mellitus and asthma.

(b) Diseases and injuries with health system costs of less than $150 million not included in this table.

(c) Public and private acute hospitals, repatriation hospitals and psychiatric hospitals. Includes public hospital non-admitted services. For mental health services, also includes specialised community mental health services and drug and alcohol residential treatment services.

(d) Medical services for private patients in hospitals are included under Hospitals.

(e) Hypertension comprises high blood pressure and hypertensive heart and renal disease.

(f) Includes health system costs of cardiovascular disease and complications due to diabetes.

(g) Part of the injury priority area; includes surgical and medical misadventure, and adverse effects of drugs in therapeutic use.

(h) Chronic bronchitis and emphysema.

(i) Inflammatory heart disease comprises cardiomyopathy, myocarditis, endocarditis, pericarditis and other diseases of the pericardium and endocardium.

Source: AIHW unpublished analysis of disease costs.

Table 5.11 ranks the health system costs of diseases and injuries in the six National Health Priority Areas, together with musculoskeletal disorders. Other diseases have not been included in this table. Ischaemic heart disease and hypertension are the leading causes of health system expenditure, together accounting for 5.5% of total health expenditure. Following these are accidental falls, dementia and back problems, then diabetes, affective disorders and stroke. The majority of health system costs for dementia are for nursing home patients. Osteoarthritis costs the Australian health system almost as much as stroke.

Total health system costs for females are 32% higher than those for males: $17.9 billion compared with $13.5 billion. Costs are higher for females than males for all disease groups apart from injury and congenital anomalies. Total health system costs per person in 1993–94 ranged from a minimum of around $800 for boys aged 5–14 years to $7,500 for women aged 75 years and over. The male–female difference in per person costs is greatest in the peak reproductive years, where average annual costs for women aged 25–34 years were $1,716, almost double the average cost of $888 for men of the same age.

It should be emphasised that this analysis does not attempt to estimate the total economic impact of diseases in the Australian community and that, as well as the health system costs described here, there are substantial costs relating to absenteeism, lost productivity, the burden on carers and family, and lost quality and quantity of life.

5.3 Private health insurance

Funding of health services by health insurance funds

The introduction of the Private Health Insurance Incentives Scheme (PHIIS) and its replacement by the 30% rebate on premiums substantially altered the role of the health insurance funds in the funding of health services after 1996–97. Total recurrent health expenditure in 1997–98 was $43,994 million. Of this, $4,685 million was directed through private health insurance funds. However, the Commonwealth Government subsidised $459 million of that expenditure through the PHIIS.

The PHIIS was paid in two ways—either as a direct subsidy (in which case the private health insurance fund would charge the contributor a reduced premium and claim the subsidy from the Commonwealth) or as a rebate through the taxation system (in which case the contributor would be charged the full premium and would be reimbursed when he or she lodged a taxation return). A total of $252 million was paid through the direct subsidy during 1997–98 and $207 million was claimed through the taxation system.

As a result of the PHIIS, the amount paid from non-government sources through the health insurance funds was $4,434 million. The $207 million claimed through the taxation system meant that the net, unsubsidised amount paid by health insurance funds was $4,226 million. This represented 9.6% of recurrent health expenditure in 1997–98. By 1998–99, total expenditure through private health insurers had increased to $4,840 million. The net expenditure by the funds (after deduction of Commonwealth subsidies) was $3,785 million (Table 5.12, page 253).

Box 5.5: Private health insurance arrangements

Since the introduction of Medicare in 1984, health insurance funds operated by Registered Health Benefits Organisations[1] *have offered benefits to members for approved services provided in both public and private hospitals. They have also operated ancillary tables which provide benefits for a wide range of non-hospital health and health-related services.*

There are four categories of health insurance membership – singles, couples without children, sole parents, and couples with children – providing a wide range of benefits cover. These include 'exclusionary tables' under which funds are able to tailor the range of benefits provided to meet particular needs of different groups of contributors. They can, for example, offer tables that exclude benefits for obstetrics or hip replacements. The contribution rates for such tables reflect the particular exclusion(s) and are lower than similar tables that do not contain such exclusion(s). 'Front-end deductible' tables are also available, which allow contributors to meet a set proportion of the charge for hospital care from their own pockets.

Changes to health insurance arrangements will be introduced from 1 July 2000, to encourage people to take out and retain private health insurance cover. From that date, people who join a health insurance fund early in life and maintain their hospital cover will pay lower premiums throughout their life compared with someone who joins later in life.

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1. A Registered Health Benefits Organisation is an organisation registered under the *National Health Act 1953* for the purpose of conducting a health benefits fund.

Expenditure on hospitals, both public and private, during 1997–98 was $16,510 million. Of this, $2,485 million was funded by the health insurance organisations. During 1998–99, the health insurance funds paid $2,200 million for hospital services from their own resources.

The hospital expenditure funded through health insurance was largely concentrated in private hospitals. In 1998–99, the benefits paid in respect of private hospital care ($2,524 million) represented 89.7% of all hospital-related benefits paid through health insurance funds. Similarly, 84.1% of total hospital bed-days for which hospital benefits were paid during 1998–99 were in respect of care in private hospitals.

Administration of health insurance funds accounted for $591 million in 1998–99. This represented 14 cents for each dollar of benefit paid from the funds and accounted for 12% of contributions income receivable by the funds in that year.

Trends in private health insurance coverage, membership and premiums

The proportion of the population with private health insurance at the end of March 2000 was 32.7%, an increase on the 30.5% coverage at 30 June 1999. This was the same level as at 30 June 1998. However, between the time of the introduction of Medicare (February 1984) and 31 December 1998 the trend in private health insurance coverage had been generally downwards. In June 1984 just over half of the total population (50.2%) were covered by some level of private health insurance. At 31 December 1998 this had fallen to 30.1% (Figure 5.3, page 254).

Table 5.12: Expenditure through the private health insurance funds, by area of expenditure and income, by type of income, current prices, 1996–97 to 1998–99 ($ million)

	1996–97	1997–98			1998–99				
		PHIIS subsidy[(a)]			PHIIS subsidy[(a)]		Subsidy on premiums[(b)]		
	Own funds	Tax	Direct	Own funds	Tax	Direct	Tax	Direct	Own funds
Expenditure									
Institutional	*2,890*	*126*	*153*	*2,586*	*125*	*79*	*41*	*396*	*2,295*
Public hospitals[(c)]	360	14	17	297	12	8	4	39	226
Private hospitals	2,437	107	130	2,188	107	68	35	340	1,974
Ambulance[(d)]	93	5	6	101	5	3	2	17	95
Non-institutional[(e)]	*1,279*	*58*	*70*	*1,154*	*56*	*35*	*18*	*177*	*1,028*
Medical	229	12	14	206	11	7	4	34	198
Dental	596	26	32	542	26	16	8	81	472
Other professional	225	10	12	204	10	6	3	32	184
Home nursing	1	—	—	1	—	—	—	—	1
Pharmaceuticals	44	2	2	32	2	1	1	5	28
Aids and appliances	184	8	10	169	8	5	3	25	146
Total benefits	*4,169*	*183*	*223*	*3,740*	*181*	*114*	*59*	*572*	*3,323*
Administration	530	24	29	487	25	16	8	80	463
Total benefits plus administration	**4,699**	**207**	**252**	**4,226**	**206**	**130**	**67**	**652**	**3,785**
Revenue									
Contributions receivable	4,404	207	252	4,254	206	130	67	652	3,872
Non-contributions income	240	n.a.	n.a.	140	n.a.	n.a.	n.a.	n.a.	149
Total income, all sources	**4,644**	**207**	**252**	**4,394**	**206**	**130**	**67**	**652**	**4,021**

(a) Commonwealth direct outlays and taxation expenditure on Private Health Insurance Subsidy Scheme is allocated by area of expenditure.

(b) Commonwealth direct outlays and taxation expenditure on the 30% rebate on premiums is allocated by area of expenditure.

(c) Public hospitals include both recognised public hospitals and repatriation hospitals.

(d) Ambulance includes levies imposed by some State and Territory Governments in respect of ambulance transport.

(e) Non-institutional excludes administration.

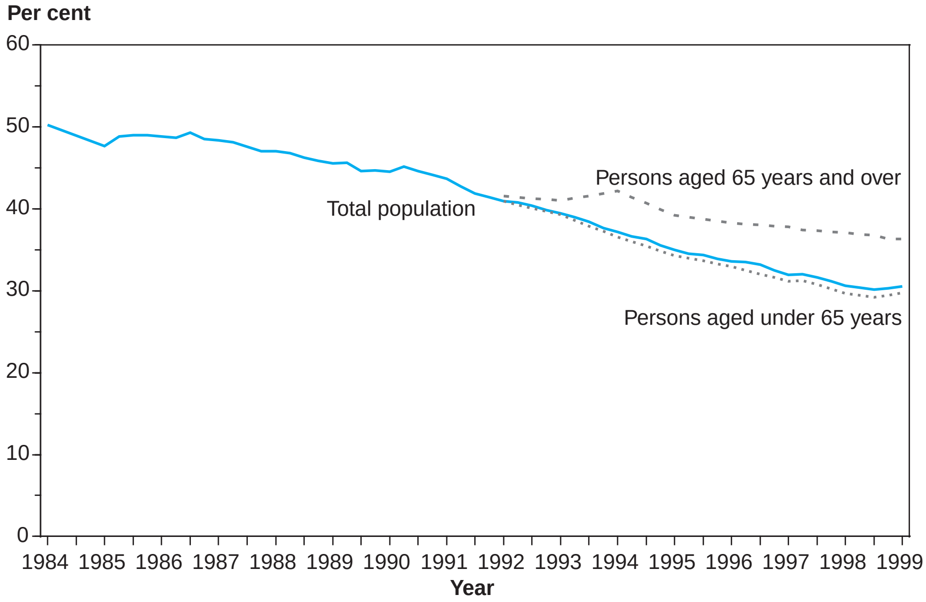
Source: PHIAC unpublished data.

A number of incentives were introduced to help arrest the decline in membership and coverage. These included:

- Introduction of ‘front-end deductible’ (FED) tables in the late 1980s. These enabled funds to offer tables that provided cover for that part of hospital charges that exceeded a given amount (excess) in a year. Between 1995–96 and 1998–99, coverage by FEDs grew by 0.8 million and coverage by non-FED tables fell by 1 million (Figure 5.4, page 255).
- Introduction of ‘exclusionary’ and ‘non-exclusionary’ tables in 1995. Exclusionary tables did not provide benefits for some types of treatment (e.g. obstetrics) and were

aimed at enabling funds to tailor their benefits cover and premiums to meet particular groups of low-drawing members.

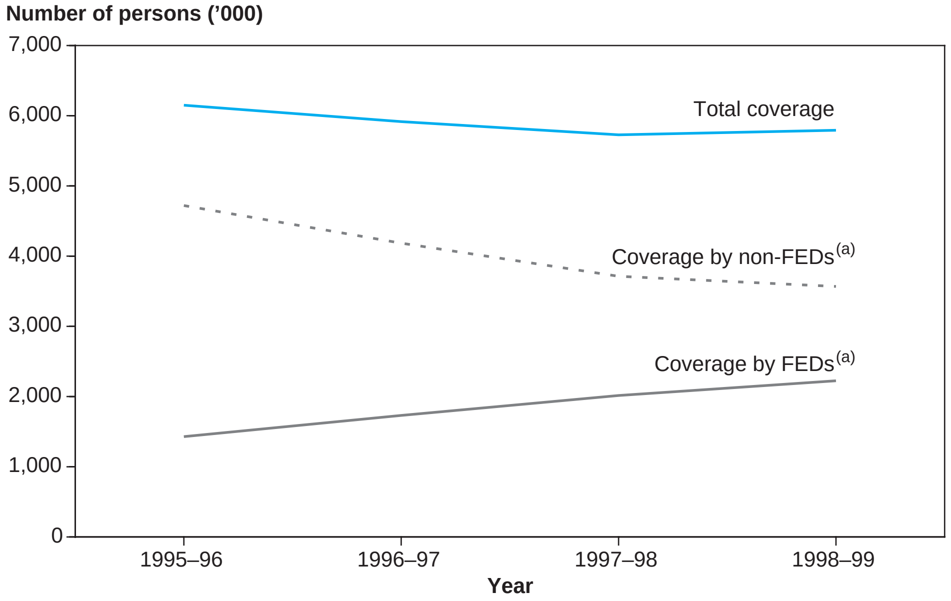
- Increasing the number of membership categories from 2 (single and family) to 4 (single, family, single parent and couples) in 1997. This was to enable funds to further differentiate their premiums.
- Introduction of the PHIIS in 1997.
- Replacement of the PHIIS with a 30% rebate on private health insurance premiums in 1999.



Sources: PHIAC 1999 and unpublished data.

Figure 5.3: Proportion of population covered by basic health insurance, 1984 to 1999

Despite these incentives, coverage by health insurance continued to decline until December 1998. At the same time, expenditure by the funds in the form of benefits, levies and administration continued to increase and the proportion of total health expenditure that was met by health insurance funds from their own resources remained relatively stable at between 10.6% and 11.5%. The introduction of the PHIIS and the rebate on private health insurance premiums have both had an effect in slowing the decline in coverage. After reaching 30.1% in December 1998, coverage increased in each quarter of 1999 to reach 31.2% at the end of December 1999.



(a) Front-end deductable tables.

Source: PHIAC annual reports, various years.

Figure 5.4: Hospital insurance coverage by type of cover, 1995–96 to 1998–99

Growth in contributions income

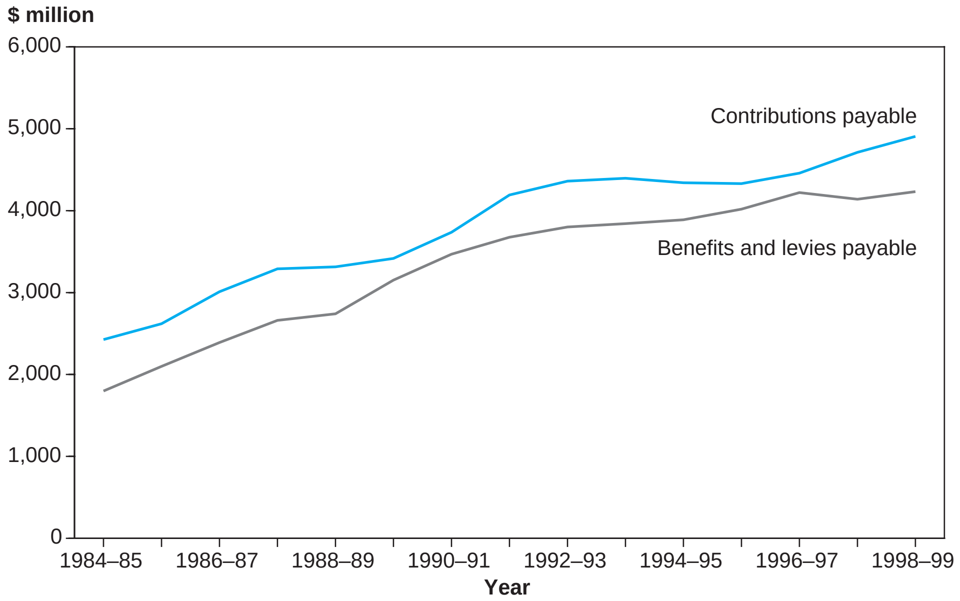
Despite their falling coverage, health insurance funds have maintained their capacity to generate income through premiums.

Between 1984–85 and 1998–99 real growth in contributions income averaged 5.2% per year. Between 1989–90 and 1998–99 the rate of growth averaged 4.1% and since 1995–96 it has averaged 4.3% (Figure 5.5, page 256).

Growth in the total amount of benefits and levies payable by health insurance funds was higher than that for contributions income between 1984–85 and 1998–99, averaging 7.4%. However, since 1995–96 the rate of growth in benefits and levies payable has been much lower (1.7%) than that of contributions income.

Ancillary benefits tables

In addition to their hospital tables, health insurance funds offer tables providing ancillary benefits in respect of services such as dental, optical, therapeutic and other (generally non-accommodation) non-medical services.



Source: PHIAC annual reports, various years.

Figure 5.5: Health insurance funds contributions income, benefits and levies payable at constant (1997–98) prices, 1984–85 to 1998–99

About 6,049,000 persons (31.9% of the total resident population) had some form of ancillary cover at 30 June 1999 (Table 5.13). Of these, 4,423,000 were covered for both hospital and ancillary cover with the same organisation. A further 1,626,000 either had ancillary cover only or had ancillary cover with one organisation and hospital insurance with another organisation.

Changes in the characteristics of the insured

The structure of the insured population changed substantially between 1983 and 1998. The proportion of contributor units with hospital insurance cover more than halved over the period, from 62.1% to 30.3%.

In all age groups below 60 years, the level of coverage by hospital insurance fell markedly. Excluding the age groups 60 years and over, coverage ranged from 54.6% to 75.6% in 1983 and from 16.3% to 41.9% in 1998 (Table 5.14). The largest falls were in the youngest age groups. In the case of contributor units headed by persons aged 60 years and over, the fall-off in coverage was less dramatic. Coverage for contributor units headed by persons aged 60–69 years fell from 45.3% to 39.6%, while those headed by persons aged 70 years and over remained relatively constant at around 36%.

Table 5.13: Membership and persons covered by ancillary tables, by type of membership, States and Territories, 30 June 1999 ('000)

Membership type	NSW[a]	Vic	Qld	WA	SA	Tas	NT	Australia
Combined with hospital insurance[b]								
Single	353	183	135	111	86	29	6	904
Family	232	118	105	85	54	19	6	618
Single parent	10	5	4	4	2	1	(d)	26
Couples	173	81	91	77	47	15	4	488
Total members	768	387	335	277	189	64	17	2,036
Persons covered	1,653	834	745	617	399	136	39	4,423
Without hospital insurance cover[c]								
Single	127	32	39	106	35	8	1	349
Family	96	34	24	48	28	4	1	236
Single parent	6	3	2	12	2	(d)	(d)	26
Couples	50	12	12	38	16	2	(d)	131
Total members	280	80	76	204	82	15	3	741
Persons covered	635	202	163	400	189	31	6	1,626
All ancillaries								
Single	480	215	174	217	121	37	7	1,253
Family	328	152	129	133	82	23	7	854
Single parent	16	8	6	16	4	1	(d)	52
Couples	223	93	103	115	63	17	4	619
Total members	1,048	467	411	481	271	79	20	2,777
Persons covered	2,288	1,036	908	1,017	588	167	45	6,049

(a) New South Wales includes the Australian Capital Territory.

(b) Members and persons covered where both hospital insurance and ancillary cover are provided with the same fund.

(c) Members and persons covered by ancillary tables only (may include members who have hospital insurance cover with a fund other than the fund providing ancillary cover).

(d) Less than 500.

Source: PHIAC 1999.

Table 5.14: Private health insurance, proportion of contributor units[a] with hospital insurance cover by age group, 1983 to 1998

Age group of head of contributor unit (years)	1983	1986	1988	1990	1992	1995	1998
15–24	54.6	29.3	30.0	29.5	29.3	20.8	16.3
25–34	70.4	46.5	43.0	40.1	35.8	27.2	22.1
35–49	75.6	55.5	53.8	52.7	46.7	40.3	32.0
50–59	71.4	56.4	56.5	55.6	52.2	48.4	41.9
60–69	45.3	42.0	43.4	45.1	45.5	42.9	39.6
70 and over	36.0	31.5	34.9	36.8	36.4	39.0	36.4
All ages	**62.1**	**44.2**	**43.6**	**43.1**	**40.5**	**35.1**	**30.3**

(a) A contributor unit includes all persons within a family unit or a single person unit that would be coverable by a health insurance policy. For example, a 'couple with dependants' contributor unit includes the parents and all dependent children and is counted as one contributor unit.

Sources: AIHW analysis of ABS Private Health Insurance Survey data.

5.4 Health workforce

The health industry

The health industry is highly labour intensive. In 1997–98, total health services expenditure in Australia was $47.03 billion. Based on the 1994–95 input–output tables of the Australian national accounts constructed by the Australian Bureau of Statistics (ABS), an estimated 65% of this expenditure can be attributed to the labour costs of wages and salaries and employer contributions to workers' compensation and superannuation (ABS 1999b).

In 1998 there were 610,000 persons employed in the health industry, 7.1% of the total civilian workforce in Australia. Of these, 378,000 or 62.0% were employed in hospitals and nursing homes.

In the health industry workforce, 38.1% of persons worked part-time, i.e. less than 35 hours per week. Although 76.6% of persons employed were female, this proportion was higher in hospitals and nursing homes in which 79.3% were female.

Between 1993 and 1998, the health industry workforce increased by 9.7%, compared with an 11.9% increase in the civilian workforce and a 6.1% increase in the population. In both, growth in part-time employment was much stronger than growth in full-time employment. In the health industry, male part-time employment growth of 13.6% was similar to full-time growth of 13.4%, but female part-time employment increased by 14.0%, much faster than the full-time increase of 4.4% (Table 5.15).

Table 5.15: Composition of the health industry and civilian population workforces, 1993 and 1998

	Full-time		Part-time		Total			Per cent	
	Males	Females	Males	Females	Males	Females	Persons	Part-time	Female
Hospitals and nursing homes									
1993	64,583	170,346	7,354	124,475	71,937	294,821	366,758	35.9	80.4
1998	69,755	167,249	8,445	132,599	78,200	299,848	378,048	37.3	79.3
Increase	8.0%	–1.8%	14.8%	6.5%	8.7%	1.7%	3.1%		
Other health industry									
1993	47,322	70,282	6,838	65,121	54,160	135,403	189,563	38.0	71.4
1998	57,107	83,892	7,683	83,620	64,790	167,512	232,302	39.3	72.1
Increase	20.7%	19.4%	12.4%	28.4%	19.6%	23.7%	22.5%		
Total health industry									
1993	111,905	240,628	14,192	189,595	126,097	430,223	556,320	36.6	77.3
1998	126,862	251,141	16,127	216,218	142,989	467,359	610,348	38.1	76.6
Increase	13.4%	4.4%	13.6%	14.0%	13.4%	8.6%	9.7%		
Total civilian workforce ('000s)									
1993	3,958	1,889	438	1,359	4,396	3,248	7,644	23.5	42.5
1998	4,256	2,094	587	1,618	4,843	3,712	8,555	25.8	43.4
Increase	7.5%	10.9%	34.0%	19.1%	10.2%	14.3%	11.9%		

Note: Quarterly survey statistics have been averaged for 1993 and 1998 to minimise volatility in estimates due to sampling.

Source: ABS Labour Force Survey.

International health workforce trends

The OECD maintains a time series of selected health statistics for OECD countries. The data need to be interpreted with care because of inconsistencies in the definitions used among countries for enumerating doctors, dentists, pharmacists and nurses, and because of differences in the health systems.

Nevertheless, Australia appears to be similar in a number of respects to other countries in some key workforce trends. The medical workforce has increased at a much faster rate than population growth and the proportion of doctors who are female has increased from around 11% in 1960 to nearly 30% now (Table 5.16, page 260).

In nursing, Australia and New Zealand with almost 10 nurses per 1,000 population in 1996 appear to have a relatively high level of nurse employment compared with Canada (7.6), the United States (8.1) and the United Kingdom (4.5). In Australia, nurse workforce numbers per 1,000 population have been declining during the 1990s because of relatively stable total nurse employment numbers. According to the ABS labour force survey, there were 197,700 employed nurses in 1998 compared with 197,100 in 1989. Part-time employment increased from 39.2% to 44.0% during the period, so that the numbers of full-time equivalent nurses fell by 1.6%, and numbers of full-time equivalent nurses per 1,000 population fell by 11.8%. In Canada, there has been a similar, but more pronounced, pattern. Employed nurses per 1,000 population climbed from 5.3 in 1966 to 11.0 in 1986, and stayed at this level until 1992 after which there was a sharp decline to 7.6 in 1997, the most recent year of data.

Growth in the dentist and pharmacist workforces per 1,000 population has been much slower than in medicine. Supply requirements for dentists are influenced by changes in work practices, productivity and labour force participation on the one hand and changes in patient demand on the other. Influences on demand include population growth, oral health status, cost and propensity to visit a dentist for preventive health reasons. Largely as a result of public health measures (such as water fluoridation and childhood screening) and rising education and real income levels, there has been a considerable improvement in the oral health of the population since the 1960s. This has led to a change in both the nature and number of dental consultations, which have increased in annual number per capita in Australia from 1.1 in 1979 to 1.5 in 1995. A similar trend occurred overseas. In the United States dental consultations per capita have increased from 1.6 in 1962 to 2.1 in 1989 and in the United Kingdom from 0.3 in 1960 to 0.7 in 1990 (OECD 1999).

In pharmacy, there have been significant workforce productivity gains in Australia through pre-packaging drugs and economies of scale achieved through restructuring the community pharmacy industry to increase the average number of pharmacists per pharmacy. The number of approved pharmacies fell from 5,606 in 1990 to 4,942 in 1999. The number of community pharmacists increased by 13.3% from 8,713 to 9,870 between 1991 and 1996, with pharmacist registrations rising a further 4.9% between 1996 and 1998. In 1996, pharmacist numbers of 0.6 per 1,000 population in Australia were the same as in New Zealand, Canada and the United Kingdom, and only just below the 0.7 per 1,000 population in the United States.

Table 5.16: Provision of doctors, dentists, pharmacists and nurses in selected countries, selected years

	Medical practitioners			Dentists		Pharmacists		Nurses	
	No.	No. per 1,000 popn	Per cent female	No.	No. per 1,000 popn	No.	No. per 1,000 popn	No.	No. per 1,000 popn
Australia									
1961	10,881	1.1	11.0	3,315	0.3	8,351	0.8	63,821	5.9
1981	27,127	1.8	18.9	5,586	0.4	10,189	0.7	106,565	7.1
1996	45,416	2.5	27.4	7,601	0.4	12,310	0.6	174,770	9.5
New Zealand									
1960	2,573	1.1	7.7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1980	4,881	1.6	16.4	1,145	0.4	2,277	0.7	19,195	6.1
1996	7,634	2.2	29.4	1,364	0.4	2,401	0.6	36,303	9.8
Canada									
1961	21,290	1.2	n.a.	5,708	0.3	n.a.	n.a.	n.a.	n.a.
1981	45,542	1.8	17.1	11,484	0.5	13,034	0.5	235,606	9.7
1996	63,209	2.1	28.4	15,869	0.5	17,808	0.6	227,830	7.6
United States									
1960	259,400	1.4	6.0	90,120	0.5	101,000	0.6	527,000	2.9
1980	453,165	2.0	10.8	126,240	0.6	142,400	0.6	1,272,900	5.6
1996	701,249	2.6	21.2	166,100	0.6	185,000	0.7	2,161,700	8.1
United Kingdom									
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1980	72,198	1.3	19.5	17,604	0.3	n.a.	n.a.	197,900	3.5
1996	98,800	1.7	n.a.	22,200	0.4	34,418	0.6	264,744	4.5

Source: OECD 1999.

Distribution of the medical practitioner, dental and nursing workforces

Medical practitioners

In 1998, there were substantial differences in the supply of doctors among the States and Territories and between metropolitan, rural and remote areas. Both Western Australia and Queensland, with 236 medical practitioners per 100,000 population, were below the national average of 260, whereas South Australia (293) and the Australian Capital Territory (310 per 100,000 population) were well above this average. Supply in metropolitan areas of 306 practitioners per 100,000 population was much higher than the 144 practitioners per 100,000 population in rural and remote areas. In the latter, there were also large differences—267 per 100,000 population in large rural centres compared with 154 in small rural centres, 91 in other rural areas and 105 in remote areas.

Reducing this imbalance has been a high priority of government and the medical profession. Longer term strategies have included increasing the numbers of medical students of rural origins and from the Aboriginal and Torres Strait Islander populations.

Table 5.17: Distribution of Medicare general practice providers, 1984–85 and 1998–99

Locality	1984–85	1998–99	Per cent change 1984–85 to 1998–99
Head count numbers			
Capital city	12,135	16,512	36.1
Other metropolitan	1,024	1,709	66.9
Large rural centre	852	1,375	61.4
Small rural centre	948	1,374	44.9
Other rural	1,695	2,426	43.1
Remote centre	137	295	115.3
Other remote area	157	485	208.9
Total	**16,948**	**24,176**	**42.6**
Full-time workload equivalents[(a)]			
Capital city	7,050	11,428	62.1
Other metropolitan	809	1,277	57.8
Large rural centre	596	939	57.6
Small rural centre	653	918	40.6
Other rural	1,116	1,458	30.6
Remote centre	87	115	32.2
Other remote area	98	133	35.7
Total	**10,410**	**16,268**	**56.3**
Population per full-time workload equivalent			
Capital city	1,407	1,045	–25.7
Other metropolitan	1,353	1,115	–17.6
Large rural centre	1,517	1,190	–21.6
Small rural centre	1,491	1,328	–10.9
Other rural	1,906	1,690	–11.3
Remote centre	2,318	1,952	–15.8
Other remote area	3,421	2,674	–21.8
Total	**1,494**	**1,153**	**–22.9**

(a) The full-time workload equivalent (FWE) is defined by the Department of Health and Aged Care (DHAC) on the basis of income from fees charged for Medicare services rendered. The FWE for each doctor is calculated by dividing this income by the mean billing of doctors considered to be working full-time. The mean billing of full-time doctors was $183,332 in 1998–99.

Source: AIHW analysis of DHAC data.

Because undergraduate and postgraduate medical training takes 10 years or more, little change will be seen in the characteristics of the workforce due to these strategies for some years.

The medical colleges have greatly expanded rural outreach programs, including telemedicine, to improve access to medical services by rural populations, and State Governments have increased the numbers of temporary resident overseas-trained doctors entering Australia from 667 in 1992–93 to 2,224 in 1998–99. There are also many incentive schemes to attract doctors to rural areas and to reduce the level of attrition of doctors from rural areas.

There has been considerable improvement in the provision of general practitioners (GPs) since the commencement of Medicare in 1984–85 (Table 5.17). Large rural centres now have, on average, a similar supply of GPs per 100,000 population as non-capital city metropolitan areas. Between 1984–85 and 1998–99, the GP workforce per 100,000 population for other rural and remote areas increased by about one-third, although some areas are less well-off than others.

Dental workforce

The national dental workforce in clinical practice consists of dentists and dental auxiliaries (dental therapists, dental prosthetists and dental hygienists). There are major geographic differences in the distribution of both dentists and dental auxiliaries in Australia.

In 1994, there were 43.0 dentists per 100,000 population in Australia, with the Australian Capital Territory and South Australia having the highest rates (57.5 and 49.7 respectively) and Tasmania the lowest (25.2). Capital cities had 51.2 dentists per 100,000 population and the rest of Australia 28.7 per 100,000 population.

The number of practising clinical dental auxiliaries per 100,000 population varies according to the type of auxiliary and the State and Territory of practice. Dental therapists who worked in School Dental Services were the most numerous in 1997, there being 7.1 per 100,000 population, which is equivalent to a full-time rate of 5.8. Western Australia (17.8), Tasmania (14.6) and Queensland (12.3) had the highest numbers of dental therapists per 100,000 population, and New South Wales (3.6) and Victoria (2.7) had the lowest.

Dental prosthetists predominantly work in their own practices making removable dentures. In 1998 there were 4.2 per 100,000 population in Australia. Tasmania had the highest number with 11.2 per 100,000 population, and South Australia had the lowest with 1.7 per 100,000 population.

There were only 1.5 dental hygienists per 100,000 population in 1997. The Australian Capital Territory (7.7) and South Australia (6.6) had the highest numbers per 100,000 population.

In contrast, in the early 1990s the United States had 60.8 dentists and 39.5 hygienists per 100,000 population, Canada 52.4 dentists and 22.8 hygienists per 100,000 population, and the Netherlands 52.8 dentists and 6.7 hygienists per 100,000 population.

Nursing workforce

There are significant differences in the supply of nurses among the States and Territories and between metropolitan and rural areas, but not to the same extent as for medicine and dentistry.

In 1996, there were 1,064 full-time equivalent nurses per 100,000 population. Western Australia with 1,236 nurses per 100,000 population, Victoria 1,178, the Australian Capital Territory 1,142 and Tasmania 1,120 were above the national average. Queensland with 962 nurses per 100,000 population and New South Wales with 984 were well below the national average. South Australia and the Northern Territory had close to the national average.

Nurse employment in rural areas was much higher than employment of other health professions. In 1996, nurse employment per 100,000 population in large rural centres (1,705), small rural centres (1,363) and remote centres (1,220) exceeded that of capital cities (1,183). However, in small rural centres, other rural and remote areas, around 30% of nurses were enrolled nurses whose minimum training involves 1 year of post-school nursing education compared with 3 years for registered nurses. In capital cities, 17% of nurses were enrolled nurses.

Tertiary education entrants to the health workforce

The number of Australian citizens and permanent residents who completed undergraduate degrees in health fields at universities increased only slightly between 1992 and 1997, from 12,645 to 12,999. However, non-nursing course completions increased by 35.2%, from 4,373 to 5,914. Basic nursing course commencements fell by 8.3% and post-basic commencements by just over two-thirds, mainly because of a fall in school leavers applying to undertake nurse training.

Table 5.18: Undergraduate course commencements in health fields, 1993 and 1998

	1993		1998	
Field of study	**Total**	**Per cent female**	**Total**	**Per cent female**
Medicine	1,293	47.3	1,221	50.3
Dentistry	224	48.7	267	50.2
Pharmacy	465	61.1	699	62.8
Physiotherapy	624	60.6	713	59.0
Medical radiography	396	63.6	574	62.9
Occupational therapy	549	85.2	749	88.1
Speech pathology	285	94.7	410	95.6
Optometry	180	63.3	231	63.6
Podiatry	120	47.5	193	59.6
Nursing				
Basic	8,543	85.2	7,830	86.3
Post-basic	3,441	91.8	1,105	92.3
Dental therapy	24	91.7	28	85.7
Rehabilitation	162	82.1	363	83.2
Nutrition and dietetics	73	87.7	160	90.6
Health administration	404	79.0	341	75.7
Medical science	454	60.1	550	63.6
Medical technology	357	65.8	384	67.2
Science and technology	250	68.4	795	71.2
Health surveying and environmental health	215	53.0	203	57.1
Health counselling	48	89.6	142	83.8
Other health[(a)]	351	77.2	807	81.2
Total	**18,458**	**79.2**	**18,050**	**76.8**
Total excluding nursing	**6,474**	**64.7**	**9,115**	**66.7**

(a) Mainly public health and Aboriginal health courses.

Note: Australian citizen or permanent resident students only.

Source: AIHW analysis of Department of Education, Training and Youth Affairs data.

Statistics on undergraduate course commencements provide a guide to future workforce supply. Between 1993 and 1998 there was a 40.8% increase in non-nursing commencements, from 6,474 to 9,115, with the female proportion increasing from 64.7% to 66.7%. In 1998, female medical and dentistry commencements exceeded the number of male commencements for the first time. Overall, 76.8% of all those commencing undergraduate health courses in 1998 were females (66.7% if nursing courses are excluded) (Table 5.18), compared with 57.5% for undergraduate commencements in all university courses in 1998.

Table 5.19: Undergraduate course commencements by Aboriginal and Torres Strait Islander persons in health fields, 1993 and 1998

	1993			1998		
Field of study	**Indigenous**	**Non-Indigenous**	**Per cent Indigenous**	**Indigenous**	**Non-Indigenous**	**Per cent Indigenous**
Medicine	7	1,286	0.54	10	1,211	0.83
Dentistry	1	223	0.45	0	267	0.00
Pharmacy	0	465	0.00	2	697	0.29
Physiotherapy	4	620	0.64	4	709	0.56
Medical radiography	3	393	0.76	3	571	0.53
Occupational therapy	2	547	0.36	1	748	0.13
Speech pathology	2	283	0.70	2	408	0.49
Optometry	0	180	0.00	1	230	0.43
Podiatry	0	120	0.00	2	191	1.05
Nursing						
Basic	80	8,463	0.94	102	7,728	1.32
Post-basic	10	3,431	0.29	6	1,099	0.55
Dental therapy	0	24	0.00	1	27	3.70
Rehabilitation	1	161	0.62	1	362	0.28
Nutrition and dietetics	0	73	0.00	1	159	0.63
Health administration	2	402	0.50	2	339	0.59
Medical science	0	454	0.00	2	548	0.36
Medical technology	2	355	0.56	4	380	1.05
Science and technology	26	224	10.40	17	878	1.94
Health surveying and environmental health	1	214	0.47	1	202	0.50
Health counselling	1	47	2.08	0	142	0.00
Other health[(a)]	67	284	19.09	171	821	20.83
Total	**209**	**18,249**	**1.13**	**333**	**17,717**	**1.88**

(a) Mainly public health and Aboriginal health courses.

Note: Australian citizen or permanent resident students only.

Source: AIHW analysis of Department of Education, Training and Youth Affairs data.

Aboriginal and Torres Strait Islanders peoples are underrepresented in all fields of study except Aboriginal health and public health training. Excluding the latter, 79 Aboriginal and Torres Strait Islander persons completed undergraduate degrees in health fields in 1997, with 62 of these in nursing. This is an increase on the 54 undergraduate degree completions in 1992, when there were 40 nursing graduates.

Overall, there were 333 Aboriginal and Torres Strait Islander persons commencing undergraduate courses in 1998, with 162 in fields other than Aboriginal and public health, including 10 in medicine (Table 5.19).

Immigration of health professionals

There are stringent immigration and professional registration board requirements for health professionals trained in overseas countries who wish to migrate permanently or work temporarily in Australia. New Zealand is an exception to this as Australian health professional registration boards recognise the qualifications of New Zealand graduates as equivalent to those gained in Australian universities, and trans-Tasman immigration agreements facilitate migration between the two countries.

During the 1990s, State health authorities have increasingly used temporary employment of overseas-trained health professionals in an attempt to remedy shortages in the Australian workforce, particularly in hospitals and in rural and remote areas. Between 1993–94 and 1998–99, the numbers of temporary resident health professionals increased from 1,282 to 3,395 (Table 5.20). The most popular countries of origin in 1998–99 were the United Kingdom and Ireland (1,867), New Zealand (632) and Asian countries (333).

During this period, the number of Australian health professionals travelling to overseas countries for temporary employment of 12 months or more increased from 1,569 to 1,770, a 12.8% increase.

Table 5.20: Health professionals arriving in Australia, 1993–94 and 1998–99

	Permanent migrants			Temporary residents for the purpose of employment		
Field of study	**1993–94**	**1998–99**	**Per cent change**	**1993–94**	**1998–99**	**Per cent change**
Medical practitioners	445	408	–8.3	893	2,224	149.0
Nurses and midwives	870	1,080	24.1	261	772	195.8
Dental practitioners	79	80	1.3	11	42	281.8
Pharmacists	72	120	66.7	27	89	229.6
Occupational therapists	27	29	7.4	12	18	50.0
Optometrists	15	98	553.3	23	101	339.1
Physiotherapists	77	90	16.9	10	32	220.0
Speech pathologists	20	16	–20.0	3	6	100.0
Chiropractors and osteopaths	5	9	80.0	9	18	100.0
Podiatrists	7	8	14.3	3	7	133.3
Medical imaging professionals	44	53	20.5	18	68	277.8
Other health occupations	54	39	–27.8	12	19	58.3
Total	**1,715**	**2,030**	**18.4**	**1,282**	**3,395**	**164.8**

Source: AIHW analysis of Department of Immigration and Multicultural Affairs data.

5.5 Supply and use of health services

Acute care hospitals

In 1997–98, there were 1,051 acute care hospitals in Australia, 734 of which were public hospitals and 317 private hospitals (Table 5.21). Acute care hospitals provide medical, surgical and obstetric services on a 24-hour basis and are staffed by qualified medical, nursing and allied health professionals. Due to advances in health care, drug treatments and medical technology, lengths of stay in hospital care are decreasing. Although some categories of patient are not admitted for acute care services, such as those requiring rehabilitation, specialised mental health services or palliative care, most patients require a relatively short stay in acute care. Alongside the increasing trend towards day surgery and procedures, treatments that have previously required admission are frequently being provided in outpatient clinics and day-care facilities or by community health services. Thus, the role of the acute hospital is increasingly to provide services to those patients where conditions require the high level of care and technology that can only be provided within hospitals.

Table 5.21: Institutions and available beds, 1991–92 to 1997–98

	1991–92	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98
Institutions							
Hospitals							
Public acute[(a)]	713	699	702	727	704	704	734
Private acute[(b)]	319	323	329	328	323	319	317
Public psychiatric[(c)]	45	36	37	35	34	23	24
Available beds[(d)(e)]							
Hospitals							
Public acute[(a)]	57,053	54,116	56,140[(e)]	54,211	54,579	53,410	52,606
Private acute[(b)]	20,745	20,860	21,241	22,370	22,757	22,966	23,019
Public psychiatric	7,266	5,814	5,360[(e)]	4,685	3,992	3,426	3,112
Available beds (per 1,000 population)[(d)(e)]							
Hospitals							
Public acute[(a)]	3.3	3.1	3.2	3.0	3.0	2.9	2.8
Private acute[(b)]	1.2	1.2	1.2	1.2	1.3	1.2	1.2
Public psychiatric	0.4	0.4	0.3	0.2	0.3	0.2	0.2

(a) Includes Department of Veterans' Affairs General and Auxiliary hospitals.

(b) Private hospitals include private psychiatric hospitals and exclude freestanding day hospital facilities.

(c) Excludes institutions in New South Wales which are not predominantly psychiatric hospitals, but have psychiatric programs.

(d) Average available beds where possible, otherwise available beds at 30 June.

(e) Available beds for New South Wales are estimated.

Sources: AIHW National Public Hospital Establishments Database; AIHW National Survey of Mental Health Services; AIHW analysis of the DHFS Aged and Community Care Strategic Information System (ACCSIS); ABS 1999a.

Hospitals vary in size from small community facilities that may have as few as 10 beds to large metropolitan hospital campuses that can have up to 1,000 beds. Changes and differences in the number of hospitals reported by States and Territories are often due to changes in administrative or reporting arrangements and not necessarily due to a change in the number of hospital campuses or buildings. In addition, the service delivery structure differs between jurisdictions, so the count of hospitals in States and Territories is not useful for comparative purposes.

A more reliable indicator of shifts in the availability of hospital services is the increases or decreases in the number of available beds over time. Available beds are those that are immediately available for use by admitted patients when required. Between 1991–92 and 1997–98, there was a 3% reduction in available acute care beds, resulting in a decrease in the rate of available beds from 4.5 to 4.1 beds per 1,000 population (Table 5.21). Decreased length of stay has led to a lower requirement for hospital beds. The change in available beds was not evenly distributed between the public and private sectors, with the number of private acute care beds increasing by 11% and public acute beds decreasing by 8%.

Psychiatric hospitals

Reforms in recent years in the provision of mental health services have led to a change in the way people with a severe mental disorder are treated, with a move away from segregated and custodial institutional care to a more balanced system that integrates hospital services with continuing care in community settings.

Between 1991–92 and 1997–98, there was a substantial reduction in the number of public psychiatric hospitals, from 45 to 24 facilities. Over the same period, the number of available beds in public psychiatric hospitals declined from 7,266 to 3,122 beds. There has been a corresponding increase in the number of beds provided in community-based residential services. The section on mental health services (page 282) contains additional information on the changes that have occurred in the delivery of mental health services over the past decade.

Regional variation in bed supply

The number of beds per 1,000 population in health care institutions is a useful indicator of the comparative supply of healthcare services across States and Territories. For hospitals, there is a different mix between public and private beds across the States and Territories. The national average for all hospital beds is 4.0 beds per 1,000 population. In 1997–98, South Australia (4.7 beds per 1,000 population) and Queensland (4.4 beds) were above the national average (Table 5.22, page 268).

Other health services

In addition to the institutional care services provided in hospitals and residential aged care facilities, there is a large range of community health services provided both publicly and privately. These include services provided directly to individuals as well as other public and environmental health services that aim to protect and promote the health of communities as a whole (through activities such as food safety regulation, monitoring of radiation levels and tobacco control measures). For services delivered directly to individuals, care is largely delivered as ambulatory care, including services provided in people’s homes (e.g. home-based palliative care, domiciliary nursing) and outreach services (e.g. mobile services to homeless people, health promotion in schools). Some health services delivered in the community also provide residential care,

Table 5.22: Available beds per 1,000 population[a], States and Territories, 1997–98

Institution type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Hospitals									
Public acute[b]	2.9	2.6	2.9	2.7	3.2	2.3	2.5	3.1	2.8
Private acute[c]	1.0	1.3	1.5	1.3	1.5	1.7	[d]	[e]	1.2
Public psychiatric	0.2	0.0	0.3	0.3	0.3	n.a.	—	—	0.2
Aged care facilities	87.7	83.5	91.7	89.4	88.8	85.8	87.2	98.3	87.5

(a) Rates per 1,000 population calculated using total population for hospitals and population aged 70 and over for aged care facilities.

(b) Includes Department of Veterans' Affairs General and Auxiliary hospitals.

(c) Private hospitals include private psychiatric hospitals and exclude freestanding day hospital facilities.

(d) Included with New South Wales.

(e) Included with South Australia.

Sources: AIHW National Public Hospital Establishments Database; ABS 1999a.

i.e. in 24-hour-staffed residential units that provide specialised treatment, rehabilitation or care. This includes residential mental health care services and residential alcohol and drug treatment services.

A large number of community-based services available to individuals are provided by private healthcare practitioners. These include general practitioners, dentists, private domiciliary nursing services and private allied health professionals.

There are also a significant number of services available to individuals that are provided publicly by governments, usually under the umbrella term 'community health services'. These services are often provided within models of care that emphasise the availability of multidisciplinary care, disease prevention and early intervention, accessibility to those with high needs, and the provision of care in a way that reduces the stigma that may be associated with some health issues (e.g. sexual health services, mental health services).

The services vary in terms of the extent to which they serve specific population groups (e.g. women's health services, child health centres) or specialise in treating specific health problems (e.g. alcohol and other drug treatment services, dental services). Other services may provide a broad range of services to a broad client base (e.g. a community nursing service may be involved in many aspects of postnatal care and post-discharge care following a hospital admission, and provide ongoing care to the aged or people who need long-term care. Community health services may also deliver services in other ways, such as services to groups (e.g. health education, support programs), and may also undertake health promotion, public health and community development activities.

Although comprehensive national data are lacking on many of the health services that are provided in the community, data are available in some areas of community health service. Two are described below.

Family planning organisations

Family planning organisations provide a range of services to promote the sexual and reproductive health of Australians, particularly for people who choose not to, or are not able to, access sexual and reproductive health services through other healthcare providers, such as general practitioners. The services provided include clinic services for individual clients, community education programs, and education and training of health professionals. The clinical services provided to individuals include contraceptive services, counselling and information services, and the management of sexual and reproductive health.

In 1998–99, there were 151,338 client visits to family planning organisations, at which 275,521 services were provided (Table 5.23). This represented a 14% reduction on the number of services provided in 1996–97, and a 13% reduction in the number of client visits over the period.

Of these services, 40% were delivered to clients who were aged less than 25 years and 20% to clients aged 40 years or over. Males made 4% of client visits, although the number of males who attended with their partners (i.e. as couples) is unknown. Approximately 25% of client visits were made by people born outside Australia (Family Planning Australia 2000).

Table 5.23: Client visits and services provided by family planning organisations[(a)], 1996–97 to 1998–99

Type of service provided	1996–97	1997–98	1998–99
Contraceptive services	72,463	64,486	62,040
Reproductive and sexual health management[(b)]	31,159	26,592	23,868
Early intervention/health promotion services[(c)]	127,807	113,193	107,554
Reproductive health counselling and information services	89,975	82,742	82,059
Total services	321,404	287,013	275,521
Number of client visits	173,036	153,767	151,338

(a) Excludes South Australia.

(b) Includes antenatal checks, postnatal checks, post-termination checks and management of menstrual irregularity, sexually transmitted infections and menopause.

(c) Includes breast checks, Pap smears, pregnancy tests, investigation and care of sexually transmitted infections, rubella tests and hepatitis tests.

Source: Family Planning Australia national database.

Aboriginal health services

Aboriginal health services provide healthcare services specifically to meet the needs of Aboriginal and Torres Strait Islander peoples in urban, rural and remote regions across Australia. These services are funded by the State/Territory and Commonwealth Governments. The State/Territory Governments provide significant funding through hospitals and community clinics. Most direct funding from the Commonwealth is provided to Aboriginal Community Controlled Health Services (ACCHS).

The Commonwealth Government, through the Office for Aboriginal and Torres Strait Islander Health (OATSIH), provides funding for a range of Indigenous-specific health and substance misuse services, which are largely delivered in community-based settings. In 1998–99, OATSIH provided $141 million for the provision of these services from 210 primary service sites and 64 secondary service sites (including outreach services) distributed throughout Australia (DHAC 1999a).

The largest area of Commonwealth funding to Aboriginal health services is in the form of 'global' grants to ACCHS, for the provision of services that are 'culturally appropriate, autonomous primary health services, initiated, planned and governed by local Aboriginal communities through their locally elected Aboriginal board of directors' (DHAC 2000a). They manage acute and chronic health conditions, conduct preventive health and health promotion activities, provide transport services, and provide advocacy and assistance to clients in obtaining other community and health services. The services operate in different ways, with the emphasis being on the provision of primary medical care within a multidisciplinary team framework. Aboriginal health workers are an important part of these teams. In 1997–98, 106 ACCHS provided reports on their service activity. These services reported that approximately 860,000 episodes of health care were provided to individual clients. Of clients who received services, 90% were Aboriginal (DHAC 2000a).

In 1996, there were 703 employed Aboriginal and Torres Strait Islander health workers (ABS 1997a). In 1998, there were 698 medical practitioners who worked full-time or part-time in an Aboriginal health service; 63% worked in metropolitan areas (AIHW 2000). The Commonwealth has commissioned a National Workforce Modelling Project to provide further data on the numbers and types of health professionals working in Aboriginal health services.

Use of hospitals

Admitted patients, patient-days and length of stay

There were 5,563,074 separations from public acute, public psychiatric and private hospitals reported to the National Hospital Morbidity Database for 1997–98 (AIHW 1999c), representing 299 separations per 1,000 population (Table 5.24, page 273). There were 3,747,532 (67%) separations from public acute hospitals, 22,566 (0.4%) separations from public psychiatric hospitals and 1,792,976 (32%) separations from private hospitals. These separations accounted for 22,555,130 patient-days, 67% in public hospitals, 6% in public psychiatric hospitals and 27% in private hospitals.

With public psychiatric hospitals excluded, average length of stay in 1997–98 was 3.8 days overall, 4.0 days in public acute hospitals and 3.3 days in private hospitals. The difference between these two hospital sectors at least in part reflects the different range of patients cared for and treatments undertaken (casemixes). For example, public acute hospitals had more children under the age of 5 years as patients (7.3% of separations) compared with private hospitals (2.7% of separations) and procedures were more commonly reported for patients of private hospitals (87%) than for patients of public acute hospitals (71%).

If same-day separations are excluded (as is the practice in most OECD countries), the average length of stay was 6.4 days in public acute hospitals and 6.0 days in private hospitals. These figures are within the range of those reported for other OECD countries (OECD 1999).

Box 5.6: Statistics and data sources relating to the use of hospitals

Admitted patient statistics

Statistics on admitted patients, although sometimes referred to as admission statistics, are more correctly referred to as separation statistics. This is because most of the data on the use of hospitals by admitted patients are based on information collected at the end of patients' episodes of care, rather than at the beginning. The reason for this is that the actual length of stay and the procedures carried out are known and the diagnostic information is more accurate.

***Admitted patient** means a patient who undergoes a hospital's formal admission process.*

***Patient-day** means the occupancy of a hospital bed (or chair in the case of some same-day patients) by an admitted patient for all or part of a day.*

***Separation** is the term used to refer to the episode of care, which 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 (for example, 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 type of care.*

*For each separation, patients are assigned a **principal diagnosis** or the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted patient care. The principal diagnosis recorded for each separation is usually a disease, injury or poisoning, but can also be specific treatment of an already diagnosed condition, such as dialysis for renal disease, or other reasons for hospitalisation.*

*If applicable, a **principal procedure** is also identified. This is the most significant procedure performed for treatment of the principal diagnosis or, if no procedure was performed for that, another therapeutic or diagnostic procedure. Diagnoses and procedures were reported using the ICD-9-CM classification in 1997–98 and are now reported using the ICD-10-AM classification (see Box 5.7, page 274).*

The State and Territory health authorities compile information on separations and supply it to the Australian Institute of Health and Welfare for collation into the National Hospital Morbidity Database. This database comprises an electronic record for each separation from almost all hospitals in Australia, including public acute and psychiatric hospitals (public sector) and private hospitals, which include private psychiatric and private freestanding day hospital facilities (private sector).

As indicators of community morbidity, hospital separation data have limitations. Sick people who are not admitted to hospital are not counted and those who are admitted more than once, or to more than one hospital, are counted on each occasion. Hospital separation data also reflect differing admission practices and availability of and access to hospitals.

(continued)

Box 5.6 (continued): Statistics and data sources relating to the use of hospitals

Non-admitted patients

Hospitals provide services to non-admitted patients 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 Australian Institute of Health and Welfare 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 on each occasion such service is provided. National data are categorised into broad clinic or service-based groupings.*

Use of the national definition and categorisation for non-admitted patients is not completely uniform among the States and Territories and has varied over time, and this affects data quality. Existing national systems for counting and classifying non-admitted patient services are being revised.

Between 1993–94 and 1997–98, there was a 10% increase in separations from public acute hospitals and a 28% increase in separations from private hospitals. There was a decrease of 5% in patient-days for public hospitals over this period but an increase of 14% for private hospitals. This is consistent with the larger increase in separations for private hospitals over this period.

In 1993–94, 72% of separations and 76% of patient days were in public acute hospitals, whereas in 1997–98 these percentages had fallen to 68% and 73% respectively. Within public acute hospitals, the proportion of patients admitted as public patients increased from 78% in 1993–94 to 86% in 1997–98.

Between 1993–94 and 1997–98, the crude separation rate per 1,000 population increased by 15% and, after adjusting for changes in the age structure, there was still a 13% increase in separations over the period. Age-standardised patient-days per 1,000 population fell by 1% over the 5-year period (Table 5.24). Thus, despite an increase in the number of separations, total patient-days remained relatively stable.

The increase in separations may be accounted for, at least in part, by the introduction of episodes of care as the unit of reporting, rather than hospital stays (see Box 5.6). This reporting change may also account for part of the decline in average length of stay over the last few years. The increased numbers of separations may also reflect improved reporting by hospitals.

In 1997–98, there were 2,577,653 same-day separations, 1,622,339 from public acute hospitals, 2,390 from public psychiatric hospitals and 952,924 from private hospitals. There has been a marked upward trend over the period 1993–94 to 1997–98 in the proportion of separations that were day-only separations, reflecting changing medical practice and efforts to increase hospital productivity. In 1993–94, 37% of separations were same-day separations, but by 1997–98 this had increased to 46% of all separations.

Table 5.24: Hospital use by admitted patients, 1993–94 to 1997–98[(a)]

	1993–94[(b)]	1994–95[(b)]	1995–96[(c)]	1996–97	1997–98
Separations per 1,000 population[(g)]					
Public acute hospitals[(d)(e)]	185.6	190.5	196.4	196.6	201.2
Public patients	144.0	151.5	163.1	166.0	173.0
Private patients	30.7	27.2	24.1	21.3	19.1
Private hospitals	74.7	82.1	87.7	92.4	97.3
Total[(f)]	**259.5**	**271.9**	**284.6**	**289.1**	**298.7**
Total age-standardised rate	*257.0*	*268.1*	*279.1*	*282.7*	*290.6*
Patient-days per 1,000 population[(g)]					
Public acute hospitals[(d)(e)]	895.6	867.2	859.1	824.1	813.6
Public patients	677.3	673.3	694.1	678.2	669.0
Private patients	142.4	121.0	103.4	88.0	76.2
Private hospitals	291.0	304.1	327.6	319.9	325.2
Total[(f)]	**1,183.8**	**1,168.4**	**1,235.7**	**1,214.0**	**1,211.1**
Total age-standardised rate	*1,157.7*	*1,133.8*	*1,187.9*	*1,161.4*	*1,149.9*
Same-day separations as a percentage of total					
Public acute hospitals[(d)(e)]	34.2	37.7	39.8	42.0	43.3
Public patients	35.0	38.2	40.4	42.6	43.8
Private patients	33.2	36.5	38.4	40.9	42.7
Private hospitals	43.3	46.1	48.9	51.0	53.1
Total[(f)]	**36.8**	**40.2**	**42.4**	**44.7**	**46.3**
Average length of stay (days)					
Public acute hospitals[(d)(e)]	4.8	4.6	4.4	4.2	4.0
Public patients	4.7	4.4	4.3	4.1	3.9
Private patients	4.6	4.4	4.3	4.1	4.0
Private hospitals	3.9	3.7	3.7	3.5	3.3
Total[(f)]	**4.8**	**4.3**	**4.3**	**4.2**	**4.1**
Average length of stay, excluding same-day separations (days)					
Public acute hospitals[(d)(e)]	6.8	6.7	6.6	6.5	6.4
Public patients	6.7	6.6	6.5	6.4	6.1
Private patients	6.4	6.4	6.3	6.3	6.2
Private hospitals	6.1	6.0	6.4	6.0	6.0
Total[(f)]	**6.6**	**6.5**	**6.8**	**6.8**	**6.7**

(a) Some of these data have been updated since previously published.

(b) For 1993–94 and 1994–95, Victorian private hospital data are incomplete. About 81% of 1993–94 separations and 98% of 1994–95 separations were included.

(c) Statistical separations were introduced in 1995–96 and would have resulted in an increase in separations reported for that and subsequent years compared with previous years.

(d) Includes the Department of Veterans' Affairs hospitals.

(e) Public and private patients account for the bulk of separations from these hospitals, but there are also separations for other categories of patients.

(f) Public psychiatric hospital data are included in totals from 1995–96. In 1995–96 Queensland was unable to report. Victoria was not able to provide patient-days data for all separations in 1995–96 and for 407 separations in 1996–97, as leave days could not be identified.

(g) Figures are crude rates per 1,000 population at 31 December of the relevant year or, if indicated as such, directly age standardised to the Australian population at 30 June 1991. For private hospitals, rates were derived using populations of the reporting States and Territories only, without adjustment for incomplete reporting.

Source: AIHW 1999c.

This change has been accompanied by a substantial increase in the number of freestanding day hospital facilities now operating in the private sector. In 1993–94 there were 111 private freestanding day hospital facilities but by 1997–98 there were 175 (ABS 1999a).

Box 5.7: Classification of diseases, procedures and episodes for admitted patients

Diseases and procedures

Hospital patient records contain a great deal of information about the patient's diagnosis and about any 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. The classification used in 1997–98 in Australia was the second Australian version of the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), developed by the National Coding Centre (NCC 1996). It comprises classifications of diseases and external causes of injuries and poisoning, based on the World Health Organization version of ICD-9, and a classification of procedures. These ICD-9-CM codes can be a source of information on the diseases which are treated in hospitals and the operations which are performed, at very detailed levels or aggregated into broad groupings such as the ICD-9-CM chapters.

The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) has now replaced ICD-9-CM. It was developed by the National Centre for Classification in Health (NCCH 1998) and implemented on 1 July 1998 in four jurisdictions, and on 1 July 1999 in the other four jurisdictions. National data for 1998–99 will be compiled and reported using this classification, with data from four jurisdictions mapped from ICD-9-CM to ICD-10-AM.

Diagnosis related groups

Australian National Diagnosis Related Groups (AN-DRGs) is a classification system used for acute admitted patient episodes. This classification provides a means of summarising and relating the number and type of acute admitted patients treated in a hospital (i.e. its casemix) and relating this information to the resources required by the hospital. This classification groups episodes with similar clinical conditions and similar usage of hospital resources using information in the hospital morbidity record such as diagnoses, procedures, and age and sex of the patients. A new diagnosis related group classification, the Australian Refined Diagnosis Related Group (AR-DRG) has been developed by the Department of Health and Aged Care for implementation with ICD-10-AM.

Each AN-DRG or 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 outputs and performance of hospitals and in planning and funding hospital service provision.

Diagnoses, procedures and diagnosis related groups for admitted patients

The conditions that hospitals treat are of interest to health service managers, planners, funders and epidemiologists. These conditions, the procedures that patients undergo in hospital and the consequent casemix of hospitals are detailed in the National Hospital Morbidity Database using the classification systems described in Box 5.7.

For patients with a disease, injury or poisoning recorded as a principal diagnosis, the broad diagnosis groups (ICD-9-CM chapters) with the highest number of separations in Australian hospitals (public acute, public psychiatric and private hospitals) in 1997–98 were diseases of the digestive system, followed by diagnoses within the obstetric category (complications of pregnancy, childbirth and the puerperium, which includes normal deliveries) and diseases of the circulatory system (Tables S34, page 397, and S35, page 398).

At a more detailed level (3-digit ICD-9-CM categories), the most common disease or injury principal diagnoses (excluding diagnoses described as symptoms) in public hospitals were asthma (54,006 separations) and selected forms of acute and subacute ischaemic heart disease, not including acute myocardial infarction (46,499 separations). In private hospitals, the most common diagnoses were cataract (71,258 separations) and diseases of the oesophagus (50,054 separations).

Principal diagnoses within the six National Health Priority Areas accounted for 29% of hospital separations (1,637,689) and 42% of patient-days (9,500,510) in Australian hospitals. Cancer accounted for the largest number of these (477,927 separations), followed by cardiovascular disease (434,748 separations). Mental disorders accounted for the highest number of patient-days (3,145,162), followed by cardiovascular disease (2,462,898 patient-days). Of the six priority areas, patients admitted with a principal diagnosis of a mental disorder had the longest lengths of stay on average (Table 5.25, page 276).

A procedure was reported for 76% of separations in Australian hospitals in 1997–98. Of these, 63% were in public hospitals, although public hospitals accounted for 68% of separations overall. Similarly, although 73% of overall patient-days were in public hospitals, only 70% of patient-days associated with procedures were in public hospitals (10,999,725). This reflects the higher proportion of separations in the private sector that were associated with a procedure compared with the public sector, 87% and 71% respectively.

At the broad group (ICD-9-CM chapter) level, if miscellaneous diagnostic and therapeutic procedures are not included (i.e. procedures that are not ‘operations’ or obstetrical procedures), operations on the cardiovascular system were the principal procedures associated with the largest proportion of public hospital separations for which a principal procedure was reported (489,280 separations)(Table S36, page 399). Haemodialysis was the principal procedure reported for 77% (378,466) of these separations. The most commonly reported procedure group for the private sector was operations on the digestive system (374,314 separations). Within that grouping, endoscopies and other diagnostic procedures on the small and large intestines were reported for 61% of the separations.

Table 5.25: Separations for National Health Priority Areas[(a)], all hospitals[(b)], 1997–98

National Health Priority Area	Separations	Separations per 1,000 population[(c)]	Patient-days[(d)]	Patient-days per 1,000 population[(c)(d)]	No. same day	Average length of stay (days)
Cancer	477,927	25.7	1,732,144	93.0	309,606	3.6
Cardiovascular disease	434,748	23.3	2,462,898	132.3	83,209	5.7
Mental disorders	235,489	12.6	3,145,162	168.9	85,383	13.4
Diabetes	23,857	1.3	166,495	8.9	3,814	7.0
Injury or poisoning	405,388	21.8	1,783,573	95.8	109,882	4.4
Asthma	60,280	3.2	210,238	11.3	7,118	3.5
Total	**1,637,689**	**87.9**	**9,500,510**	**510.1**	**599,012**	**5.8**

(a) Only separations for which the principal diagnosis corresponds to one of the priority areas have been included. These conditions will also have been reported as additional diagnoses for separations with principal diagnoses not within these priority areas. Diabetes in particular is more often reported as an additional diagnosis than a principal diagnosis. The ICD-9-CM codes associated with the priority areas can be found in AIHW 1999c.

(b) Includes public psychiatric hospitals.

(c) Crude rates.

(d) Information on patient-days has been updated since it was published in AIHW 1999c.

Source: AIHW 1999c.

Table 5.26: Separations[(a)] for the top 12 AN-DRGs (version 3.1), all hospitals, 1997–98

AN-DRG		Separations	Per cent same-day separations	Patient-days[(b)]	Average length of stay (days)
572	Admit for renal dialysis	417,359	99.9	418,134	1.0
780	Chemotherapy	193,529	99.7	194,138	1.0
332	Other gastroscopy for non-major digestive disease[(c)]	181,419	94.7	203,595	1.1
335	Other colonoscopy[(c)]	145,241	93.2	166,561	1.1
674	Vaginal delivery without complicating diagnosis	141,124	3.2	512,238	3.6
99	Lens procedure without vitrectomy[(c)]	97,405	73.4	106,265	1.1
128	Dental extractions and restorations	73,392	84.7	77,383	1.1
421	Knee procedures	69,325	60.4	97,470	1.4
484	Other skin, subcutaneous tissue and breast procedures	66,034	85.6	84,686	1.3
683	Abortion with D&C, aspiration curettage or hysterotomy	65,242	82.0	68,653	1.1
843	Major affective disorders	56,078	44.6	569,084	10.1
659	Conisation, vagina, cervix and vulva procedures	48,487	85.8	56,864	1.2

(a) Includes separations with acute or unspecified type of episode of care only. Includes public psychiatric hospitals.

(b) Information on patient-days has been updated since it was published in AIHW 1999c.

(c) Without complications and co-morbidities.

Source: AIHW 1999c.

Procedures were reported for varying proportions of separations within the broad groups of principal diagnoses. High proportions of separations for neoplasms (93%), diseases of the blood and blood-forming organs (91%) and diseases of the genito-urinary system (88%) had procedures reported. In contrast, there were fewer reported for separations for mental disorders (33%), infectious and parasitic diseases (39%) and diseases of the respiratory system (50%).

The Australian National Diagnosis Related Groups (AN-DRGs) with the highest numbers of separations in 1997–98 featured several for which same-day separations dominated (Table 5.26). Among these were the top two groups in public hospitals, admit for renal dialysis (372,965 public sector separations) and chemotherapy (133,062 public sector separations) and the top two groups in the private sector, gastroscopy (107,914 private sector separations) and colonoscopy (95,483 private sector separations) (AIHW 1999c).

Vaginal delivery without complicating diagnosis was the most common AN-DRG that was not usually a same-day hospitalisation. This group was the third most common in public hospitals (109,246 separations) and the eighth most common in private hospitals (31,878 separations). This category does not include deliveries by caesarean section or complicated deliveries.

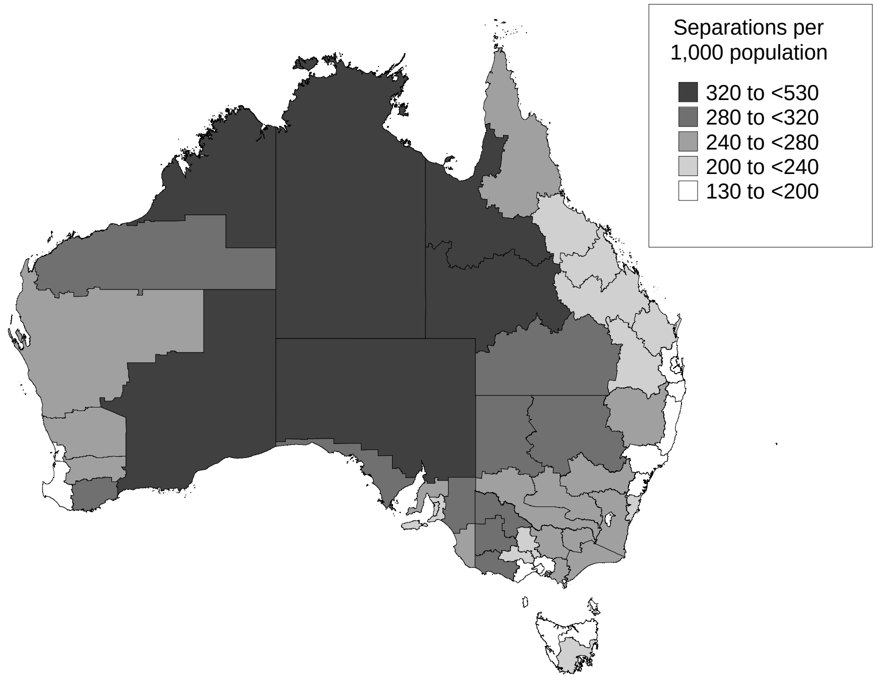
Area of usual residence

Figures 5.6 (page 278) and 5.7 (page 279) show age-standardised separation rates per 1,000 population by statistical division of the usual residence of the patient, for public and private hospitals. In the public sector, the highest rates were reported for residents of the statistical divisions of the Kimberley in Western Australia, north-west Queensland and northern South Australia. In the private sector, highest rates were reported for the Queensland statistical divisions of Mackay and Darling Downs and for the Victorian statistical division of Melbourne.

Non-admitted patients

Public hospitals provide about 95% of non-admitted patient services. In 1997–98, there were 32,764,972 non-admitted patient occasions of service reported for public acute and psychiatric hospitals, or about 1,760 per 1,000 population (AIHW 1999c). In 1997–98, 5,138,744 or 14.0% of these occasions of service were provided in accident and emergency departments and 2,683,371 or 8.2% were provided as radiology or organ imaging. Note that there is considerable variation among States and Territories in the way data on non-admitted patient occasions of service are collected, and this may affect the proportion of non-admitted patient occasions of service assigned to this category by different jurisdictions.

Private hospitals also contribute to the provision of non-admitted patient services, with a different mix of types compared with the public hospitals. In 1997–98, private hospitals reported 1,670,300 occasions of service (90 per 1,000 population) (ABS 1999a). The largest numbers were reported for allied health services (384,100 or 22.9%), radiology and organ imaging (248,000 or 14.8%) and accident and emergency (408,300 or 24.4%).



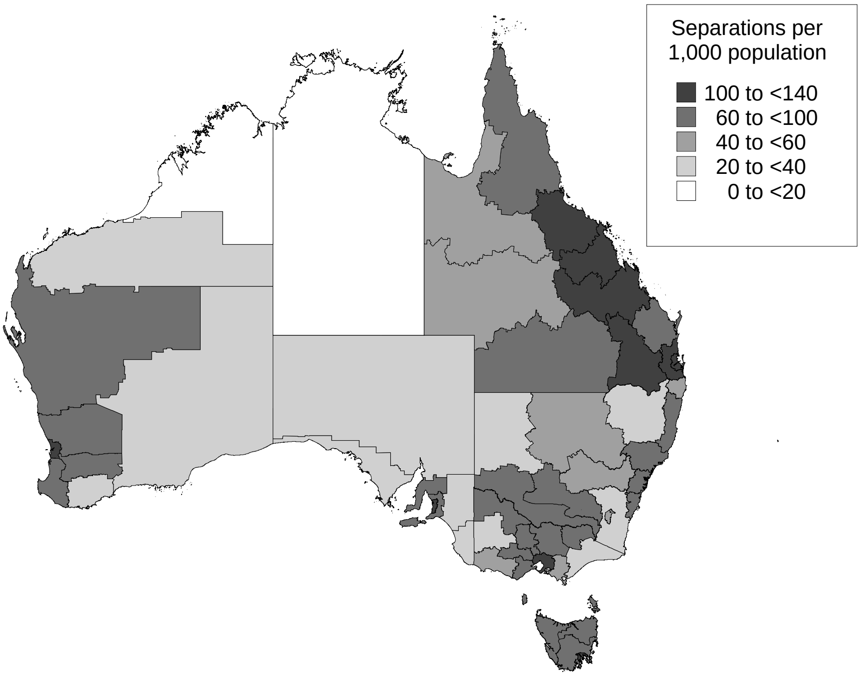
Note: Data for statistical divisions were combined for mapping purposes for both the Northern Territory and the Australian Capital Territory because of the difference in the relative sizes of the populations between statistical divisions within these jurisdictions.

Source: AIHW National Hospital Morbidity Database.

Figure 5.6: Separations per 1,000 population by statistical division of usual residence, public hospitals, 1997–98

Aged care services

As well as using those health services provided for the general population, such as hospitals and community health services, older Australians use a number of health services provided specifically for the older, frail segment of the population. The core elements of the Australian aged care system are aged care assessment teams, home- and community-based services provided through the Home and Community Care (HACC) program, community aged care packages and residential aged care facilities. Current policy directions include a continued emphasis on the role of assessment, containment of the expansion of residential aged care facilities to the planning ratio of 90 places per 1,000 persons aged 70 and over, continuing expansion of home-based services provided through both the HACC program and community aged care packages, the development and implementation of quality appraisal and accreditation procedures for both home-



Note: Data for statistical divisions were combined for mapping purposes for both the Northern Territory and the Australian Capital Territory because of the difference in the relative sizes of the populations between statistical divisions within these jurisdictions.

Source: AIHW National Hospital Morbidity Database.

Figure 5.7: Separations per 1,000 population by statistical division of usual residence, private hospitals, 1997–98

based and residential care, and an ongoing emphasis on providing support to carers through a range of support services including respite care. For a more detailed account of these policy directions, see *Australia's Welfare 1999* (AIHW 1999b).

Aged care assessment teams

Aged care assessment teams play a central role in the Australian aged care system. They determine eligibility for community aged care packages and for admission to residential aged care facilities. They also function as a source of advice and referral for a range of services including the HACC program, although they do not determine eligibility for HACC services. Their aim is to 'ensure frail older people gain access to available care services appropriate to their needs, and improve coordination of aged care services with other health and community support agencies' (DHAC 1999a:213). In 1999, there were 123 assessment teams in Australia, 66 based in rural and remote areas and 57 in metropolitan areas.

In the 6 months from January to June 1999, 81,135 clients aged 65 and over were assessed, an increase on the 55,746 clients assessed in the same period in 1994. The proportion of the aged population assessed has also increased, from 2.6% in 1994 to 3.5% in 1999. Rates of assessment were higher among women than among men, and substantially higher in the 80 and over age group (9.6%) than at younger ages (0.7% of those aged 65–69) (Table 5.27). Expenditure on aged care assessment teams was $36.1 million in 1997–98 (AIHW 1999b:200).

In 1998, 24% of persons assessed were recommended for nursing home accommodation, 21% for hostel accommodation, and 9% to receive assistance through community aged care packages or through community options projects (AIHW 1999b:184).

Table 5.27: Assessments of aged care assessment team clients aged 65 years and over by age group and sex, January to June 1994 and January to June 1999

	1994				1999			
	65–69	70–79	80+	Total	65–69	70–79	80+	Total
Males								
Assessments	2,145	7,372	9,930	19,447	2,176	10,519	15,873	28,568
% population assessed	0.6	1.7	6.5	2.1	0.7	2.1	8.6	2.8
Females								
Assessments	2,421	11,601	22,277	36,299	2,478	15,354	34,735	52,567
% population assessed	0.7	2.1	7.6	3.0	0.7	2.5	10.1	4.0
Persons								
Assessments	4,566	18,973	32,207	55,746	4,654	25,873	50,608	81,135
% population assessed	0.7	2.0	7.2	2.6	0.7	2.3	9.6	3.5

Source: AIHW 1999b:184.

Home and Community Care program

The HACC program is funded jointly by the Commonwealth and State and Territory Governments. The bulk of home- and community-based services are provided through this program, many of them by not-for-profit agencies. The program includes home nursing services, delivered meals, home help and home maintenance services, transport and shopping assistance, paramedical services, home- and centre-based respite care, and advice and assistance of various kinds. HACC also provides special case management services for some clients through its community options or linkages projects.

In 1997–98, HACC agencies provided 441 hours of home help per month per 1,000 people aged 70 and over. They also provided 506 hours of centre-based respite care and 697 delivered meals per 1,000 persons aged 70 and over. The levels of provision were lower in the more intensive service types—for home-based respite (196 hours), for personal care (143 hours) and for home nursing (127 hours). There was a substantial increase in the level of services delivered in 1997–98 compared with 1993–94 for personal care, paramedical, respite care and centre day care. There was a substantial reduction in the level of provision of home nursing (Table 5.28).

Expenditure on HACC increased from $620.9 million in 1993–94 to $855.3 million in 1998–99.

Table 5.28: HACC average hours of service provision per month[(a)] per 1,000 persons aged 70 and over, 1993–94 and 1997–98

Service type	1993–94	1997–98	Per cent change
Home help (hours)	428	441	3.0
Personal care (hours)	109	143	31.2
Home nursing (hours)[(b)]	206	127	–38.3
Paramedical (hours)	20	23	15.0
Home respite care (hours)	155	196	26.5
Centre day care (hours)	421	506	20.2
Home meals (number)	746	697	–6.6
Centre meals (number)	101	100	–1.0
Home maintenance/modification (hours)	42	45	7.1

(a) Based on data collected for a sample month.

(b) Excludes the Northern Territory as home nursing is not HACC-funded in the Northern Territory.

Source: AIHW 1999b:186.

Community aged care packages

Community aged care packages were first implemented in 1993 and provide personal care services for people living at home who would otherwise be eligible for what was then referred to as Personal Care level admission to a hostel. Care packages provide a full range of home-based care services, with care coordinated by the care package provider.

The program has expanded rapidly in recent years, from 1,227 packages in 1994 to 6,124 in 1997, and then to 13,725 in 1999. The ratio of provision has thus changed from less than 1 per 1,000 persons aged 70 and over in 1994 to 8 places per 1,000 persons aged 70 and over in 1999 (Table 5.29). Expenditure on community aged care packages increased from $7.4 million in 1993–94 to $121.8 million in 1998–99.

Table 5.29: Community aged care packages and residential care places, 30 June 1994 and 30 June 1999

Year	Residential care type	No. of places	Ratio of places per 1,000 population aged 70 and over
1994	Care packages	1,227	0.9
	Hostels	57,104	40.3
	Nursing homes	74,247	52.3
	Residential aged care[(a)]	131,351	92.6
	Total residential aged care and care packages	*132,578*	*93.5*
1999	Care packages	13,725	8.3
	Residential aged care[(a)]	140,651	85.6
	Total residential aged care and care packages	*154,376*	*93.9*

(a) Residential aged care combines nursing homes and hostels; from 1 October 1997 nursing homes and hostels were combined into one residential aged care system.

Source: AIHW 1999b:192.

Residential aged care facilities

From 1 October 1997, nursing homes and hostels were integrated into a single residential aged care system. These changes were undertaken as part of the National Aged Care Strategy, which was implemented during 1997–98. In addition to the amalgamation of nursing homes and hostels into a single system of care, the new eight-category Resident Classification Scale was introduced to determine the level of payment to which facilities were entitled for each resident (based on residents' levels of dependency); income and asset-tested fees were introduced; and a pre-existing system of contributions to the capital costs of aged care facilities was modified and expanded to include all aged care facilities.

The number of residential aged care places has increased in recent years, from 131,351 in 1994 to 140,651 in 1998. However, taking into account the increasing size of the aged population, this is equivalent to a decline in the number of places per 1,000 persons aged 70 and over, from 92.6 places in 1994 to 85.6 places in 1998. When community aged care packages are taken into account, there has been a slight increase in the total level of provision (care packages plus residential aged care places) from 93.5 in 1994 to 93.9 in 1999. The average annual cost per bed has increased, from $22,784 in 1997–98 to $24,801 in 1998–99 (DHAC 1999a:228).

The number of respite bed-days provided in residential aged care facilities is increasing, in line with the policy commitment to improve support for carers of frail older people or those with disabilities. In 1998–99, there were 969,838 bed-days of respite care provided, compared with 872,128 in 1996–97, an increase of 11%.

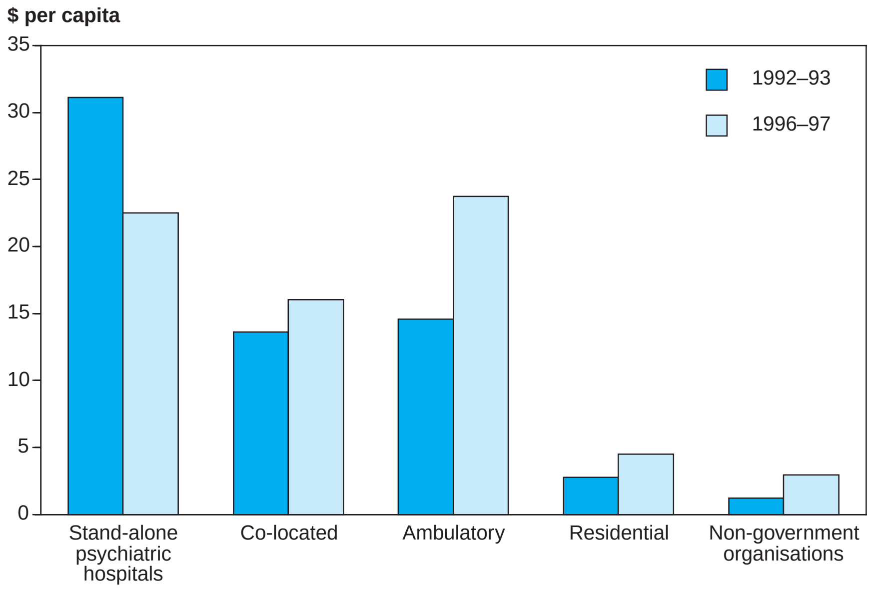
Between 1993–94 and 1998–99, expenditure on residential aged care facilities increased from $2,016.0 million to $2,963.3 million.

Public hospitals also provide nursing-home-type care to some patients. In 1997–98, there were 10,548 separations of nursing-home-type patients reported to the AIHW's National Public Hospital Establishments Database, with an average length of stay of 109 days.

Mental health services

Services for Australians with a mental illness are provided in a number of settings. In the institutional setting, both psychiatric hospitals and designated wards or units in acute hospitals ('co-located facilities') provide specialised psychiatric care. In the community sector, ambulatory care services provide mental health assessment, treatment and rehabilitation programs, including mental health crisis teams and outpatient clinic services. Residential facilities provide 24-hour care in the community. Non-government organisations provide services such as supported accommodation and advocacy programs. General practitioners also play a significant role in the treatment of mental illness: in 1997, 77% of Australians with a mental disorder who use health services consulted a general practitioner about their condition (ABS 1998).

Over the last decade, the delivery of services to mental health patients has shifted from predominantly institutional to a mix of institutional and community-based services such as ambulatory and 24-hour residential care. This change in emphasis is demonstrated by the shift in expenditure (Figure 5.8). Over the period 1992–93 to 1996–97, there has been



Note: Co-located facilities are designated wards/units in acute hospitals.

Source: DHAC 1998.

Figure 5.8: Gross per person expenditure on mental health services, 1992–93 and 1996–97

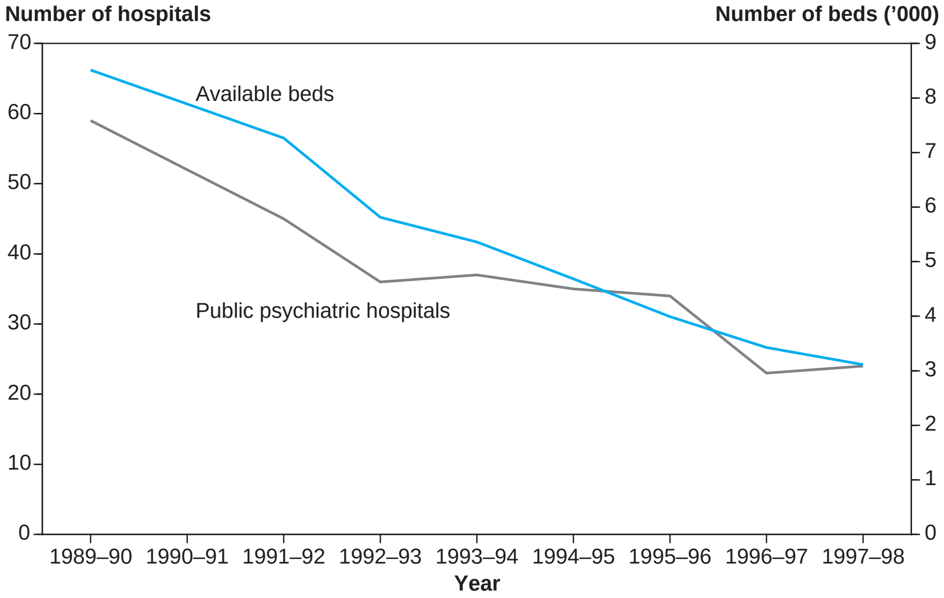
a decrease in spending per person on stand-alone psychiatric hospitals (from $31 to $23 per person) and a corresponding increase in spending in community areas, particularly ambulatory care (from $15 to $24 per person).

There have been marked decreases in the number of public psychiatric hospitals and available beds since 1989–90 (Figure 5.9, page 284, and Table 5.21, page 266). In 1997–98, there were 23 private and 24 public psychiatric hospitals in Australia, although public psychiatric hospitals had over twice the number of available beds compared with private psychiatric establishments (Table 5.30).

The number of staff per 1,000 patient-days was similar in both public and private psychiatric hospitals. However, the number of staff per 1,000 separations in public psychiatric hospitals was 10 times that for private psychiatric hospitals. This is consistent with the difference in the type of mental health disorders treated between the sectors, with fewer separations and longer average lengths of stay in public psychiatric hospitals.

In the public sector, the major component of expenditure was for staff costs. Expenditure on psychiatric hospitals was about $489 million in 1997–98, of which around three-quarters was for public psychiatric hospitals.

As well as the services provided in psychiatric hospitals, there are specialised psychiatric units in acute hospitals. One hundred and four public acute hospitals and 20 private acute hospitals had specialised psychiatric wards in 1997–98 (AIHW: Moore et al. 2000).



Notes

1. No data are available for 1990–91.
2. Average available beds where possible, otherwise available beds at 30 June.

Sources: 1989–90: AIHW: Gillett & Solon 1992; 1992–93 to 1996–97: National Survey of Mental Health Services; 1997–98: AIHW National Public Hospitals Establishments Database.

Figure 5.9: Number of public psychiatric hospitals and available beds, 1989–90 to 1997–98

Table 5.30: Psychiatric hospitals: number of hospitals, beds, staff, and total expenditure, 1997–98

	Public psychiatric hospitals	Private psychiatric hospitals
Number of hospitals	24	23
Available beds	3,112	1,344
Full-time equivalent staff		
Number	6,128	1,515
Per 1,000 separations	271	27
Per 1,000 patient-days	4.4	4.2
Recurrent expenditure ($'000)[(a)]		
Staff	276,877	n.a.
Other	100,962	n.a.
Total	377,839	111,141

(a) Excludes Tasmanian public psychiatric hospitals as data not available.

Source: AIHW: Moore et al. 2000.

Hospitalisations

Although patients with a mental health disorder as the principal diagnosis accounted for only 4.2% of all hospital separations in 1997–98, they made up 13.9% of all patient-days (AIHW: Moore et al. 2000).

A patient with a mental health disorder as the principal diagnosis may or may not receive specialised psychiatric treatment depending on the type and severity of the illness and the availability of specialised services. Patients who received any care in a specialised psychiatric unit or ward are classified as receiving specialised care, whereas those who were not in specialised units are referred to as receiving general care. Nearly all patients in psychiatric hospitals received some specialised care. In public acute hospitals, 48% of all mental health disorder separations received some specialised care (Table 5.31, page 286). However, approximately two-thirds of the 6,741 patients who stayed 36 days or more in public acute hospitals received some specialised care.

Community-based facilities

Currently there are only limited data available on the number and size of community mental health care facilities. However, recent collection agreements have provided means whereby these data will soon become available. Collection of information on resources and other establishment characteristics commenced on 1 July 1998. This data set, along with the patient-level community mental health care collection to be introduced from 1 July 2000, will provide more information on this growing sector of mental health service delivery.

Use of dental services

This section focuses on the use of dental services with a particular emphasis on use by persons in rural and remote communities, persons born overseas, and Australia’s Aboriginal and Torres Strait Islander peoples. The data presented here were collected in three national telephone interview surveys in the period 1994 to 1996. A further survey was conducted in late 1999.

Rural and remote dwellers

The time since a person last visited a dental professional is an indication of the level of contact with dental services.

In all age groups, 15.7% of dentate adults (those with some natural teeth) in remote areas and 12.5% in rural areas had a period of 5 or more years since their last dental visit compared with 9.4% of urban adults (Table 5.32, page 287). Differences between urban and rural residents were most evident in the 45–64 and 65 years and over age groups. The proportion of rural adults aged 45 years and over who had not visited a dental professional for 5 or more years was almost double the urban rate.

The percentage of dentate adults who made a visit to a dental professional in the previous 12 months is highest in urban areas and declines across rural to remote areas. Of urban persons who were not recipients of a government concession card, 58% had made a recent dental visit, compared with 54% of rural dwellers and 47% of those living in remote areas. The pattern for holders of government concession cards was quite similar, although the overall percentage of cardholders who visited a dental professional in the last year was lower than for non-cardholders (Figure 5.10, page 288).

Table 5.31: Hospital separations and patient days for a mental health disorder principal diagnosis, type of care received, 1997–98

	Public acute	Private[(a)]	Public psychiatric	Total
Same-day separations with a mental health disorder principal diagnosis				
General care	18,574	15,380	105	34,059
Specialised care	19,581	29,818	1,925	51,324
Total	*38,155*	*45,198*	*2,030*	*85,383*
Short-stay[(b)] separations with a mental health principal diagnosis				
General care	51,736	14,367	1,753	67,856
Specialised care	43,634	11,813	13,670	69,117
Total	*95,370*	*26,180*	*15,423*	*136,973*
Long-stay[(b)] separations with a mental health disorder principal diagnosis				
General care	2,302	1,032	16	3,350
Specialised care	4,439	2,011	3,331	9,781
Total	*6,741*	*3,043*	*3,347*	*13,131*
Total separations with a mental health principal diagnosis	**140,266**	**74,421**	**20,800**	**235,487**
Per cent receiving specialised care	**48.2**	**58.6**	**91.0**	**55.3**
Same-day patient-days with a mental health disorder principal diagnosis				
General care	18,574	15,380	105	34,059
Specialised care	19,581	29,818	1,925	51,324
Total	*38,155*	*45,198*	*2,030*	*85,383*
Short-stay[(b)] patient-days with a mental health principal diagnosis				
General care	346,374	153,216	8,584	508,174
Specialised care	412,314	151,449	147,002	710,765
Total	*758688*	*304665*	*155586*	*1218939*
Long-stay[(b)] patient-days with a mental health disorder principal diagnosis				
General care	266,377	71,686	1,449	339,512
Specialised care	300,153	116,195	1,084,957	1,501,305
Total	*566,530*	*187,881*	*1,086,406*	*1,840,817*
Total patient-days with a mental health principal diagnosis	**1,363,373**	**537,744**	**1,244,022**	**3,145,139**
Per cent receiving specialised care	**53.7**	**55.3**	**99.2**	**72.0**

(a) Includes some separations from private freestanding day hospitals.

(b) Short-stay separations are those with less than 36 patient-days, excluding same-day separations. Long-stay separations are those with 36 patient-days or more.

Source: AIHW: Moore et al. 2000.

The reason for seeking dental care influences the treatment likely to be received. Visiting for a problem rather than a check-up may reflect the ability to access dental services in terms of availability and affordability. The lack of oral health facilities and the scarcity of dentists, as well as the greater distances involved, present a barrier to regular dental care in rural and remote areas.

Table 5.32: Dentate adults: time since visit to a dental professional, 1994 to 1996 (per cent)

	Urban	Rural	Remote	Total
18–24 years				
<12 months	54.7	50.2	47.6	53.6
1–4 years	35.5	37.3	36.3	35.9
5+ years	9.8	12.5	*16.1	10.5
25–44 years				
<12 months	53.9	53.3	42.3	53.5
1–4 years	36.0	36.4	41.8	36.3
5+ years	10.0	10.3	15.8	10.2
45–64 years				
<12 months	63.0	54.7	54.8	61.0
1–4 years	28.9	31.3	31.6	29.5
5+ years	8.1	14.0	*13.6	9.5
65+ years				
<12 months	64.6	52.4	43.5	61.6
1–4 years	26.3	28.9	*37.2	27.0
5+ years	9.2	18.7	*19.3	11.4
Total				
<12 months	57.6	53.2	45.8	56.3
1–4 years	33.0	34.3	38.5	33.5
5+ years	9.4	12.5	15.7	10.2

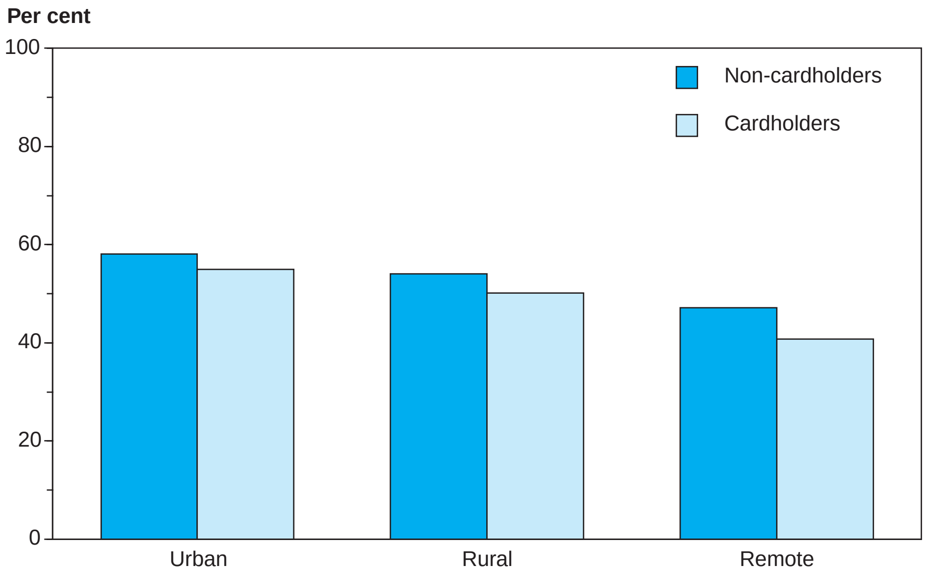
* Estimate has a relative standard error greater than 25%.

Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

A considerably higher proportion of adult non-cardholders in rural (55%) and remote areas (58%) than in urban areas (45%) reported that their usual reason for making a dental visit was for a dental problem (Figure 5.11, page 289). Cardholders in rural and remote areas reported even higher levels of problem-related visits to a dental professional, 65% and 69% respectively, compared with 56% of urban cardholders.

Overseas-born

There is little difference between Australian-born persons and those born overseas in the percentage who had visited a dental professional in the previous 12 months (Figure 5.12, page 289). However, in each group there were some differences between English-speakers and those who spoke a language other than English at home. Of those born in Australia, a greater proportion of persons who spoke a language other than English at home had visited than those who spoke English at home. Of those born overseas, a higher percentage of those who spoke English at home had visited than of those who spoke a language other than English at home. Among persons aged 18–24 years, the percentage who made a dental visit within the previous 2 years was 70.3% of Australian-born persons, compared with 80.9% of overseas-born persons. The pattern of dental visits was similar for other age groups.



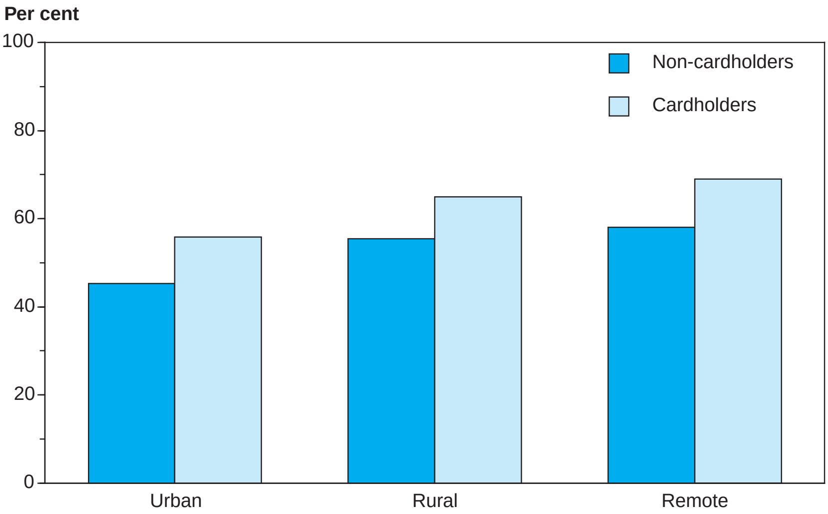
Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

Figure 5.10: Proportion of dentate adults who visited a dental professional in the last year, 1994 to 1996

Overseas-born persons who spoke a language other than English at home were generally the most likely to report that their last dental visit was for a problem (Table 5.33, page 290). Overall, 61% of this group last visited for a problem, compared with 56% of Australian-born persons.

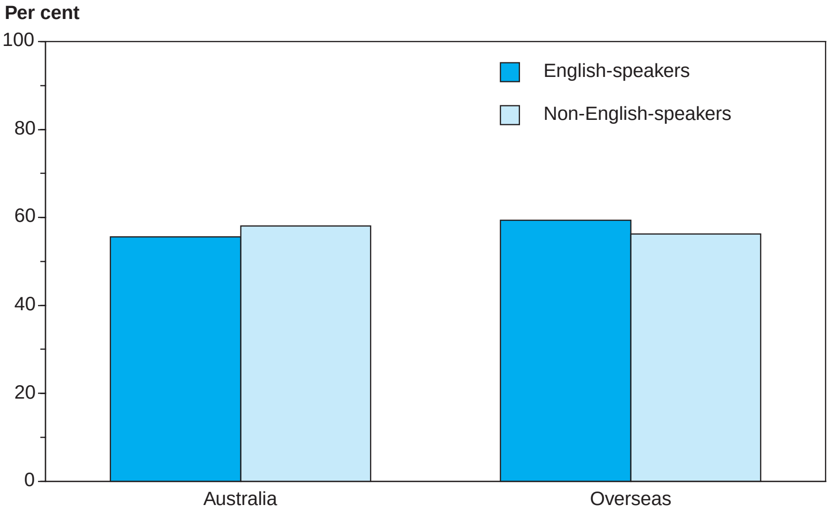
Among persons who received their dental care in the public system, there were consistent differences between the Australian-born and the overseas-born in the type of care received, with higher percentages of emergency treatment received by patients born overseas (65%) compared with those born in Australia (50%). However, patterns of oral health were not consistently better or worse for overseas-born patients.

Differences in public service provision by country of birth/language spoken persisted after controlling for age, geographic location, type of care, Indigenous status, numbers of decayed teeth, numbers of missing teeth, numbers of decayed tooth roots, and the presence of periodontal pockets. These findings may indicate variations in the availability of fluoridated water and cultural differences in accessing dental services.



Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

Figure 5.11: Proportion of dentate adults who usually visit a dental professional for a dental problem, 1994 to 1996



Note: Non-English speakers are those who spoke a language other than English at home.
Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

Figure 5.12: Proportion of dentate adults who visited a dentist in the last year by place of birth, 1994 to 1996

Table 5.33: Dentate adults whose last dental visit was less than 12 months ago: reason for last dental visit by country of birth, language spoken and age group, 1994 to 1996 (per cent)

	Australian-born			Overseas-born		
	English	Non-English	Total	English	Non-English	Total
18–24 years						
Problem	46.8	*22.3	44.8	38.1	50.6	45.2
Check-up	53.2	77.7	55.2	61.9	49.4	54.8
25–44 years						
Problem	56.8	60.5	57.0	45.3	62.0	50.9
Check-up	43.2	39.5	43.0	54.7	38.0	49.1
45–64 years						
Problem	61.5	76.7	61.8	58.9	64.5	60.7
Check-up	38.5	*23.3	38.2	41.1	35.5	39.3
65+ years						
Problem	58.0	*55.1	58.0	61.6	64.6	62.5
Check-up	42.0	*44.9	42.0	38.4	35.4	37.5
Total						
Problem	56.4	51.2	56.2	52.3	61.4	55.5
Check-up	43.6	48.8	43.8	47.7	38.6	44.5

* Estimate has a relative standard error greater than 25%.

Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

Indigenous Australians

An analysis by Indigenous status of the time since the last visit to a dental professional indicates that Indigenous adults are slightly less likely than non-Indigenous adults to have visited a dental professional in the last 12 months (Table 5.34). They were also more likely than non-Indigenous adults to have reported a problem as their usual reason for a dental visit (64% compared with 50%). Indigenous adults also had a lower mean number of dental visits in a 12-month period (1.81 compared with 2.43 visits) than non-Indigenous Australians.

Table 5.34: Dentate adults: time since last dental visit by Indigenous status, 1994 to 1996 (per cent)

	Indigenous	Non-Indigenous	Total
Total			
<12 months	53.7	56.4	56.3
1–4 years	37.3	33.3	33.5
5+ years	*9.0	10.2	10.2

* Estimate has a relative standard error greater than 25%.

Note: Estimates are based on small numbers of Indigenous persons who have a younger age distribution than non-Indigenous persons.

Source: National Dental Telephone Interview Surveys 1994, 1995, 1996.

Use of allied health and other health services

Information on the number of people who consulted non-medical health professionals is provided by the 1995 National Health Survey. This survey included questions about occasions on which people had consulted an allied or other health professional for treatment or discussion of a health-related matter. Occasions on which the person may have attended an allied or other health professional only to obtain medical supplies or aids (such as attending a chemist to fill a prescription) were not included (ABS 1997b).

Table 5.35 shows that 10% of people (8% of males and 12% of females) had consulted an allied or other health professional within the previous 2 weeks. Only 1% had visited more than one type of allied or other health professional within the previous 2 weeks. The allied or other health professionals most frequently consulted were chemists (by 2.4% of the population), chiropractors (1.6%), physiotherapists/hydrotherapists (1.5%) and nurses (1.3%).

Table 5.35: Number and per cent of people who visited an allied or other health professional in previous 2 weeks, by sex and type of health professional visited, 1995

	Males		Females		Total	
	Number ('000)	Per cent	Number ('000)	Per cent	Number ('000)	Per cent
Acupuncturist	15.2	0.2	39.0	0.4	54.2	0.3
Audiologist/audiometrist	13.1	0.1	6.3	0.1	19.4	0.1
Chiropractor	126.5	1.4	159.9	1.8	286.3	1.6
Chemist	159.0	1.8	265.5	2.9	424.5	2.4
Chiropodist/podiatrist	34.0	0.4	77.1	0.9	111.1	0.6
Dietician/nutritionist	15.2	0.2	39.5	0.4	54.7	0.3
Herbalist	12.5	0.1	28.9	0.3	41.3	0.2
Hypnotherapist	*1.4	*0.0	3.4	0.0	4.8	0.0
Naturopath	32.7	0.4	80.2	0.9	112.9	0.6
Nurse	100.2	1.1	132.9	1.5	233.1	1.3
Optician/optometrist	71.4	0.8	81.4	0.9	152.8	0.8
Osteopath	11.6	0.1	20.5	0.2	32.1	0.2
Occupational therapist	13.0	0.1	8.5	0.1	21.4	0.1
Physiotherapist/hydrotherapist	136.9	1.5	139.8	1.5	276.6	1.5
Psychologist	25.4	0.3	35.5	0.4	60.9	0.3
Social worker/welfare officer	27.5	0.3	44.3	0.5	71.8	0.4
Speech therapist/pathologist	29.8	0.3	9.6	0.1	39.4	0.2
Not stated	5.2	0.1	8.1	0.1	13.3	0.1
Total(a)	**751.4**	**8.4**	**1,041.2**	**11.5**	**1,792.6**	**9.9**

(a) Totals do not add to the sum of components as people may have consulted with more than one allied or other health professional within the previous 2 weeks.

* Relative standard error greater than 25%.

Source: ABS National Health Survey, unpublished data.

People aged 65 years or over were more likely to have visited at least one allied or other health professional within the previous 2 weeks than people in younger age groups. In this age group, the most frequently consulted health professionals were chiropodists/podiatrists (by 2.8% of those aged 65 years or over), nurses (2.1%), physiotherapists/hydrotherapists (1.7%) and opticians/optometrists (1.7%) (Table 5.36). For those aged under 65, the most frequently consulted allied or other health professionals were chemists, chiropractors, physiotherapists/hydrotherapists and nurses.

Table 5.36: Percentage of people who visited an allied or other health professional in previous 2 weeks, by age group and type of professional visited, 1995

Type of health professional	0–24	25–49	50–64	65+	Total
Acupuncturist	0.1	0.4	0.4	0.5	0.3
Audiologist/audiometrist	0.1	0.0	*0.1	0.4	0.1
Chiropractor	0.7	2.3	2.3	1.2	1.6
Chemist	2.8	2.6	1.7	1.0	2.4
Chiropodist/podiatrist	0.1	0.3	0.9	2.8	0.6
Dietician/nutritionist	0.2	0.3	0.5	0.3	0.3
Herbalist	0.2	0.3	0.2	*0.1	0.2
Hypnotherapist	*0.0	0.0	n.p.	*0.0	0.0
Naturopath	0.5	0.9	0.6	0.4	0.6
Nurse	1.8	0.8	0.6	2.1	1.3
Optician/optometrist	0.6	0.7	1.2	1.7	0.8
Osteopath	0.1	0.3	0.2	*0.1	0.2
Occupational therapist	0.1	0.1	0.1	0.2	0.1
Physiotherapist/hydrotherapist	1.0	1.8	2.1	1.7	1.5
Psychologist	0.3	0.5	0.2	*0.0	0.3
Social worker/welfare officer	0.5	0.4	0.2	0.3	0.4
Speech therapist/pathologist	0.5	*0.0	*0.0	*0.0	0.2
Not stated	0.0	0.1	0.1	*0.0	0.1
Total[(a)]	8.7	10.7	9.9	11.5	9.9

(a) Totals do not add to the sum of the components as people may have consulted with more than one allied or other health professional within the previous 2 weeks.

* Relative standard error greater than 25%.

Source: ABS National Health Survey, unpublished data.

People who had consulted a non-medical health professional were asked to provide up to five reasons for their most recent consultation. The most frequently mentioned health conditions or reasons for which people had sought treatment from an allied or other health professional were 'check-up/examination', 'other diseases of the musculoskeletal system and connective tissue', 'unspecified back problems' and 'dislocations, sprains and strains'. Information on the treatments provided in these consultations was not collected.

Hearing services

Hearing problems or deafness are major problems for many Australians. In 1995, a total of 2.25 million Australians reported that they suffered from diseases of the ear and mastoid process (ABS 1997b). The 1998 ABS Survey of Disability, Ageing and Carers estimated that there were 280,700 persons with a disability due to diseases of the ear and mastoid process. Of these, 30,600 were severely or profoundly restricted in their communication, and 73,100 were restricted in their ability to successfully participate in schooling or employment (ABS 1999c). Permanent hearing impairment occurs in approximately 3.5 children per 1,000 births and nearly 50% of people over the age of 60 years have a hearing impairment (Australian Hearing Services 1999).

The Commonwealth Government funds Australian Hearing Services to provide hearing support services and to conduct research. In 1998–99, Australian Hearing Services assisted 167,827 clients, including 43,866 children and 115,783 pensioners and veterans (Table 5.37). Services provided included fitting 98,737 hearing aids.

Table 5.37: Australian Hearing Services: client statistics and hearing aids fitted, 1996–97 to 1998–99

	1996–97	1997–98	1998–99
Client programs			
Pensioners and veterans	114,200	114,800	115,783
Children	41,500	43,700	43,866
Other services	6,400	8,300	8,178
Total clients	162,100	166,800	167,827
Hearing aids fitted			
In the ear/in the ear canal	53,700	53,500	61,402
Behind the ear	41,600	34,300	36,708
Other	900	600	627
Total	96,200	88,400	98,737

Source: Australian Hearing Services 1999.

Morbidity and its management in general practice

Consulting a doctor is the second most common health-related action taken by Australians, after the use of medications (ABS 1997b). The clinical activities of GPs are now the subject of an ongoing national survey known as BEACH (Bettering the Evaluation And Care of Health). The study is conducted by the General Practice Statistics and Classification Unit (an AIHW collaborating unit within the Family Medicine Research Centre, University of Sydney). BEACH began in April 1998 and involves a random sample of approximately 1,000 GPs per year. This section provides a brief summary of the first year's results, covering the period April 1998 to March 1999 (AIHW GPSCU: Britt et al. 1999a, 1999b).

The patients

The majority (57.7%) of patients were female. Approximately one in six encounters was with a child aged less than 15 years (15.8%), one in ten with a young adult (9.8%), and one in four with a patient in each of the following age groups: 25–44 years (26.0%), 45–64 years (24.4%), and 65 years and older (24.0%).

Almost half the encounters (47.3%) were with patients who held a healthcare card and 3.4% were with persons who held a Department of Veterans' Affairs card. In 14.5% of encounters the patient was from a non-English-speaking background, and in 1.0% the patient identified as an Aboriginal and/or a Torres Strait Islander person (Table 5.38).

Patients described an average 146.3 reasons for encounter (RFEs) per 100 encounters. Almost half (48.6%) of all reasons were symptom descriptions and 23.0% were described in terms of a diagnostic label (e.g. 'about my diabetes'). The 10 most commonly recorded RFEs accounted for 35.4% of all RFEs and are listed in order of frequency in Table 5.39.

The need for a check-up was by far the most common RFE (13.7 per 100 encounters) and requests for medication were also frequent (8.2). It is notable that RFEs described as 'hypertension' or 'high blood pressure' were reported at a rate of 2.5 per 100 encounters and these are likely to be closely associated with the need for a check-up and/or request for medication. RFEs associated with immunisation or vaccination were the fourth most often reported RFE (4.9 per 100).

Table 5.38: GP consultations: patient characteristics, 1998–99

Patient characteristic	Percentage of encounters
New patient to practice	9.2
Healthcare card	47.3
Veterans' Affairs card	3.4
Non-English-speaking background	14.5
Aboriginal and Torres Strait Islander person	1.1

Note: Based on 96,901 encounters.

Source: AIHW GPSCU: Britt et al. 1999b.

Table 5.39: GP consultations: 10 most frequent patient reasons for encounter, 1998–99

Patient reason for encounter (RFE)	Percentage of all reasons	Rate per 100 encounters
Check-up	9.3	13.7
Prescription	5.6	8.2
Cough	4.3	6.2
Immunisation/vaccination	3.4	4.9
Throat complaint	2.6	3.8
Back complaint	2.4	3.6
Test results	2.3	3.4
Upper respiratory tract infection	2.0	2.9
Rash	1.8	2.6
Hypertension/high blood pressure	1.7	2.5
Subtotal	*35.4*	. .
Total RFEs	**100.0**	**146.3**

Note: Based on 141,766 reasons for encounter.

Source: AIHW GPSCU: Britt et al. 1999b.

Problems managed

A total of 140,824 problems were managed at an average of 145.3 problems per 100 encounters. The number of problems managed increased steadily with age of patient and ranged from 118 per 100 encounters for those aged 1–14 years to 170 per 100 for those aged 65 years or more.

Half the problems managed in general practice related to four major body systems—the respiratory (16.7%), musculoskeletal (11.7%), skin (11.3%) and circulatory (11.11%) systems. The 20 most frequently managed problems accounted for 39.0% of all problems managed. Hypertension was the most common (8.3 per 100 encounters) followed by upper respiratory tract infection (6.8), immunisation/vaccination (5.2) and depression (3.5) (Table 5.40).

Table 5.40: GP consultations: 20 most frequently managed problems, 1998–99

Problem managed	Percentage of all problems	Rate per 100 encounters
Hypertension	5.7	8.3
Upper respiratory tract infection	4.7	6.8
Immunisation/vaccination	3.6	5.2
Depression	2.4	3.5
Acute bronchitis/bronchiolitis	2.3	3.3
Asthma	2.2	3.2
Back complaint	1.8	2.7
Diabetes	1.8	2.6
Lipid disorder	1.7	2.5
Osteoarthritis	1.5	2.2
Sprain/strain	1.3	1.9
Contact dermatitis	1.3	1.8
Acute otitis media/myringitis	1.2	1.8
Anxiety	1.2	1.7
Sleep disturbance	1.1	1.6
Urinary tract infection	1.1	1.6
Female genital check-up/Pap smear	1.1	1.6
Sinusitis acute/chronic	1.1	1.6
General check-up	1.1	1.6
Oesophageal disease	1.0	1.5
Subtotal	*39.0*	. .
Total problems	**100.0**	**145.3**

Note: Based on 140,824 problems managed.

Source: AIHW GPSCU: Britt et al. 1999b.

Management

A total of 189,735 management activities were undertaken by GPs at rates of 196 per 100 encounters and 135 per 100 problems. The most common management activity was the prescribing, advising (for purchase over the counter) or supply of medications (109.7 per 100 encounters or 75.5 per 100 problems). Other treatments of a clinical or procedural nature were provided at a rate of 43.2 per 100 encounters, and referral (11.2 per 100), ordering of pathology (24.6) and imaging (7.1) were also significant management activities (Table 5.41).

One or more medications were given for 59.1% of problems and at least one non-pharmacological treatment was used for 26.8% of problems. A referral was made for 7.6% of problems and at least one investigation was ordered for 14.2%, more commonly for pathology (10.0% of problems) than for imaging (4.5% of problems).

Table 5.41: GP consultations: summary of management activities, 1998–99

Management type	Rate per 100 encounters	Rate per 100 problems	Percentage of total problems[(a)]
Medications	109.7	75.5	59.1
Prescribed	93.6	64.4	51.3
Advised	8.8	6.1	5.5
GP supplied	7.3	5.0	4.0
Other treatments	43.2	29.7	26.8
Clinical	31.4	21.6	19.8
Procedural	11.8	8.1	7.7
Referrals	11.2	7.71	7.6
Specialist	7.4	5.1	5.0
Allied health	3.0	2.1	2.0
Hospital	0.7	0.5	0.5
Emergency department	0.1	0.0	0.0
Pathology	24.6	12.8	10.0
Imaging	7.1	3.7	4.5

(a) The percentage of total problems for which at least one of the specified management types was initiated by the GP.

Source: AIHW GPSCU: Britt et al. 1999b.

Medicare services

Data on the operation of Medicare, Australia's universal system of health insurance, provide an overview of the use of private medical services. These include services provided outside hospital as well as medical services for private patients in public and private hospitals. Note, however, that Medicare data do not provide a complete view of the use of medical services (see Box 5.8, page 297).

In 1998–99, Medicare provided benefits for 206.3 million services. This represents a 2-year increase of 3.8% over the 198.8 million services in 1996–97. The increase over this period was in part due to the effects of population growth (2.4%), a rise in the number of items per person and the inclusion of additional items in the Medical Benefits Schedule (MBS). Medicare items cover a range of different services, from a single doctor consultation to multiple pathology tests for a single patient episode, each of which is

Box 5.8: Medicare

Medicare, a universal system of health insurance, came into operation in 1984. Administered by the Health Insurance Commission (HIC), the scheme covers everyone normally resident in Australia, except foreign diplomats and their dependants. Short-term visitors, except those from countries with which reciprocal health care agreements have been made, are not eligible for Medicare benefits.

A schedule of fees has been established, and Medicare benefits for services provided by private practitioners are based on those fees. Benefits are payable for services provided by qualified medical practitioners, consultations by participating optometrists and certain services performed by eligible dental practitioners.

Some types of medical services do not qualify for Medicare benefits. These include services provided to eligible veterans and their dependants under Veterans' Affairs arrangements. Interim Medicare benefits may be paid for services for which claims may be lodged under motor vehicle third-party insurance and workers' compensation schemes, but these benefits are recovered by the HIC at the time claims are settled. Other services which do not qualify for Medicare benefits include services provided by public authorities and most government-funded community health services, as well as services not necessary for patient care (for example, examinations for employment purposes). To attract benefits, services must be 'clinically relevant', i.e. reasonably required for the treatment of the patient's condition.

Practitioners are not obliged to adhere to the schedule fees, except in the case of participating optometrists, but if they direct-bill the HIC for any service rather than issuing patients with accounts, the amount payable is the Medicare benefit, and additional charges must not be raised for the service.

For private admitted patients in hospitals (including day-hospital facilities), the Medicare benefit is 75% of the schedule fee, but the gap between benefit and schedule fee is insurable with private health insurance organisations. Insurance to cover amounts paid in excess of the schedule fee is prohibited unless the services are the subject of a private health insurance contract.

For non-hospital services, a benefit of up to 85% of the schedule fee is payable. The patient is responsible for the gap between the benefit paid and the schedule fee, up to a maximum amount, which is indexed annually. From 1 November 1999, that amount was set at $50.90. Patients remain responsible for payments of amounts charged above the schedule fee.

For all beneficiaries (individuals and registered families), if the sum of the gaps between benefits and schedule fees exceeds a specified amount in any year for non-hospital services, an amount up to the level of the schedule fee is reimbursed for services during the remainder of the year. The level of this 'safety net' threshold is linked to the Consumer Price Index, and is adjusted each year.

(continued)

Box 5.8 (continued): Medicare

Agreements between the Commonwealth Government and State and Territory Governments provide for all persons eligible for Medicare benefits to obtain inpatient and outpatient care at public hospitals without charge. Doctors appointed by the hospitals provide medical care for such 'public' patients (at no cost to the patient). Inpatients in public hospitals may choose to be private patients, in which case they are liable for accommodation and nursing charges set at levels agreed by the Commonwealth and for medical fees charged by private practitioners. Private health insurance can be purchased to cover hospital charges for private patients of public hospitals and patients of private hospitals. Uninsured patients can also elect to be treated as private patients, and pay the accommodation and other fees charged themselves.

counted as a separate item. Consequently, it is not possible to directly compare different types of services on the basis of the number of Medicare claims. Also for this reason, the terms 'items' or 'items of service' are generally used when referring to Medicare claims.

In 1998–99, a total of $6,669 million was paid in Medicare benefits, of which $2,395 million (35.9%) was for unreferred attendances, i.e. general practitioner services, emergency attendances after hours, other prolonged attendances, group therapy and acupuncture. A further $1,065 million (16.0%) was paid for diagnostic imaging, $1,008 million (15.1%) for pathology tests and $941 million (14.1%) for specialist attendances (Figure 5.13).

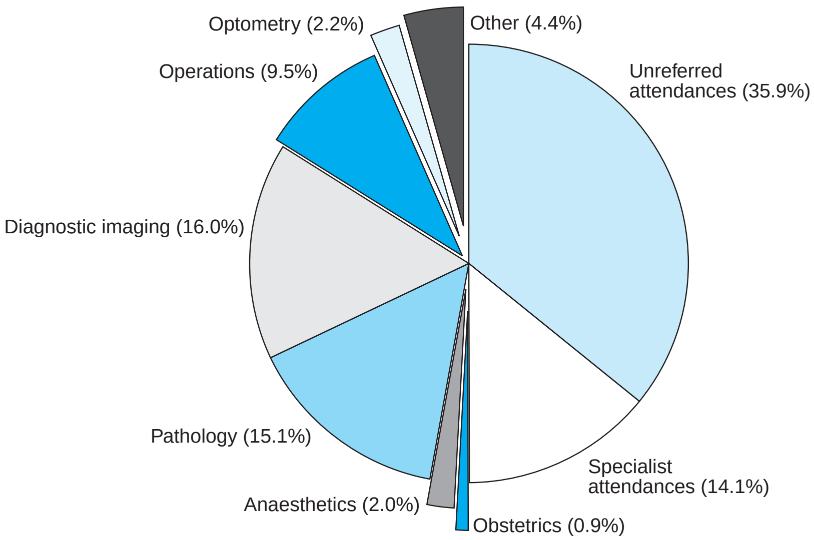
The largest increases in items of service from 1996–97 to 1998–99 were in radiotherapy and therapeutic nuclear medicine (39.1%), diagnostic imaging (21.5%) and pathology (17.6%).

Each person in Australia received, on average, 10.9 services under Medicare in 1998–99 (or 9.9 services if patient episode initiation items, which cover the administrative costs associated with collection of specimens for pathology, are excluded). These services included 5.4 unreferred attendances, 1.0 specialist attendance and 2.9 pathology items.

Since 1996–97, the annual number of services per person (including pathology patient episode initiation items) has increased from 10.7 to 10.9, or an average annual increase of 0.7% (Table 5.42, page 300). The largest increase was in pathology, in part due to privatisation of Commonwealth pathology laboratories and the inclusion of new items in the MBS. The next largest increase was in diagnostic imaging, partly due to the inclusion of magnetic resonance imaging in the MBS from 1 September 1998.

Although the average use was 10.9 services overall, the number per person varied considerably. For example, in 1998–99, 2.7% of the population received 51 or more services, accounting for 20.2% of total benefits paid, whereas 39.6% of the population received between one and five services, accounting for only 7.4% of total benefits.

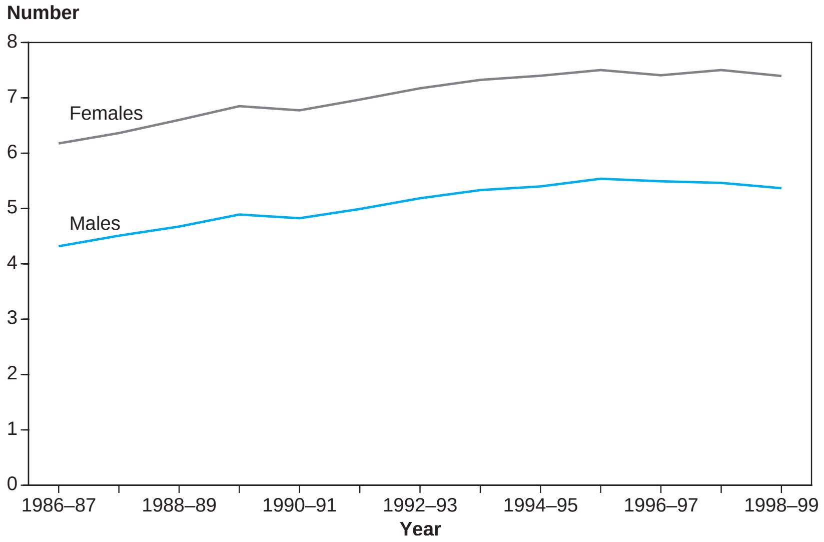
The average number of consultations with general practitioners and specialists per person increased steadily from 1986–87, until levelling out from 1995–96 (Figure 5.14). The data exclude obstetrics, pathology, radiology, anaesthetics, optometry and surgery.



Note: Based on the amount paid in benefits ($), not the number of services.

Source: DHAC 2000b.

Figure 5.13: Medicare benefits paid by broad type, 1998–99



Note: Rates are age-adjusted to the Australian population at 30 June 1991.

Source: AIHW, derived from Medicare claims data provided by the DHAC.

Figure 5.14: GP and specialist consultations per person, 1986–87 to 1998–99

In 1986–87, males consulted a general practitioner or specialist on average 4.3 times per year and females 6.2 times per year. In 1998–99, these rates were 5.5 and 7.5 respectively, representing average annual increases of 2.3% and 1.7%, respectively. The increase in consultation rates may be due in part to improved access to doctors, as there was a 20.6% increase in the number of full-time equivalent Medicare providers of general practice services between 1986–87 and 1998–99 (DHAC 2000b).

Increased promotion and awareness of steps which individuals can take to maintain their own health and that of their families, such as immunisation, Pap smears, blood pressure measurements and general health check-ups, may have also contributed to the increased consultation rates.

Table 5.42: Medicare items processed per capita, by broad type, 1996–97 and 1998–99

Type of item	1996–97	1998–99	Total change (per cent)	Annual change (per cent)
Unreferred attendances[(a)]	5.53	5.41	–2.3	–1.2
Specialist attendances	0.98	0.98	0.1	0.1
Obstetrics	0.09	0.08	–6.8	–3.4
Anaesthetics	0.09	0.09	–0.0	–0.0
Pathology				
PEI items[(b)]	0.91	0.97	6.3	3.2
Other	1.80	1.96	8.9	4.4
Total	2.71	2.93	8.0	4.0
Diagnostic imaging	0.56	0.60	7.2	3.6
Operations	0.29	0.29	–1.2	–0.6
Optometry	0.20	0.21	4.1	2.0
Other[(c)]	0.26	0.27	6.9	3.4
Total including PEI items	**10.73**	**10.88**	**1.4**	**0.7**
Total excluding PEI items	**9.82**	**9.91**	**0.9**	**0.5**

(a) Includes general practitioner attendances, emergency attendances, attendances after hours, other prolonged attendances, group therapy and acupuncture.

(b) Patient episode initiation items. These items cover the administrative costs associated with the collection of specimens.

(c) Includes assistance at operations, radiotherapy and therapeutic nuclear medicine, and miscellaneous services.

Source: DHAC 2000b.

Use of private medical services by State

Variations in the use of medical items occur across States. In 1998–99, the highest number of services was in New South Wales with 11.7 services per person, followed by Victoria (11.0), Queensland (10.8) and South Australia (10.3). The lowest per person use occurred in the Northern Territory (5.7). The low rate in the Northern Territory is at least partly due to services being provided to Aboriginal and Torres Strait Islander peoples through programs other than Medicare, and these services are not included in the data reported here.

5.6 Use of medications

Use of medications is the most common health-related action taken by Australians (ABS 1997b). Prescription medications are provided through community pharmacies and hospitals, and non-prescription medicines and complementary and alternative medicines are available from pharmacies and other retail outlets.

The 1995 National Health Survey provides the most recent data on the overall use of medicines in the total community. The survey estimated that 10.7 million Australians (59.1% of the population) used some form of prescribed or non-prescribed orthodox medication (medications other than homeopathic, herbal, nutritional and other complementary and alternative medicines) in the 2 weeks before interview, 4.7 million (25.8%) used vitamins or minerals and 1.7 million (9.4%) used herbal or natural medications. In general, the use of medication as a health-related action increased with age, with the lowest usage in the age group 5–14 years (48.9%) and the highest in the age group 75 years and over (91.6%). More females reported medication use than males (74.0% compared with 63.4%).

Use of orthodox medicines was also more common in females (64.0%) than in males (54.2%) and most common in persons aged 75 years or more (87.3%). Most types of drugs were most commonly used by persons aged 65 years or more; however, medications for coughs and colds were most commonly reported for children under the age of 5 years (16.7%), asthma medications were most common in children in the age group 5–14 years (9.6%) and use of medications for allergies and pain relievers was most often reported by persons in the age group 35–44 years (4.3% and 31.3% of people in that age group, respectively).

Prescribed medicines

The 1995 National Health Survey estimated that 6.54 million Australians used medications that had been prescribed by a medical practitioner in the 2 weeks prior to interview. The types of drugs most commonly used were medications for fluid, heart, blood pressure (1.93 million people), asthma medications (1.01 million people) and pain relievers (752,000 people).

Other information on the apparent use of prescription medicines in the community is compiled from two sources (DHAC 1999b). The first is the Health Insurance Commission records of prescriptions submitted for payment of a subsidy under the Pharmaceutical Benefits Scheme or the Repatriation Pharmaceutical Benefits Scheme (PBS and RPBS, see Box 5.9, page 302). The second is the Pharmacy Guild of Australia’s ongoing survey of a representative sample of about 250 community pharmacies, which provides an estimate of the use of non-subsidised prescription medicines. These sources do not cover use of medications in public hospitals and only cover use of some medications in private hospitals.

In 1998–99, there were 128.4 million community PBS prescriptions (19.3 million to general patients, 109.1 million or 85.0% to concessional patients) and about 45 million prescriptions which did not attract a subsidy (35 million below the copayment threshold and about 10 million private prescriptions, i.e. prescriptions for drugs not

Box 5.9: The Pharmaceutical Benefits Scheme

The Pharmaceutical Benefits Scheme (PBS) aims to provide timely, reliable and affordable access for the Australian community to necessary and cost-effective medicines, subsidising the cost of a wide range of prescription medications. As at 1 February 2000, 574 generic drugs, available in 1,391 forms and strengths (items) marketed as 2,084 different drug products (brands) were covered by the scheme. The items that attract benefits are reviewed frequently, and the price of every item covered is negotiated with the supplier.

Australian residents and visitors from those countries with which Australia has a Reciprocal Health Care Agreement are eligible for PBS benefits. Patients are grouped into two classes. General patients pay the first $20.60 (from 1 January 2000) for each prescription item. Concessional patients (people with low incomes and sickness beneficiaries who hold a healthcare card) make a copayment of $3.30 per item.

Individuals and families are protected from large overall expenses for PBS-listed medicines by safety nets. Once a general patient and/or their immediate family has spent $631.20 in a calendar year, the patient copayment per item decreases from $20.60 to the concessional rate of $3.30 per item. For concessional patients, the $3.30 copayment is not required once their expenditure on PBS items exceeds $171.60 in a calendar year. These copayments and safety net thresholds are indexed to movements in the Consumer Price Index from 1 January each year.

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 safety nets.

The PBS also funds a range of miscellaneous services including highly specialised drugs, IVF-centre hormones, growth hormones, emergency (Doctor's Bag) supplies and methadone.

The Commonwealth also helps in the provision and purchase of drugs through the Repatriation Pharmaceutical Benefits Scheme (RPBS), which provides assistance to specific groups of Australian war veterans and dependants. It is generally similar to the PBS for concessional beneficiaries.

listed on the PBS or RPBS) (DHAC 1999b). The number of prescriptions per person remained fairly constant over the period 1995 to 1998, averaging around 6.7 PBS prescriptions and 2.5 non-PBS prescriptions per year.

Use of prescription medicine can be described using the defined daily dose per 1,000 population per day (DDD/1,000/day) as the unit of measurement. The DDD is based on the assumed average dose per day of the drug, used for its main indication (reason for use) by adults. It provides an estimate of how many people per 1,000 population are taking the standard dose of the drug each day, on average, and allows for comparisons independent of differences in quantities of drugs per prescription. In 1998, salbutamol (a bronchodilator used for asthma) was the most commonly used drug using the DDD/1,000/day measurement (Table 5.43), followed by frusemide (a diuretic) and simvastatin (used for serum lipid reduction). In contrast, the top three drugs by prescription volume were paracetamol (an analgesic; 4.6 million PBS/RPBS prescriptions and 0.1 million other prescriptions), amoxycillin (an antibiotic; 2.3 million PBS/RPBS prescriptions and 2.3 million other prescriptions) and salbutamol (3.6 million PBS/RPBS prescriptions and 0.9 million other prescriptions).

The BEACH survey of general practice activity collects information on drugs prescribed by GPs. In 1998–99, antibiotics was the drug group most commonly prescribed by general practitioners, accounting for 17.8% of all prescriptions. This was followed by cardiovascular drugs (14.8%), central nervous system drugs (12.0%), psychological drugs (8.3%), respiratory drugs (7.3%) and hormones (6.9%).

Table 5.43: Top 10 drugs by defined daily dose per 1,000 population per day

Rank and drug name		Action	PBS/RPBS	Non-PBS/ RPBS	Total community use
1	Salbutamol	Bronchodilator (used for asthma)	22.5	6.5	29.0
2	Frusemide	Diuretic	20.3	2.2	22.6
3	Simvastatin	Serum lipid reduction	21.9	0.1	22.0
4	Enalapril	Anti-hypertensive	18.7	0.3	19.0
5	Ranitidine	Peptic ulcer treatment	17.0	0.1	16.9
6	Ipratropium bromide	Bronchodilator (used for asthma)	15.4	0.0	15.5
7	Amlodipine	Anti-hypertensive	13.9	0.1	13.9
8	Budesonide	Asthma preventative	13.5	0.0	13.6
9	Felodipine	Anti-hypertensive	10.9	1.0	11.9
10	Thyroxine	Thyroid hormone	7.1	4.6	11.7

Source: DHAC 1999b.

The most frequently prescribed individual generic drugs are listed in Table 5.44 (page 304). Five of the top ten drugs are from the antibiotic group. Simple analgesics were very frequently prescribed, probably reflecting their prescription for health care cardholders for whom they are a cheaper option than over-the-counter purchase. Influenza vaccine represented 1.8% of all prescriptions, presumably reflecting a response by patients and GPs to public health campaigns to increase vaccination levels in at-risk groups.

Non-prescribed medicines

The 1995 National Health Survey estimated that 6.3 million people (34.6% of the population) used orthodox medications that were not prescribed in the 2 weeks prior to interview, and 178,900 Australians (1.0%) used medications provided by a doctor or hospital (ABS 1997b). The most commonly used types of non-prescribed drugs were pain relievers (used by 3.6 million people) and skin ointments and creams (1.1 million people). Those drug types were also most commonly reported as provided by doctors or hospitals (48,600 people and 14,500 people respectively).

The BEACH survey collects information on drugs that GPs advise patients to purchase over the counter, and those that the GPs supply directly. About 8.0% of drugs were advised for over-the-counter purchase in 1998–99 and 6.7% were supplied by the GP, with the remainder being prescribed. Extrapolated, this represented about 8 million recommendations for purchase of drugs, and 6.7 million occasions at which at least one

Table 5.44: GP consultations: 20 most frequently prescribed drugs, 1998–99

Generic drug	Percentage of prescriptions	Prescriptions per 100 encounters
Paracetamol	4.2	3.9
Amoxycillin	3.5	3.2
Paracetamol/codeine	2.8	2.7
Salbutamol	2.6	2.4
Cefaclor monohydrate	2.3	2.2
Cephalexin	2.3	2.1
Roxithromycin	1.9	1.8
Amoxycillin/potassium clavulanate	1.9	1.8
Influenza virus vaccine	1.8	1.7
Temazepam	1.5	1.4
Diclofenac sodium systemic	1.4	1.3
Levonorgestrel/ethinyloestradiol	1.3	1.2
Doxycycline HCl	1.2	1.2
Diazepam	1.2	1.1
Erythromycin	1.2	1.1
Ranitidine	1.1	1.0
Atenolol	1.1	1.0
Frusemide (furosemide)	1.0	1.0
Betamethasone topical	1.0	0.9
Simvastatin	1.0	0.9
Subtotal	*36.2*	. .
Total prescribed	**100.0**	**93.6**

Note: Based on 90,710 prescriptions.

Source: AIHW GPSCU: Britt et al. 1999b.

drug was supplied from the GPs' stocks or samples. The drugs most commonly advised for over-the-counter purchase were paracetamol, chlorpheniramine/phenylephid (an expectorant) and topical clotrimazole (an anti-infective). GPs most commonly supplied influenza vaccine, triple antigen vaccine and oral polio vaccine.

Complementary and alternative medicines

In addition to the prescribed pharmaceuticals and other orthodox drugs, some Australians use a range of complementary and alternative medicines, including homoeopathic, herbal and nutritional medications. The 1995 National Health Survey estimated that 25.8% of Australians used vitamin or mineral supplements in the 2 weeks prior to interview, and 9.4% used herbal or natural medications (ABS 1997b). Vitamin or mineral supplements were used more commonly by females (30.3%) than by males (21.3%), as were herbal or natural medications (12.0% and 6.9% respectively). Persons aged 45 to 54 years were most likely to have used vitamin and mineral supplements (32.3%), and herbal or natural medications were most commonly used by persons aged between 45 and 64 years (13.6%).

In a 1993 representative survey of South Australian residents, 48.5% of respondents (54.8% of females and 33.8% of males) reported using at least one non-medically prescribed alternative medicine in the past year (MacLennan et al. 1996). Non-prescribed vitamins were most commonly reported (41.2% of females and 33.8% of males), followed by herbal medicines (11.1% of females and 8.6% of males), mineral supplements (10.3% of females and 8.1% of males) and evening primrose oil (12.7% of females and 2.7% of males). Respondents reported spending between $1 and $500 each on alternative medicines each month, with a median expenditure of $10. Extrapolated to the total Australian population, this expenditure corresponded to an estimated $621 million spent on complementary and alternative medicines in 1993.

Expenditure on pharmaceuticals

Total expenditure on non-hospital pharmaceuticals was $5,335 million in 1997–98: $3,377 million on benefit-paid pharmaceuticals and $1,958 million on other non-hospital pharmaceuticals. The Commonwealth Government contributed $2,783 million to the benefit-paid pharmaceuticals and individuals paid the remaining $593 million (Table 5.45). Public hospital expenditure reported to the AIHW National Public Hospital Establishments Database was about $611 million.

Table 5.45: Expenditure on pharmaceuticals[(a)] in Australia, 1997–98 ($ million)

	Benefit-paid pharmaceuticals	All other pharmaceuticals	Total pharmaceuticals
Public sector			
Commonwealth Department of Veterans' Affairs	205	. .	205
Commonwealth Department of Health and Aged Care	2,578	2	2,580
Public acute care and psychiatric hospitals	. .	611	611
Other State, Territory and local government	. .	16	16
Total public sector	*2,783*	*629*	*3,412*
Private sector			
Health insurance funds	. .	34	34
Individuals	593	1,869	2,463
Workers' compensation insurance	. .	27	27
Third party motor vehicle insurance	. .	10	10
Private hospitals	. .	n.a.	n.a.
Total private sector[(b)]	*593*	*1,940*	*2,534*
Total[(b)]	**3,377**	**2,569**	**5,946**

(a) Not including complementary and alternative medicines.

(b) Not including most expenditure in private hospitals.

Source: AIHW Health Expenditure Database.

The PBS was the largest single contributor to expenditure on pharmaceuticals. PBS expenditure on prescriptions and other miscellaneous services was $2,785 million in 1997–98 and increased by 10% to $3,070 million in 1998–99 (Table 5.46, page 306) (DHAC 1999c). Costs of the scheme and patient copayments have both risen each year in recent years, with the proportion met by the scheme remaining constant at about 82%.

Table 5.46: Cost of PBS items to the PBS and patients, 1994–95 to 1998–99 ($ million)

	1994–95	1995–96	1996–97	1997–98	1998–99
Patient contributions for PBS prescription items (a)	445	478	530	570	601
General patients	230	252	278	294	318
Concessional patients	214	227	252	276	283
PBS payments for PBS prescription items (b)	1,882	2,191	2,333	2,527	2,782
General patients—no safety net	291	343	392	412	468
General patients—safety net	93	119	73	99	107
Total general patients	384	462	465	510	576
Concessional patients—no safety net	1,195	1,369	1,466	1,576	1,740
Concessional patients—safety net	303	360	402	440	467
Total concessional patients	1,497	1,730	1,867	2,016	2,207
Total cost of PBS prescription items (a) + (b)	*2,326*	*2,669*	*2,863*	*3,097*	*3,384*
Miscellaneous PBS service payments (c)	110	135	206	259	287
Total expenditure by the PBS (b) + (c)	1,991	2,327	2,538	2,785	3,070
Total cost of PBS items to the PBS and patients (a) + (b) + (c)	**2,436**	**2,805**	**3,068**	**3,356**	**3,671**

Source: DHAC 1999c.

5.7 Health promotion and prevention

Health promotion and prevention are part of the suite of activities generally referred to as public health or population health. Health promotion and prevention activities have traditionally included population screening (e.g. for breast cancer), mass immunisation, water fluoridation, food inspection and quarantine, communicable disease control and surveillance, and health promoting communications (including social marketing), to name just a few.

In the last couple of decades, the scope of population health interventions and infrastructure has extended to include surveillance of disease risk factors, management of healthy growth and development (including, for example, parenting effectiveness training and support), mental health promotion, consumer product safety, and so on.

Population health interventions are characterised by a focus on:

- prevention, promotion and protection as opposed to treatment;
- population groups rather than the individual;
- the factors that affect health and causes of illness.

In its population health planning framework document, the National Public Health Partnership (NPHP 2000) lists 10 types of public health interventions covering policy and program areas (see Box 5.10).

For a particular public health issue, a mixture of intervention types is typically employed (constituting an intervention portfolio)—this is another characteristic of public health action, namely a comprehensive program of integrated activities to tackle the health issue. This section presents a case study of an intervention portfolio in the area of tobacco control.

Box 5.10: Types of public health interventions

1. *Public policy development*
2. *Legislation and regulation*
3. *Resource allocation*
4. *Engineering and technical*
5. *Incentives (financial and non-financial)*
6. *Service development and delivery*
7. *Education (including in clinical care and skills development)*
8. *Communication (including social marketing)*
9. *Collaboration/partnership building (community and intersectoral)*
10. *Community and organisational development (including organisational policy)*

Source: NPHP 2000.

Tobacco control—a case study in public health interventions

Over 18,000 deaths and 150,000 hospital separations each year in Australia are attributable to tobacco smoking (AIHW 1999a). Smoking-related conditions account for almost 10% of the total burden of disease (AIHW: Mathers et al. 1999c). Tobacco smoking is the single largest preventable cause of death.

The main elements of public health action in tobacco control are:

- taxation;
- regulation of tobacco products;
- promotion of (and, in some cases, legislation for) smoke-free indoor areas;
- education campaigns and social marketing; and
- community development and partnership building.

Taxation is a mechanism by which governments can affect the price of tobacco products; increasing the price of tobacco in turn reduces its accessibility. The Commonwealth Government levies the industry through excise payments on locally manufactured products and customs duty tariffs on imported products.

Tobacco products are regulated in a number of ways: legislation banning or limiting tobacco advertising; regulations regarding health warnings on tobacco products; minimum age restrictions on the sale of cigarettes; and legislation prohibiting the sale of individual cigarettes.

Restrictions on the promotion of tobacco products have been introduced, with a gradual phasing-in of bans on tobacco advertising in print, on television and radio, and in cinemas, with the exception of point-of-sale advertising. Point-of-sale advertising is prohibited in two States and restrictions are imposed in several other jurisdictions. There have been significant restrictions in the number of international sporting events granted exemptions from the general ban on tobacco advertising in Australia.

In some jurisdictions, health promotion foundations have been established. These foundations provide funding to arts and sporting bodies to replace tobacco sponsorship, resources for health promotion and, in some jurisdictions, funding for research.

In 1994 regulations were enacted to ensure uniform labelling of tobacco products throughout Australia and provision of appropriate product information to consumers. This includes six rotating health warnings and related information on tobacco products (see Box 5.11).

Box 5.11: Health warnings on tobacco products

Under the system operating since 1994, tobacco products are required to display:

1. *one of six rotating health warnings occupying 25% of the front of the pack:*

   SMOKING CAUSES LUNG CANCER

   SMOKING IS ADDICTIVE

   SMOKING KILLS

   SMOKING CAUSES HEART DISEASE

   SMOKING WHEN PREGNANT HARMS YOUR BABY

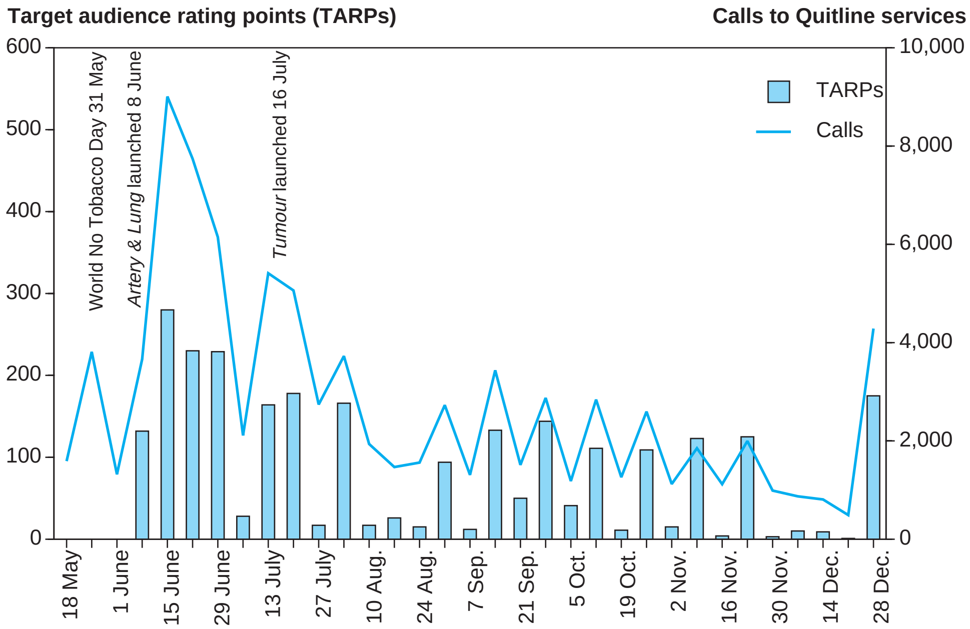
   YOUR SMOKING CAN HARM OTHERS
2. *detailed information (corresponding to the warning on the front of the pack) occupying 33% of the back of the pack*
3. *information about the tar, nicotine and carbon monoxide content of the cigarettes, occupying one entire side of the pack.*

Source: Trade Practices (Consumer Product Information Standards) (Tobacco) Regulations 1994 (Attachment W).

In all jurisdictions the minimum age for purchasing tobacco products is 18 years (with penalties imposed on those selling or, in some cases, supplying to minors). Most jurisdictions also restrict the location of cigarette vending machines to limit access by under-aged persons.

Policy change over the last decade has sought to reduce environmental tobacco smoke. Industries have been encouraged to adopt non-smoking policies for enclosed public places and in workplaces. More formal arrangements include the prohibition of smoking in commercial and government buildings, and on public transport. Legislation exists in some jurisdictions for smoke-free indoor areas in workplaces and other public places such as restaurants, cafes, shops and theatres. All other jurisdictions are working towards similar legislation.

The multi-tiered National Tobacco Campaign combines a series of explicit advertisements on television and radio, in newspapers and on buses with a nationally coordinated Quitline service for smokers. At the national level, Quitline call activity has been closely correlated with the volume of television advertising (Figure 5.15).



Source: Ministerial Tobacco Advisory Group 1999.

Figure 5.15: National Tobacco Campaign: target audience rating points (TARPs) compared with calls to Quitline services, May–December 1997

5.8 Health research in Australia

Health research focuses on understanding the influences on population health, and on developing and testing health promotion and disease prevention strategies. Medical research relates to understanding fundamental biological processes, disease and injury mechanisms, and the development and testing of clinical interventions for disease and injury prevention, treatment, rehabilitation and palliation.

Research funding

Australia invested a total of $853 million in health research and development during 1996–97 (Table 5.47, page 310). General government sources provided 38.3% of this funding ($328 million). A further $268 million came from institutes of higher education, while businesses—including government business enterprises—provided $134 million and private non-profit organisations and overseas sources funded the remaining $123 million.

Table 5.47: Expenditure on health research and development by source of funds, 1994–95 to 1996–97 ($ million)

Source	1994–95	1995–96	1996–97
Higher education institutions	170	231	268
Private non-profit and other	87	95	101
Overseas	14	18	22
Business enterprises[(a)]	72	135	134
Commonwealth Government	198	192	196
State and Territory Governments	137	131	127
Government (nec)	5	4	4
All funding sources	**682**	**806**	**853**

(a) Includes government business enterprises.

Source: AIHW Health Expenditure Database.

Institutes of higher education increased their share of the proportion of total funding for health research and development from 24.9% in 1994–95 to 31.4% in 1996–97. The share of funding by business enterprises also grew, from 10.6% in 1994–95 to 15.7% in 1996–97. General government funding of research and development fell as a proportion of total expenditure from 49.9% in 1994–95 to 38.3% in 1996–97.

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6

Health service strategies, performance and monitoring

In view of the importance, high cost and complexity of maintaining health, it is necessary to coordinate activities, set priorities and monitor the performance of the health system. This is a very challenging task, given the large number of agencies, both government and non-government, responsible for the delivery of health services, the range of potential health interventions and the difficulty of measuring their independent effects. This chapter describes the efforts being made at the national level to deal with these problems.

Commonwealth, State and Territory Health Ministers meet regularly as the Australian Health Ministers' Conference to coordinate health policy matters across jurisdictions. Their high-level advisory body, the Australian Health Ministers' Advisory Council (AHMAC), includes the heads of Commonwealth, State and Territory health authorities and the Commonwealth Department of Veterans' Affairs. In recent years these bodies have adopted a range of strategic plans for a national approach to deal with major health issues.

Performance indicators exist for Aboriginal and Torres Strait Islander health, the six National Health Priority Areas (NHPAs) and hospital services. The National Public Health Partnership and a new National Health Performance Committee, established by Health Ministers in 1999, are coordinating the development of frameworks for public health and for monitoring the performance of the overall health system.

Section 6.1 provides background on general issues associated with health services planning, including the evidence base needed to support priority setting. Section 6.2 describes some emerging and contemporary issues that are influencing decisions on health priorities. Section 6.3 describes the information frameworks that have been developed for monitoring performance against the objectives of high-level national health strategies. Section 6.4 reports on performance in some specific areas where national information has been developed and collected.

6.1 Issues in health services planning

The type of evidence and information required to support informed priority setting in health depends on the societal goals for health. Improving the overall health of the population is a major goal of all societies. However, priority setting based on the potential for health gain is not the only goal that Australians might value. Others might be:

- to give priority to those most disadvantaged, so that inequalities in health are reduced;

- to attach greater priority to large benefits than to the sum of many small ones, with life-saving counting the most of all;
- to attach greater importance to giving everyone some benefits as opposed to larger benefits for a few; and
- to attach less importance to life extension past a normal lifespan, thus attaching greater moral weight to achieving a 'fair innings' (Williams 1999).

The World Health Organization sees three goals for the health sector: health improvement, responsiveness and fair financing (Murray 1999). Responsiveness refers to the non-health aspects of the health sector which society values, and includes attributes such as privacy, accountability, informed choice and consumer participation. In principle, societies will generally be interested in improving both the level and the distribution of health and of responsiveness. Fair financing relates to distribution only; the level of health financing usually depends on broader social and political choices.

The evidence base needed to support priority setting in relation to these goals requires the following basic types of information (AIHW: Mathers et al. 1999):

- evidence based on scientific research on the nature and causes of health problems and the efficacy of prevention and treatment interventions;
- a detailed assessment of the magnitude and impact of health problems in the population, including information on the causes of loss of health (both in terms of disease and injury, and risk factors or broader determinants);
- information on health expenditure and health infrastructure (a national system of health accounts) detailing the availability of resources for health improvement, what the resources are currently used for, and the sources and distribution of health financing;
- information on the cost-effectiveness of available technologies and strategies for improving health; and
- information on variations and inequalities in health status, health determinants, and access to and use of health services (including both prevention and treatment services).

Australian and international health research aims to provide the first of these types of information. The National Health and Medical Research Council is the principal adviser to Government on health research matters.

A wide range of health information is collected in Australia to attempt to improve the second of these information needs. Health Ministers and administrators attach a high priority to this national task, which is led by the Australian Institute of Health and Welfare.

The third type of information is obtained through a range of statistical activity to monitor health expenditure, workforce numbers and infrastructure (see chapter 5).

The fourth type of information is still largely unexplored territory and will remain so, although there are increasing numbers of cost-effectiveness studies into particular aspects of health. An example is presented in Box 6.1.

Confronting a major health problem comprehensively may require a combination of preventive and curative interventions and continuing care. Resource allocation decisions are influenced by information, not always empirically derived, on the cost-effectiveness of interventions across this continuum. Most 'health' data in Australia still relate mainly to the inputs and throughputs of the healthcare system rather than to health outcomes and cost-effectiveness.

Box 6.1: Pharmaceutical Benefits Scheme: evidence-based case study

The Commonwealth subsidises a wide range of prescription medications through the Pharmaceutical Benefits Scheme (PBS). Before a new pharmaceutical is listed on the PBS, it is evaluated for safety and effectiveness by the Pharmaceutical Benefits Advisory Committee (PBAC). Since 1991–92, the PBAC has taken into consideration the costs as well as the benefits of new pharmaceuticals.

The guidelines for the PBAC state:

'A new drug entity may be recommended for listing if

(a) it is needed for the prevention or treatment of significant medical conditions not already covered, or inadequately covered, by drugs in the exiting list and is of acceptable cost-effectiveness;

(b) it is more effective, less toxic (or both) than a drug already listed for the same indications and is of acceptable cost-effectiveness; or

(c) it is at least as effective as a drug already listed for the same indications and is of similar or better cost-effectiveness.'

When pharmaceutical companies make submissions for listing their new products on the PBS, they have to supply an economic analysis of the expected costs and benefits of the pharmaceutical as well as information on the chemistry of the product, stability, quality control, in vitro studies, animal studies and clinical trials. There are specific guidelines to ensure that the economic analyses are undertaken in a way that enables the different pharmaceuticals to be evaluated consistently.

Analysis of the recommendations of the PBAC in the period November 1993 to March 1996 shows significant consistency in the decisions. Where the cost per additional life-year gained due to the pharmaceutical was less than $37,000, then 10 of the 11 pharmaceuticals in this category were recommended for listing on the PBS. All pharmaceuticals with a cost effectiveness greater than $70,000 per life-year were rejected at that price, and for those with a cost-effectiveness between $37,000 and $70,0000 per life-year some were accepted, and some rejected (George et al. 1997).

A pharmaceutical that does not get listed on the PBS, but is considered safe, can still be purchased in Australia. However, consumers have to pay the full cost.

A considerable number of pharmaceuticals approved before 1992–93 have not been considered for cost-effectiveness. In 1998–99, 34% of drugs listed on the PBS had been subjected to a cost-effectiveness evaluation.

Analyses of health information for population subgroups defined by a range of factors (area, socioeconomic status, Indigenous status, country of birth, etc.) are a source of information on variations and inequalities in health. Chapter 4 provides information of this nature.

The evidence base needed to help society set priorities for health interventions should allow assessment of the trade-offs between efficiency (maximising health outcomes) and equity (providing health benefits to all groups and reducing inequalities in health outcomes). Thus society needs information not only on the size of health problems and the potential for cost-effective health gain, but also on measures of the distribution of health in the population and the distributional impacts of health-related interventions. Equity concerns can then be tackled explicitly in any priority-setting or resource-allocation process, along with the potential to improve health.

6.2 Emerging and contemporary issues

There are a number of issues that are influencing decisions on health priorities to some extent at present, but which are likely to take on greater significance in coming years. These include demographic changes such as population ageing, changes in service delivery models including a move to more emphasis on community care, and coordinated care. A brief review of these emerging and contemporary issues follows.

Population ageing

The Australian population, like that of most other industrialised countries, is ageing, with an increasing proportion of men and women aged 65 and over. This is due to increases in life expectancy and lower fertility rates. In 1999, 12.2% (2.3 million) of the population were aged 65 and over; this is projected to rise to 18.0% (4.0 million) by 2021 (ABS 1998).

Turning to the older ages, some 2.0% of men were aged 80 and over in 1999; this is projected to reach 3.2% in 2021. For women, the comparable figures are 3.6% and 4.9%. This older age group (80 and over) is then projected to increase more rapidly, reaching 6.7% of men and 10.1% of women in 2051.

Expenditure on health services in the future depends on the interaction between supply and demand factors, each of which is difficult to predict. On the demand side, ageing adds only 0.6% to expenditure per year, so does not have a major impact on costs. However, changes in medical practice due to changes in technology add significantly to health costs each year (1.9% per person per year in the last 22 years). On the supply side, there has been an excess supply of general practitioners (GPs) in the metropolitan areas and shortages in the rural GP workforce. Whether supply shortages occur in the future will depend on workforce planning decisions now. In the nursing area, student nurse entrants have dropped from a peak of 9,300 in 1991 to 7,900 in 1998. The implications of this decline for the future, and the reasons for it, merit close attention.

Shift to community care

A move away from institutional-based care has occurred in the areas of mental health, disability and aged care, and there have been new models to replace some traditional hospital treatment, such as birthing centres and day surgery.

Between the early 1960s and 1992, the psychiatric bed ratio declined from 281 beds per 100,000 population to 40 beds per 100,000. As a consequence, thousands of people were discharged from long-stay institutions into the community, as were somewhat smaller numbers of people with physical or intellectual disabilities (Burdekin et al. 1993:166). In line with policy driving the first National Mental Health Strategy from 1992–93 to 1996–97, this 'de-institutionalisation' continued, with the proportion of State and Territory mental health service expenditure going to psychiatric hospital services reducing from 49% to 32%, and the proportion going to ambulatory services increasing from 23% to 34% (DHAC 1999b).

Average lengths of stay in public acute hospitals have fallen from 5.1 days in 1993–94 to 4.0 days in 1997–98 and in private hospitals from 3.9 to 3.3 days over the same period. A major contributor to this trend in recent years has been an increase in the number of same-day patients, whose treatment does not require an overnight stay in hospital. Same-day separations as a proportion of separations from all hospitals increased from 36.8% in 1993–94 to 46.3% in 1997–98.

Since 1985, the mix of aged care services has changed. There has been an increase in the availability of community-based care and no increase in the ratio of residential places to the population aged 70 and over. Similarly, in the last two decades there has been a large increase in the number of people with a disability with ongoing support needs living in the community, mainly with their families, and a relatively small decline in the number living in institutions (AIHW 1999c).

The cumulative effect of these coinciding policy directions is one of increasing need for and use of services that are home- and community-based.

Coordinated care

People with complex health service needs, such as those with chronic conditions, multiple health issues or other complex health needs, present a particular challenge to the health system. The number of people in this group is growing, in part due to the ageing of the population. Their needs are a challenge when faced with a complex health system and with care being needed from a number of different, and quite often separate, service providers. To better meet the needs of such people, Commonwealth, State and Territory governments have cooperated to establish coordinated care trials. There are currently nine trials being conducted throughout Australia. They have involved nomination of a formal care coordinator who undertakes multidisciplinary care planning and service coordination, along with pooled funding arrangements to support access to services needed for optimal patient care. These trials are in the final stages of data collection, with interim evaluation results recently released (DHAC 1999a).

6.3 Performance indicators

Well-designed and clearly defined indicators enable the systematic analysis of trends in health outcomes and factors affecting those outcomes. Indicators also enable comparisons across populations, help identify problem areas and are used to establish benchmarks. A number of high-level indicator frameworks have been established, or are under development, to enable the objectives of particular national health strategies to be monitored.

Performance indicators for Aboriginal and Torres Strait Islander health

In early 1996, the AHMAC agreed to develop a set of performance indicators for Aboriginal and Torres Strait Islander health. One of the intentions behind developing these indicators was to allow jurisdictions to monitor their efforts and progress in tackling the health disadvantages of Indigenous Australians, described in section 4.6.

Interim performance indicators, incorporating targets for selected indicators, were endorsed by AHMAC in April 1997, and later endorsed by all Australian Health Ministers and Ministers responsible for Aboriginal Affairs.

The interim indicator set includes over 50 indicators in the areas of:

- **health outcomes**, such as various aspects of mortality (age-specific, age-standardised, premature, by selected causes, stillbirths, etc.), children's hearing loss, low birthweight, hospitalisation, infectious diseases and sexually transmitted diseases;
- **access to services**, such as travel time to primary healthcare services and to hospital, per capita expenditure on health services, and measures of community control and community participation;
- **health service outputs**, such as health promotion programs targeted at Indigenous people, cervical cancer screening, childhood immunisation, protocols for effective management of selected conditions, hospital inpatient and outpatient activity, and primary care activity;
- **health workforce development**, such as Indigenous people in training, availability of an appropriate workforce in hospitals and primary care centres, number of identified positions and cross-cultural awareness programs;
- **risk factors**, including smoking, obesity, and hazardous consumption of alcohol and other substances; and
- **intersectoral issues**, such as household after-tax income relative to the poverty line and the presence of functioning household utilities (water, sewerage, power).

A first report comparing selected indicators from different jurisdictions was published in early 2000 (NHIMG 2000), but is characterised by much missing and poor-quality data.

All jurisdictions have experienced difficulty in reporting on a number of the indicators, although the extent of such problems has varied. Reporting problems have generally been due to inadequacies in the availability and quality of the necessary data, but some difficulties have arisen because of shortcomings in some of the indicators themselves. Refinement of the performance indicators is under way, taking into account the experiences of jurisdictions in the reporting process to date. Among the issues to be considered are the total number of indicators, the balance of measures of inputs, outputs and outcomes, the relevance of individual indicators, and the feasibility of collecting adequate data to allow for reporting on a regular basis.

National Health Priority Area indicators

Sets of indicators have been developed or are under development to monitor health interventions and outcomes in each of the National Health Priority Areas (NHPAs) of cardiovascular health, cancer control, injury prevention and control, mental health, diabetes mellitus and asthma (the last still under development). The indicators have been designed as summary measures, rates and ratios, to monitor the results of interventions at process, risk and primary outcome levels. A framework to guide the development of these indicators was prepared by the National Health Information Management Group in 1996 (see Box 6.2, page 320).

Extensive information on NHPAs is included in other parts of this report. However, an update of the indicator sets that have been adopted for NHPA reporting is provided in Tables S52–57, pages 415–425.

As NHPA strategies are developed, strategic tracking indicators will be included to enable more precise monitoring and evaluation.

National public health performance indicators

Public health is characterised by planning and intervening for better health in populations rather than focusing on the health of the individual. The activity of public health is concerned with those factors that determine health and causes of illness rather than responding to episodes of illness or injury, which is the major role of clinical health services. Therefore, public health indicators must be able to monitor health determinants as well as health status in populations.

The National Public Health Partnership (NPHP) is currently developing a set of public health performance indicators. It is working concurrently on a Planning Framework for Public Health Practice, which will define the principles that characterise public health action and the domains in which action takes place, and provide a framework for public health performance indicators. An AIHW discussion paper on National Public Health Indicators (AIHW 1999b) and recently developed overseas models, such as the United States' Leading Indicators for Healthy People 2010 (Institute of Medicine 1999) and the Canadian health indicators framework (Canadian Institute for Health Information 2000), are helping to shape the process. The NPHP is working in conjunction with the National Health Performance Committee (NHPC) in this task.

National health performance indicators

In 1999, the Australian Health Ministers' Conference, on advice from AHMAC, agreed to the establishment of the NHPC, whose terms of reference include developing and maintaining a national performance measurement framework for the health system. This framework will provide a basis for reporting to the Australian Health Ministers' Conference and other national authorities with a comparative analysis and information on national health system performance. The scope of the NHPC's brief is broad and so will encompass reporting on the acute healthcare sector, as previously undertaken by the National Health Ministers' Benchmarking Working Group (see Performance indicators in the hospital sector, page 321), community health care and public health.

Box 6.2: NHIMG health outcome indicator framework

In 1996, the National Health Information Management Group responded to a request from AHMAC for development of a framework for health outcome indicators. The framework was required to be applicable to generic and clinically specified measures and indicators of health outcomes, including outcomes pertaining to the national goals and targets. The NHPA initiative, which replaced previous activity under the banner 'National Health Goals and Targets', adopted the framework to guide specification and development of indicator sets.

The framework consists of a two-dimensional grid made up of four types of indicators:

- *primary outcome indicators*
- *risk indicators*
- *process and quality indicators*
- *system indicators*

and three intervention strategies:

- *prevention*
- *management*
- *maintenance.*

The primary outcome indicators cover incidence, prevalence and sequelae ranging from mortality to quality of life. Risk indicators provide information about characteristics, variables or hazards, which, if present in a given individual, make it more (or less) likely that this individual will develop a health problem. The process and quality indicators refer to the performance of interventions on health or risk. System indicators relate to policies, resources and infrastructure for dealing with the health problem area.

The term 'prevention' is reserved for interventions that occur before the diagnosis of an event is made. There are three different types of prevention targeted at populations or individuals with different risk levels: universal, selective and indicated. 'Management' refers to interventions that are therapeutic in nature and are provided to individuals who meet diagnostic criteria. Management involves case identification and standard treatment for the known disorder, which includes interventions to reduce the likelihood of future associated disorders. 'Maintenance' interventions include the provision of support and after-care services to the patient, including rehabilitation.

Further information is contained in the First Report on National Health Priority Areas 1996 *(AIHW & DHFS 1997).*

Outside of the health sector, the performance of the national health system is monitored in annual reports by the Steering Committee for the Review of Commonwealth/State Service Provision. Health agencies, including the AIHW, are represented on the Steering Committee's Health Working Group, which draws principally on data already available across the health sector (SCRCSSP 2000).

6.4 Service delivery monitoring

This section presents information illustrative of the current state of information that can be reported on performance in health service delivery. It covers admitted patient services in the hospital sector and palliative care services. Performance reporting for services delivered in community and ambulatory settings remains developmental. A case study in the preventive care field, breast cancer screening, is also included to illustrate the kind of performance monitoring that is emerging for public health activity.

Performance indicators in the hospital sector

Advances in drug treatments and medical technology have led to substantial changes in the hospital sector. Health care delivered in hospitals has become more and more the domain of specialist services that provide a high level of medical and technical care for patients with the most severe conditions. There have also been reductions in the length of stay of patients and a shift towards the provision of care in community settings.

Efficiency and effectiveness

The National Health Ministers' Benchmarking Working Group, which operated under the auspices of the Australian Health Ministers' Conference from 1994 to 1999, has developed a set of indicators to measure the efficiency and effectiveness of hospital performance (Table 6.1, page 322). Data are not currently available to allow a comprehensive report on all these indicators. Data are presented in this section on cost per casemix-adjusted separation, the main indicator of efficiency of hospital operations, on elective surgery waiting times and, to the extent possible with limited data, on quality of care in hospitals and other healthcare delivery settings. Other indicators have been reported by the National Health Ministers' Benchmarking Working Group (DHAC 1999c).

Cost per casemix-adjusted separation

The cost per casemix-adjusted separation can be used to compare the average cost of treating an admitted patient after adjusting for differences in the complexity of case types (i.e. the overall casemix) treated by different hospitals. Table 6.2 (page 322) shows the cost per casemix-adjusted separation for each jurisdiction. In 1997–98, the cost per casemix-adjusted separation for acute hospital care for States and Territories ranged from $2,354 in Queensland to $3,623 in the Australian Capital Territory. A major portion of these costs is nursing and medical staff salaries, which nationally accounted for 45% (27% in nursing salaries and 18% in medical salaries) of the cost per casemix-adjusted separation.

In Victoria, psychiatric patients are included in the total separations used to calculate the cost figures in Table 6.2. This follows the mainstreaming of specialised psychiatric care into the public acute hospital system so that, for the period reported, these separations cannot be separately identified. For other States, much of their specialised psychiatric care is in public psychiatric hospitals which are not included in this calculation. Separations and expenditure for rehabilitation and non-acute patients could also not be excluded from the Victorian data. The Victorian Department of Human Services has estimated that the combined effect of these differences is to inflate the cost per casemix-adjusted separation for Victoria by approximately 10%.

Table 6.1: Performance indicators developed for benchmarking in the hospital sector

Category	Indicator
Efficiency	Cost per casemix-adjusted separation
	Cost of treatment per outpatient
	Average length of stay for top twenty Australian National Diagnosis Related Groups (AN-DRGs)
	User cost of capital (per casemix-adjusted separation)
	Ratio of depreciated replacement value to total replacement value
	Total replacement value per casemix-adjusted separation
	Labour costs per casemix-adjusted separation
Effectiveness	Rate of emergency patient readmission within 28 days of separation
	Rate of hospital-acquired infection
	Rate of unplanned return to theatre
	Patient satisfaction
	Proportion of beds accredited by Australian Council on Healthcare Standards
	Waiting times for elective surgery
	Accident and emergency waiting times
	Outpatient waiting times
	Variations in intervention rates
	Separations per 1,000 population

Source: NHMBWG 1996.

Table 6.2: Cost per casemix-adjusted separation ($), selected public acute hospitals(a), 1997–98

Cost component	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Medical labour(b)	542	440	376	484	472	453	685	481	471
Non-medical labour(c)	1,431	1,384	1,359	1,631	1,237	1,486	1,856	1,858	1,419
Non-salary costs(d)	664	638	619	851	749	800	1,082	1,024	685
Total	**2,637**	**2,462**	**2,354**	**2,966**	**2,458**	**2,739**	**3,623**	**3,363**	**2,575**

(a) Excludes psychiatric hospitals, drug and alcohol services, mothercraft hospitals, dental hospitals, hospices, community non-acute hospitals, rehabiliation facilities and multipurpose facilities.

(b) Salaried/sessional staff, payments to Visiting Medical Officers and private patient costs.

(c) Salary costs for nursing, diagnostic/allied health staff, administrative staff, other personal care and domestic staff and superannuation payments.

(d) Non-salary costs for domestic services, repairs/maintenance, medical supplies, drug supplies, food supplies, administration, transport and insurance.

Source: AIHW 1999a.

Elective surgery waiting times

Waiting lists for elective surgery, and the associated waiting times, are often used to evaluate the status of health services within a community, particularly the ability of public hospitals to provide access to their services, i.e. to provide appropriate, affordable and timely care according to need.

The National Elective Surgery Waiting Times Data Collection is maintained by the AIHW (see Box 6.3 for definitions used). The focus of the national collection is waiting times, rather than waiting lists, because, without knowledge of the rate of turnover of patients on a waiting list, its size is not a reliable indicator of access to the hospital system or of the amount of time that a patient would be likely to have to wait, or to have waited, for surgery. Two summary measures are used:

- the proportion of patients admitted for elective surgery after extended waits on waiting lists (throughput data); and
- the proportion of patients on waiting lists on a particular date who had already had an extended wait (census data).

Waiting times for patients admitted during a certain period of time are generally used as the main summary measure of elective surgery waiting times, although they provide measures of waiting times only for patients who complete their wait and are admitted. Most patients are admitted after waiting, but 10% to 20% of patients are removed from waiting lists for other reasons (e.g. they were admitted as an emergency patient for the awaited procedure; or they were not contactable, had died, had been treated elsewhere, or had declined the surgery). In contrast, census data are collected on all patients on waiting lists, not just those who actually receive elective surgery at the end of their wait.

Box 6.3: Elective surgery waiting times: definitions

National Health Data Dictionary *(AIHW 1998b) definitions are the basis of the National Elective Surgery Waiting Times Data Collection, but the definitions used varied slightly among the States and Territories in 1997–98 and compared with previous reporting periods.*

Clinical urgency category

The patients waiting for elective surgery are classified according to their clinical urgency into three categories. 'Extended waits' are waits longer than 30 days for clinical urgency category 1, waits longer than 90 days for clinical urgency category 2 and waits longer than 12 months for clinical urgency category 3.

Calculation of waiting times

Waiting times are generally calculated by comparing the date a patient was added to a waiting list with the date the patient was admitted (for throughput data) or the census date (for census data). In 1997–98, there was some variation in the method by which waiting times were calculated by the States and Territories for patients who change clinical urgency category while they are on the waiting list.

Emergency admissions

Most States and Territories provided data separately for patients admitted for the awaited procedure as an elective admission and for patients admitted as an emergency patient for the awaited procedure. In that case, only the data on elective admissions were included, because patients who were admitted as emergency patients for the awaited procedure can no longer be regarded as having 'elective surgery'. However, small numbers of records for emergency admissions were not able to be excluded from the patient-level admissions data for some States and Territories.

National elective surgery waiting times data are for public acute care hospitals. Private hospitals are not included, except for two hospitals in New South Wales that are funded by the New South Wales Health Department to provide services for public patients. Some public patients treated under contract in private hospitals in Victoria are also included.

The most recent data available are for 1997–98 (AIHW 2000b). In that year all public acute care hospitals in New South Wales, the Australian Capital Territory and the Northern Territory were included in the data collection. In other States and Territories, all public hospitals that perform elective surgery were generally included, although data were not collected for some smaller public hospitals.

Table 6.3 shows the proportion of patients admitted for elective surgery during 1997–98 after extended waits on waiting lists (throughput data). Nationally, 11% of patients admitted for elective surgery from the two most urgent groups (clinical urgency categories 1 and 2) had extended waits. In clinical urgency category 3, 4% of patients had extended waits.

Table 6.3: Proportion of patients admitted after extended waits, by State and Territory and clinical urgency, 1997–98 (per cent)

		Clinical urgency(a)			
State or Territory	**Coverage**	**Category 1**	**Category 2**	**Category 3**	**All patients**
New South Wales	100	14.3	8.5	5.6	9.6
Victoria(b)	76	n.a.	n.a.	n.a.	n.a.
Queensland	95	6.4	15.5	0.0	8.3
Western Australia	68	10.0	12.0	9.0	9.9
South Australia	73	8.6	8.9	2.7	5.2
Tasmania	88	15.3	35.3	13.2	20.4
Australian Capital Territory	100	7.7	25.7	10.7	16.9
Northern Territory	100	10.3	19.0	3.7	9.8
Total		**11.2**	**11.2**	**4.0**	**8.2**

(a) See Box 6.3, page 323.

(b) For the period 1 January to 30 June 1998 only.

Source: AIHW 2000b.

The proportion of patients in clinical urgency category 1 admitted with extended waits varied among the jurisdictions, from 6% in Queensland hospitals to 15% in Tasmanian hospitals. There was more variation in the proportion with extended waits in clinical urgency categories 2 (from 9% to 35%) and 3 (from 0% to 13%). Some of this variation could be due to differences in coverage and use of definitions, or to differences in the types of elective surgery performed in each jurisdiction.

Quality

Frameworks for health sector performance measurement all incorporate quality as an aspect of health care that should be monitored, but there is variation in the way in which it is included. Some frameworks, such as that developed by the National Health Ministers' Benchmarking Working Group for acute care hospitals, have viewed quality as a component of effectiveness, monitored with indicators such as patient satisfaction, rates of unplanned re-admissions, rates of hospital-acquired infection and the proportion of hospital beds that are accredited. Other frameworks, such as that proposed by Boyce et al. (1997), and frameworks currently under consideration by the National Health Performance Committee to be applicable to the wider health sector, have included quality not as a separate category but as encompassing effectiveness, appropriateness, safety, consumer experience, acceptability, accessibility and equity, continuity, capability and/or other aspects of service delivery.

Considered together, the range of frameworks can be seen to summarise quality as being assessable in two major ways. The first is whether the health service has achieved what was intended, i.e. whether it has been effective in producing a desired outcome. The second is whether it was safe, i.e. whether there were adverse effects or unintended or undesired outcomes resulting from the intervention or the healthcare environment.

Reliable national information on these aspects of the quality of the health services is, however, not readily available. Most data collection and indicator development have focused on clinical care and, in particular, on the acute care hospital setting, with progress in the areas of prevention and population health much more limited. Even within clinical care and hospitals, the availability of information has been limited by difficulties in specifying valid indicators and in generating reliable and consistent data. Because desired and undesired outcomes can be difficult to assess (because they occur a long time after the health service provision, for example), ‘process’ indicators are sometimes used instead of outcome indicators. Process indicators, which should be able to predict outcomes, are often based on specialist and evidence-based opinion on methods for managing particular conditions, for example, and can be more sensitive to errors or deficiencies in healthcare provision than are outcome indicators.

Desired outcomes

National information on whether health services have achieved desired outcomes is particularly scarce. In the hospital setting, a wide range of clinical indicators (including health outcome indicators and process indicators) are being developed for the Australian Council on Healthcare Standards (ACHS) Evaluation and Quality Improvement Program by the ACHS itself and by medical colleges, associations and special societies. Reports published for the Program summarise data from over 500 healthcare organisations and may provide directions for the development of national health outcome indicators (ACHS 1998).

The evaluation of some population health programs has included assessment of health outcomes, but these outcomes are necessarily influenced by other factors, including other health services, and non-health factors such as socioeconomic status. Nevertheless, national programs such as those for controlling HIV/AIDS, for improving immunisation against measles and for breast cancer screening have been linked with reduced incidence, impact and/or mortality of the diseases that they targeted.

The effectiveness of healthcare services has also been indirectly assessed using process indicators such as the proportion of hospitals that are accredited by the ACHS or other bodies. The proportion of hospitals and hospital beds accredited by the ACHS is the only data available on a national basis for this assessment for hospitals. In 1997–98, 47%

of public hospitals, 49% of private freestanding day hospital facilities and 78% of other private hospitals were accredited. Larger hospitals were more likely to be accredited than smaller hospitals, such that 75% of beds in public hospitals, 52% of beds in private freestanding day hospital facilities and 90% in other private hospitals were accredited. Because accreditation is voluntary, can be relatively costly for small hospitals and can be sought from other bodies, these data provide only indicative information about the quality of care provided in Australian hospitals.

Accreditation measures have also been reported as an indicator related to quality for general practitioners (SCRCSSP 2000). In 1998–99, the proportion of full-time GPs with vocational registration was 91% in 1998–99 and, at end of 1999, almost half of the general practices were accredited with Australian General Practice Accreditation Limited.

Patient perspectives on the quality of health care, gathered through patient satisfaction surveys, can also potentially provide measures of whether health care has produced desired outcomes. These surveys, which have included questions to assess aspects of health care related to effectiveness, safety, accessibility and acceptability, have been conducted on a population basis in some jurisdictions, and for hospital patients in others. Methods and questionnaires used differ among the surveys so the data have not been collated or reported on a national basis. However, State reports indicate high levels of satisfaction with care provided in public acute care hospitals (SCRCSSP 2000).

Undesired outcomes

Information from the patient's perspective has also been used to assess the occurrence of adverse events and other undesired outcomes of health care. Each State and Territory has an independent health complaint body that investigates and conciliates complaints made by consumers about health services, and compiles information about the complaints. In 1996, the National Health Complaints Information Project was established to work towards a national database of health complaint data. It was anticipated that collation and analysis of the national database would lead to information being available to improve health care services. The Project's main focus so far has been on developing the reporting infrastructures and definitions to be used in the national database, with national data yet to be reported.

In the hospital setting, the last large-scale assessment of the occurrence of adverse events was in the Quality in Australian Health Care Study (Wilson et al. 1995), which used information collected in a review of medical records for hospitalisations in New South Wales and South Australia in 1992. Since then, potential hospital-level indicators of undesired outcomes (unplanned re-admission to hospital, unexpected return to operating theatre, and hospital-acquired infections) have been tested for validity and reliability and for the ease of collection of the data required for their measurement. However, a valid relationship between quality of care and the indicators tested could not be demonstrated and the data to measure these outcomes could not be extracted from the databases available of routinely collected data.

The Australian and New Zealand College of Anaesthetists has been compiling and publishing reports on anaesthesia-related mortality in Australia since 1985. In the 1994–96 triennium, there were 135 deaths that were definitely or probably attributable to anaesthesia, or were attributable to anaesthesia in combination with other factors (about

2.6 deaths per million population per year). Of these, 55 deaths (1.0 death per million population per year) were considered to be definitely attributable to anaesthesia. It was estimated that there was 1 death definitely, probably or jointly attributable to anaesthesia for every 63,000 operative or diagnostic procedures performed in Australia in the triennium, with 1 death definitely attributable to anaesthesia for every 150,000 procedures (Davis 1999).

The Australian Incident Monitoring Scheme, run by the Australian Patient Safety Foundation, compiles anonymously reported detailed data on incidents in hospitals and other healthcare facilities, with incidents defined broadly as any event or circumstance which could have harmed or did harm anyone or which could result in a complaint. This type of incident reporting may be a source of national adverse-event data in the future, but reporting is voluntary and, at present, only a minority of hospitals and other facilities report. Some data on the occurrence of adverse events are also collected in the routinely compiled hospital morbidity databases and in the national mortality data. However, the sensitivity and specificity of these data sources for adverse events are probably not high enough for them to be used to routinely measure adverse outcomes.

The development of a national reporting system for errors that result in serious injury and death of patients in the healthcare system has been identified as an area for immediate action by the recently established Australian Council for Safety and Quality in Health Care. The role of the Council, established in 2000 by the Commonwealth, State and Territory Health Ministers, is to lead national efforts to promote systemic improvements in the safety and quality of health care in Australia with a particular focus on minimising the likelihood and effects of error. Its main aims include the development of a national strategy to improve the safety and quality of health care in hospitals and other health settings; the development of a national framework for adverse-event monitoring, management and prevention including incident monitoring and complaints; and effective reporting and measurement of performance, including research and development of clinical and administrative information systems.

Palliative care

Palliative care is 'the active total care of people whose disease is not responsive to curative treatment' (DHFS 1998:2). Most palliative care is provided to patients with cancer, although a significant amount of care is also provided to people with non-malignant diseases such as heart failure, end-stage renal failure and motor neurone disease.

In 1997–98, there were 17,824 hospital separations in Australia where the patient was identified as receiving palliative care. The average length of stay was 13.3 days, and 84% of separations were from public hospitals. Over one-third of palliative care separations were patients aged 75 years or over, and approximately two-thirds of all palliative care separations were patients aged 65 years or over. Males accounted for 54% of the palliative care separations, and 70% of palliative care separations had a principal diagnosis of cancer.

To support the monitoring of the provision of palliative care, all States and Territories are cooperating in the development of a National Minimum Data Set (NMDS) for palliative care.

The NMDS for institutional palliative care will be used to collect data on palliative care patients seen in public and private hospitals and hospices from 1 July 2000. The data set will include demographic, clinical and administrative data on all admitted patients. Patients who do not receive care from specialised palliative care staff, but where the principal clinical intent is palliative, will be separately identified. Much of these data are already collected as part of the National Hospital Morbidity Database, and existing data relating to palliative-care patients has been summarised in *Palliative Care Information Development: Progress Report on the National Minimum Data Set for Palliative Care* (AIHW: Jellie & Shaw 1999).

An NMDS for community palliative care is currently being developed by all States and Territories in collaboration with the AIHW and the Commonwealth Department of Health and Aged Care. This data set will be used to collect information in all services funded by governments which provide home- or community-based palliative care.

These data will be used to underpin the derivation of a suite of national palliative care performance indicators. This information will be used to monitor the current delivery of palliative care and to provide a basis for future policy development relating to this area.

Breast cancer screening

Following a review of international evidence and an evaluation of breast cancer screening in Australia, AHMAC implemented, in 1991, the National Program for the Early Detection of Breast Cancer (now called BreastScreen Australia).

The key aims of BreastScreen Australia are:

- to ensure that the program is implemented in such a way that significant reductions can be achieved in morbidity and mortality attributable to breast cancer;
- to maximise the early detection of breast cancer in the target population;
- to ensure that screening for breast cancer is provided in dedicated, accredited screening and assessment services;
- to ensure equitable access for women aged 50–69 years to breast cancer screening; and
- to ensure that services are acceptable and appropriate to the needs of the eligible population.

Indicators have been developed in areas of participation, detection, sensitivity, incidence and mortality to monitor the performance of the program (AIHW 1998a).

In the two years 1996 and 1997, about 1.25 million Australian women were screened through the program, including just over half of all women in the target group (aged 50–69 years, Table 6.4).

The rate of small cancer detection measures the number of women with small invasive breast cancers of 10 mm or less in size. Early detection of small cancers gives a woman a better chance for a good prognosis, as small tumours have a greater chance of being removed with less extensive surgery, requiring less after-care. The greater the rate of detection of small cancers, the greater the likelihood of achieving reductions in mortality and morbidity from breast cancer. The small-cancer detection rate for women aged 50–69 years in 1997 was 13.2 cancers per 10,000 women screened (Table 6.4).

Sensitivity refers to the effectiveness of screening mammography and/or the BreastScreen Australia program at detecting the presence of breast cancer in well women. There are two sensitivity measures. The first is the interval cancer rate, which measures the sensitivity of the mammography screening test. The second is program sensitivity, which takes into account the accuracy of the test, the processes of the program and the length of the screening interval. The aim is for an interval cancer rate as low as possible and high program sensitivity (AIHW 2000a).

Incidence is the rate of new cases of breast cancer. After peaking in the mid-1990s, the incidence rate for women aged 50–69 years appears to have declined slightly.

Reducing the death rate from breast cancer is the main objective of BreastScreen Australia. The effect of the program on death rates may not be evident until several years after the introduction of screening. However, the death rate for breast cancer among women aged 50–69 years has fallen slightly in recent years from 65.0 per 100,000 in 1996 to 59.4 per 100,000 women in 1998 (Table 6.4).

Table 6.4: Summary indicators for breast cancer screening, women aged 50–69 years

Indicator	Year	Proportion/rate
Per cent of women screened in 24-month period	1996–1997	52.2
Rate of small diameter (≤10 mm) invasive cancers detected (per 10,000 women screened)	1997	14.4
Incidence rate of breast cancer cases (new cases per 100,000 women)	1996	270.2
	1997	281.5
Death rate for breast cancer (per 100,000 women)	1996	65.0
	1997	62.8
	1998	59.4

Source: AIHW 1998a.

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7 Challenges for national health information

The large amount of material presented in preceding chapters describes the current state of health in Australia at the end of the twentieth century. Australia has a well-developed statistical system, and is well served by institutions with a major commitment to national health information. Among these, the Australian Institute of Health and Welfare (AIHW) and the Australian Bureau of Statistics (ABS) play leading roles in the collection, coordination and reporting of information on health and wellbeing. These two agencies, together with the Commonwealth, State and Territory health departments and the Health Insurance Commission, are responsible for implementing the National Health Information Agreement (NHIA). The bulk of the information presented in this report is sourced from one or more of the NHIA members.

The National Health Information Management Group (NHIMG), which oversees the NHIA on behalf of the Australian Health Ministers' Advisory Council (AHMAC), advises on health information priorities. Its National Health Information Development Plan (AIHW & AHMAC 1995) identified priority directions for a projected 10-year period. Since the release of the plan, progress has been achieved in each of its highest priority areas. However, new information demands have emerged, and NHIMG currently has the plan under review.

This chapter presents an overview of progress with the National Health Information Development Plan and outlines the emerging information requirements of new national health strategies. Information gaps that constrain reporting in the earlier chapters of *Australia's Health 2000* are also identified.

7.1 The National Health Information Development Plan

The objectives of the Plan are to 'promote the development of high priority health information and to increase the cost-effectiveness of Australian national health information'. Highest priority development directions of the Plan are:

- work with Aboriginal and Torres Strait Islander peoples to develop a plan to improve all aspects of information about their health and health services;
- develop a national health and welfare information model;
- in consultation with health service consumers and providers, undertake a comprehensive examination of the feasibility and usefulness of potential approaches to developing and enhancing the ability to link health records, and identify the linkages that will result in the greatest community benefit;

- develop a plan to improve health outcomes information by developing clinically specific measures of health outcomes for major health problems and enhancing the usefulness of clinical information systems for measuring the effectiveness and outcomes of interventions;
- develop and collect standardised information on the incidence, prevalence, consequences and outcomes of care of severe mental illness;
- develop and collect standardised information on primary and other non-institutional healthcare encounter data;
- undertake a systematic review of current major health data collections and make recommendations regarding rationalisation and improvements in the cost-effectiveness of collections; and
- develop ongoing surveillance of potentially modifiable, major disease risk factors, including biological measurements where necessary, ensuring adequate coverage of small, priority populations.

Achievements since 1995

Progress has been made in each of the priority directions.

Aboriginal and Torres Strait Islander health

In 1998, AHMAC endorsed *The Aboriginal and Torres Strait Islander Health Information Plan…This Time Let's Make it Happen* (ATSIHWIU 1997) and established a process for its implementation, to be managed by NHIMG. The ABS accepted responsibility for improving the quality of Indigenous identification in vital statistics collections. Good progress has been made in Queensland, which was the last State to commence Indigenous identification in birth and death records. Nevertheless, the quality of identification in the other eastern States has not improved sufficiently to permit publication of data on deaths.

The joint ABS/AIHW Aboriginal and Torres Strait Islander Health and Welfare Information Unit has taken the lead role in improving hospital morbidity data for the Indigenous populations. A pilot study has provided indicative results on the extent of coverage of Indigenous patients in hospitals (which ranged from 55% to 100%) and a methodology for testing coverage in other hospitals. AIHW has accepted the lead role in relation to cancer registries (where it is working with the Australasian Association of Cancer Registries) and in perinatal statistics (where it is working through its National Perinatal Statistics Unit to standardise and improve coverage in perinatal data collections).

National health and welfare information model

The National Health Information Model, version 1 (AIHW 1995), has been further developed and replaced by a draft version 2. Version 2 has been constructed as a high-level, conceptual model, quite different from version 1 which was constructed as an entity-relationship model. Unlike version 1, version 2 does not attempt to describe relationships between the entities in the model, as it is considered that these are more appropriately described at enterprise or operational levels of information modelling.

Version 2 provides an organising structure for the *National Health Data Dictionary*, which is now structured to present data elements in accordance with their relationship to Model entities (NHDC 1998).

Record linkage

The AIHW has built considerable record linkage experience using its National Death Index and the National Cancer Statistics Clearing House. The AIHW's Health Ethics Committee approved 41 projects involving linkage using these databases during 1998–99, a number that has increased markedly over 5 years. Studies have contributed to knowledge about health patterns in occupational cohorts (e.g. Radium Hill workers), specific population groups (e.g. older women, Vietnam veterans), selected communities (Western Sydney Area Health Service) and for specific diseases (e.g. hepatitis C, cardiovascular surgery outcomes). Other linkage projects have been undertaken to examine the potential for creating person-based records from hospital separations to examine the patterns of re-admission for cardio-revascularisation procedures.

Several States have established linked data sets with matched records from local hospital morbidity, mortality and other health records. Western Australia, in particular, has used health record linkage extensively in health studies, including prostate cancer survival analysis (Holman et al. 1999), an examination of hospitalisation of the elderly during the last year of life (Brameld et al. 1998), and estimation of the incidence of aortic aneurysm (Semmens et al. 1998). A study into the linking of data from the Western Australian linked data set with national data sets (e.g. Medicare data, data from the Pharmaceutical Benefits Scheme and the National Death Index) for people with diabetes is in the planning stages. Protocols for such studies are complicated by the need to meet privacy protection requirements under various administrative and legislative regimes. Identifying and resolving such issues is one of the objectives of the study.

Following a review of its household survey program, the ABS has announced that it will pursue the linking of survey data to administrative records with consent. The linkage would be done within the ABS under the protection of the secrecy provisions of the *Census and Statistics Act 1905*.

Health outcomes

The NHIMG, in response to a specific request from AHMAC, has developed a health outcomes indicator framework. The framework encompasses outcome and other indicators spanning prevention, management and maintenance services. It has been adopted for reporting under the National Health Priority Areas (NHPA) program. NHPA reports on injury and diabetes and a forthcoming report on asthma have applied the framework. The framework also provides a planning basis for data development for future NHPA reporting.

A register to monitor new cases and prevalence of acute rheumatic fever and rheumatic heart disease among the Indigenous populations has been established in the Top End of the Northern Territory. Data in the register permits monitoring of rates of compliance with treatment and provides data on the outcome of intervention. For cardiovascular disease in general, the AIHW has reported on medical care of cardiovascular disease and, in collaboration with the National Heart Foundation of Australia, on the use of cardiac surgery and coronary angioplasty procedures. The feasibility of establishing a national cardiovascular procedures register is being investigated. This would provide reliable, longitudinal, risk-adjusted data for monitoring national indicators of quality and outcomes for cardiac procedures and cardiology interventions.

One of the indicator sets developed under the health outcomes indicator framework is that for monitoring the performance of the BreastScreen Australia program. These indicators seek to highlight progress towards the program objectives relating to participation, cancer detection, program sensitivity, cancer incidence and mortality. The mortality indicator is the ultimate test of the program's effectiveness, and between 1994 and 1998 there has been evidence of a reduction in mortality rates due to breast cancer of 2.5% per annum (AIHW & AACR 1999).

Severe mental illness

An ABS Survey of Mental Health and Wellbeing, conducted in 1995, reported on the prevalence of mental illness among adults in the community (ABS 1998). A complementary multijurisdiction study of people living with psychotic illness has provided information on people attending mental health services for treatment of psychotic disorders, including schizophrenia (Jablensky et al. 1999). New administrative data in mental health services have become available through implementation of a new National Minimum Data Set for Institutional Mental Health Services from 1997–98 (AIHW 2000). Progressive implementation of a National Minimum Data Set for Community Mental Health Services is proceeding, following its adoption by NHIMG.

Non-institutional healthcare data

Progress in this area has included the establishment in 1998 of a Survey of General Practice Activity (BEACH—Bettering the Evaluation And Care of Health—see chapter 5). The survey commenced in April 1998 with funding from a consortium of private pharmaceutical companies and several government agencies. A report on the first year of the survey was published in 1999.

A National Community Based Health Services Codeset, prepared by a consortium of Commonwealth and State health agencies, has provided the basis for implementing data collections that will fill a large gap in national health services information.

Improving cost-effectiveness of collections

The ABS has conducted a wide-ranging review of its household survey system, including the National Health Survey, and plans to introduce a new 3-yearly cycle of health surveys. Sample supplementation for the Aboriginal and Torres Strait Islander populations will be introduced over the first two surveys in the new program (2001 and 2004) and continue at 6-year intervals thereafter. Also included in the program is a 3-yearly General Social Survey that will permit analysis of the social determinants of the health of the population. An Indigenous General Social Survey will be conducted in conjunction with every second General Social Survey from 2002.

Some rationalisation has occurred in national hospital statistics, with a withdrawal by the Department of Heath and Aged Care from publication of its hospital casemix series. Re-establishment of the AIHW's Australian Hospital Statistics series on a regular and timely basis has permitted this rationalisation of publication activities.

Potentially modifiable disease risk factors

ABS National Health Surveys have provided information on disease risk factors, including smoking, alcohol consumption, exercise and unhealthy weight, based on self-report methods. National Drug Household Surveys, conducted by the Department of Health and Aged Care and its predecessors, provide information about use of and attitudes towards tobacco, alcohol and illicit drugs. Biomedical risk factor information, of the kind collected by the National Heart Foundation in three surveys during the 1980s, has not been collected during the past decade. A one-off survey of diabetes prevalence is being undertaken during 1999 and 2000 by the International Diabetes Institute, Melbourne, but plans for ongoing national monitoring of biomedical risk factors are still at the development stage. Options include a survey in conjunction with the ABS's National Health Survey in 2004 or a stand-alone survey.

7.2 Newly emerging information challenges

Since the release of the National Health Information Development Plan, new issues have raised unanticipated challenges for national health information. Major emerging themes are:

- plans to incorporate new communications technology into health care;
- increased focus on the health of rural and remote populations;
- increased focus on factors affecting the health and wellbeing of children; and
- coordinated attention to public health, brought by the National Public Health Partnership.

Plans 'to provide a basis for a national strategic approach to using information in the health system' have been released in a report by the National Health Information Management Advisory Council entitled *Health Online* (NHIMAC 1999). The Plan's scope includes information collection, privacy and confidentiality, and access, but also information transfer in interactive services and situations. Under the plan's information objectives, two strands of information development have been identified. One is concerned with development and adoption of information technology standards, for which much of the work occurs under the auspices of Standards Australia, its committee processes and international connections. The other strand is concerned with data standards, for which the NHIMG's management of the *National Health Data Dictionary* (NHDD) provides a well-established basis for future development.

Electronic health records offer an opportunity for expanded availability of statistical data, including linked data sets. The challenge for national health information will arise from the strict business requirements for an electronic health record that is transferable across healthcare settings. This will require standard definitions for data elements that are included in an electronic health record. The NHIMG's processes are well placed to handle this expanded requirement. As well, classification and coding schemes are required that are flexible enough to support the expected interchange of information across settings while continuing to meet the different business requirements for specific care settings. The World Health Organization's development of a Family of International Health Classifications is pertinent. The AIHW is a WHO Collaborating

Centre on health classifications (including the International Classification of Diseases and the International Classification of Impairments, Disabilities and Handicaps) and is actively participating in this work.

Increased attention to rural and remote health and health services presents challenges to improve the flexibility of geographic coding in major health data sets. Fixed regional boundaries, whether administrative (such as postcodes or local government areas) or statistical (such as statistical local area or statistical division), currently coded in most data sets, limit the capacity to support the area-specific analysis that is increasingly required to meet rural and remote health and environmental health management needs. Remote health issues are confounded by the poorer health of Aboriginal and Torres Strait Islander people who constitute a significant proportion of the population in remote areas (see chapter 4).

Demands for information about child and youth health and wellbeing are increasingly concerned with the influence of early social development as a determinant. Existing information systems are extensive, but are cross-sectional, not longitudinal. Opportunities exist through linkage of data sets to create longitudinal views at low cost.

Public health information has a higher profile since the establishment in 1996 of the National Public Health Partnership. Through its National Public Health Information Working Group, the Partnership has developed a National Public Health Information Development Plan (AIHW 1999). The challenges contained in this plan include establishment of an infrastructure for monitoring health determinants, health and causes of ill health of Aboriginal and Torres Strait Islander populations, socioeconomic disadvantage and health, intersectoral information on the physical environment and financial information on public health programs.

Across a number of health fields there is increasing demand for analytical work for the specification and production of broad health indicators and of performance indicators, either within specific program areas or more generally focused on the health system as a whole. General health indicator requirements cover fields such as burden of disease and health inequalities. Performance indicators include efficiency and effectiveness of services, including quality and outcomes.

The 1998 Australian Health Care Agreements include requirements for development of performance indicators across the health sector. This work is being led by the National Health Performance Committee.

7.3 Major gaps in this report

The requirement to report on Australia's health itself raises awareness of the gaps that are unable to be filled. This section provides an alternative view, from a reporting perspective, of the development required to augment information presented in the preceding chapters of this report.

The health of Australians (chapter 2)

As reported in chapter 2, mental health is the third most important contributor to the burden of disease. Although information available on mental health services continues to improve (chapter 5), there is no provision in the work programs of relevant agencies for any ongoing data collection on population mental health. Information from the ABS 1997 Survey of Mental Health and Wellbeing was reported in *Australia's Health 1998* and some further information from that survey has been included in chapter 2. However, ongoing coverage of population mental health is not included in a comprehensive manner in the new ABS population survey program.

Chapter 2 is able to report in only a limited way on the oral health of Australians, particularly of adults. As reported in *Australia's Health 1998*, fluoridation of water supplies has reduced the prevalence of dental decay in cohorts that have lived all or most of their lives with such protection. Some information on decayed, missing or filled teeth (DMFT status) is available from self-report through telephone surveys conducted by the AIHW Dental Statistics Research Unit. However, periodic surveys including an oral examination are needed to verify reports on DMFT status and to measure other aspects of oral health.

Determinants of health (chapter 3)

Chapter 3 is devoted to the environmental and individual factors that determine health. This reflects the increasing attention being given to managing determinants through public health practice, evident at the national level in the establishment in 1996 of the National Public Health Partnership. However, only limited information could be presented in many areas of chapter 3. In particular, biomedical risk factor information is needed to monitor levels of modifiable risks to health from major disease categories, especially cardiovascular disease, diabetes and some cancers. Better information is also needed on environmental health risks, and on attitudinal and lifestyle factors, an area where the National Public Health Partnership has begun efforts to coordinate existing information activities.

Health and determinants in population groups (chapter 4)

The inability to report comprehensively on the health of Aboriginal and Torres Strait Islander people has already been discussed, as has the lack of longitudinal data to monitor child and youth health. Health of people with disabilities is another area where data is almost non-existent (see *Australia's Welfare 1999*). A particularly difficult group to monitor is homeless people.

Health resources and use of services (chapter 5)

Chapter 5 presents only limited information about health services other than those provided to admitted patients in hospitals and consultations with general practitioners. Ambulatory services provided within hospitals (accident and emergency units and hospital-based clinics) and in the community are important in their own right and as contributors to integrated care regimes that are emerging. A Community Based Health Services Codeset, developed by a consortium of jurisdictions, provides a basis for development of community services information, but will require a major coordinated effort to implement.

Health service strategies, performance and monitoring (chapter 6)

A number of frameworks for health system performance monitoring are receiving attention from national bodies such as the National Health Performance Committee. Information systems are being developed to support these frameworks, but some components require prior work to develop concepts and specifications for indicators. For instance, in line with many countries, Australia has not developed valid and reliable indicators of the quality of health care.

Data systems for monitoring the performance of services and activities aimed at the health of Aboriginal and Torres Strait Islander peoples are a priority, as are performance information systems related to community-based health care.

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8 Changes in Australia's disease profile: a view of the twentieth century

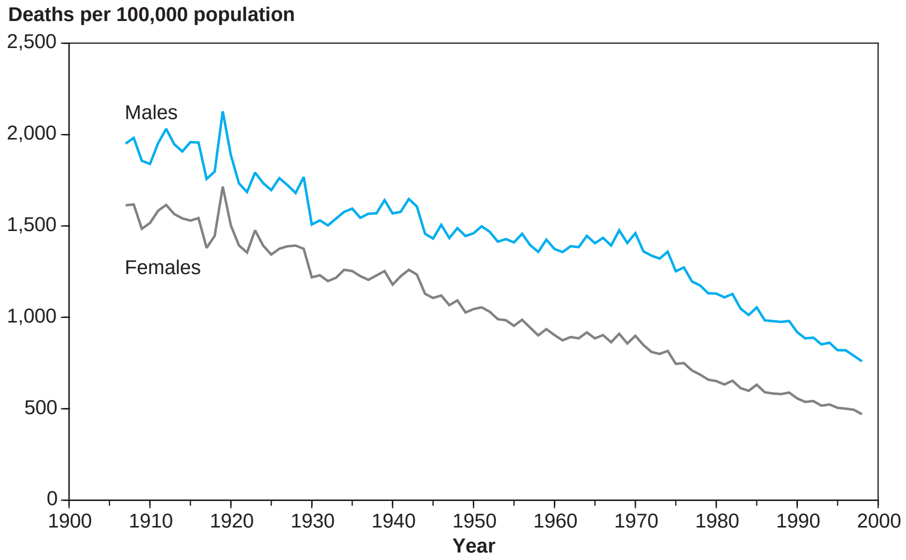
The twentieth century was a period of great social, economic and scientific development in Australia. In health, these developments brought better nutrition and living conditions from the start of the century, widespread immunisation and improvements in medical treatment in the second half, and a growing awareness in more recent times of the effect of lifestyle and socioeconomic factors on health. Such advances have resulted in death rates that are now less than half what they were in 1900, an improvement in life expectancy at birth of over 20 years, and a dramatic decline in perinatal mortality and deaths from infectious diseases. But there has also been a greater prominence of the chronic diseases (e.g. cardiovascular diseases and cancer) and the rise and partial fall of two epidemics, coronary heart disease and lung cancer.

This chapter examines these and other mortality trends in Australia over the past 100 years. Although mortality trends provide a limited picture of Australia's health, they are one of the few statistical series that were collected with some consistency over the whole century (AIHW: Taylor 1992). This chapter also highlights some critical factors that have influenced patterns of deaths in Australia.

8.1 General trends in health over the twentieth century

Mortality has shown a remarkably consistent decline during the century despite some short-term impacts of specific diseases (Figure 8.1). This decline has been consistent in both males and females, although there are differences in the timing and make-up in the patterns of causes of death. Age-standardised mortality rates declined by 61% in males and 71% in females between 1907 and 1998 (Knibbs 1909; ABS 1999). This is in line with mortality reductions seen elsewhere in the developed world. The death rate in males is consistently above that of females.

As expected, these mortality declines are reflected in the substantial increases in life expectancy that have occurred over the century (Figure 8.2, page 342). However, what is not evident from these declines are the significant changes in the main causes of death during the twentieth century. Also, these mortality declines may not have been equally distributed among all population groups such as the immigrant and Indigenous populations. For example, there is presently a substantial difference in life expectancy between Indigenous and non-Indigenous Australians and death rates are higher for the Indigenous populations for most causes of death. Indeed, the mortality patterns for Australian Indigenous peoples are strikingly worse than their indigenous counterparts in Canada, New Zealand and the United States, as shown by their lower life expectancies at birth and higher age- and cause-specific death rates (Hogg 1992). It is



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.1: Death rates for all causes combined, 1907 to 1998

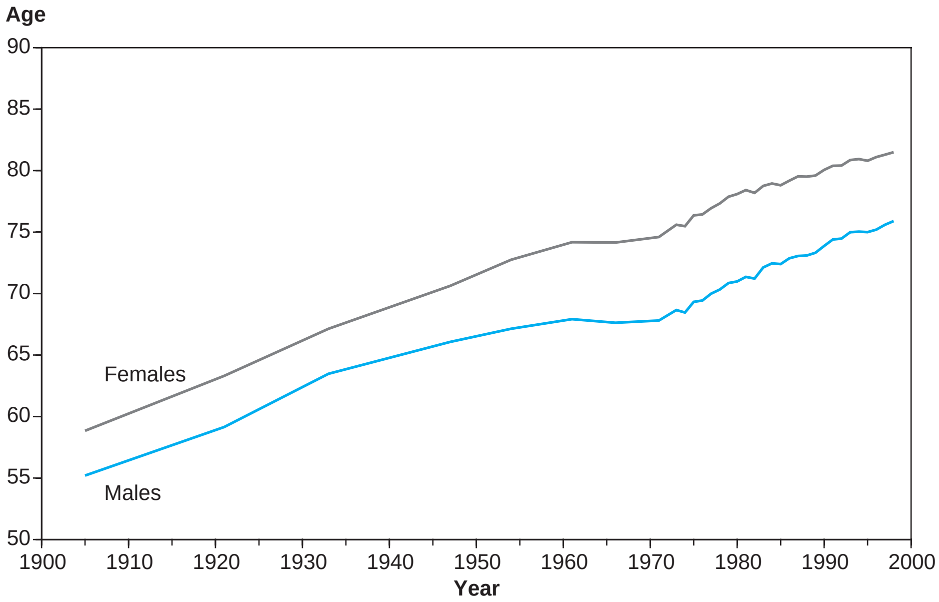
not known whether Indigenous health has improved over the century or whether it has maintained its relatively poor position. This is because Indigenous peoples have not been identified in many administrative or health-specific data collections. It is known that while the population of Australia has increased from around 4.4 million in 1899 to about 18 million a century later (an approximate fourfold increase) the Indigenous population has not yet doubled from its estimated level of 200,000 in 1898 (Coghlan 1900), and reached only 386,000 in 1996 (ABS 1998). However, it is not known what effect these changes in the relative sizes of the Indigenous and total populations have had on overall trends in mortality and life expectancy.

Many immigrant groups have proved to be healthier in some respects than the existing Australian population (e.g. cardiovascular disease, cancer). Young (1986) speculated that this healthy migrant effect is a result of immigrant selection, lifestyle and diet, and tobacco and alcohol consumption patterns. Young indicated that immigrants from Southern Europe, Lebanon and South East Asia had lower mortality rates than for Australians generally for many causes of death. Giles, Jelfs and Kliewer (1995) showed this pattern existed for many of the major migrant groups in Australia in relation to cancer mortality, even showing that for some cancers these migrants fared better than those remaining in their own country. It is important to recognise these differences in mortality patterns when looking at long-term trends, as the impact of the large-scale immigration from the 1940s onwards would have tended to reduce the overall mortality rate from this point forward.

Increased life expectancy

For the overall population, life expectancy at birth rose from 55.2 and 58.8 years at the beginning of the twentieth century to 75.9 and 81.5 years in the late 1990s for males and females respectively (ABS 1999) (Figure 8.2). This rise in life expectancy was relatively constant over the century, apart from a plateau during the 1960s that was related to an increase in deaths from heart disease.

However, in the late 1990s, the life expectancy of Indigenous Australians was estimated to be 20 years less than the general population, at 56.9 years for males and 61.7 years for females (ABS & AIHW 1999). So life expectancies for Indigenous Australians are 100 years behind those for non-Indigenous people, and show that the high standard of health achieved by the general population over the last 100 years has not been shared by all Australians.



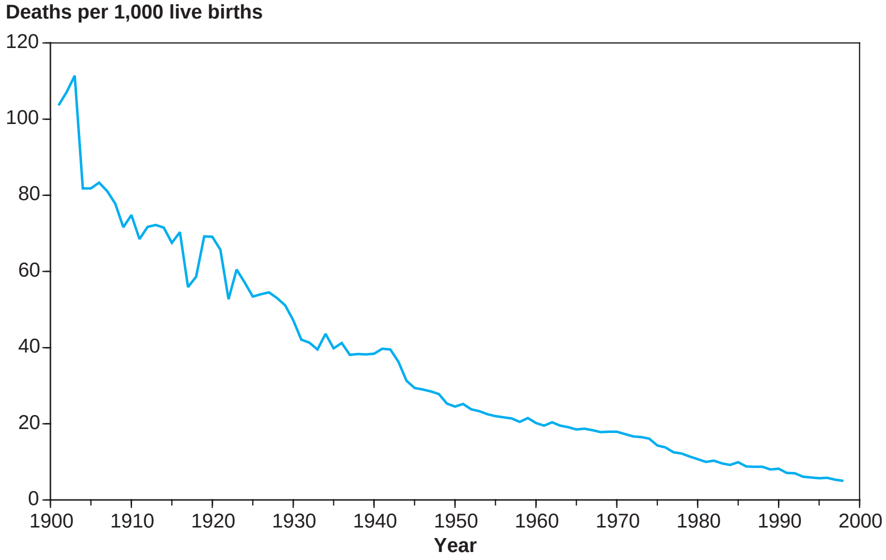
Source: AIHW unpublished data.

Figure 8.2: Life expectancy at birth, 1905 to 1998

Reductions in infant mortality

Increases in life expectancy are largely related to the substantial decrease in perinatal and infant mortality that occurred in the first half of the century (Figure 8.3). Infant mortality rates were very high in the 1880s (130.5 deaths per 1,000 live births in males and 114.1 in females) but had fallen to nearly half that by 1910–20 (Lancaster 1956). In the first decade of the twentieth century, 1 in 10 children died before the age of 5, most from infections such as diarrhoeal diseases and enteritis (Cumpston 1989:111).

By 1926, the infant mortality rate had been reduced by half and there had been a dramatic decline in deaths from gastrointestinal diseases. This followed the introduction of improved sanitation, such as the systematic collection and removal of ‘nightsoil’ (Cumpston 1989:113). Improvements in the quality of water and milk supplies, an increase in breast-feeding, better access to education and a decreasing number of births per woman were also likely to have played a part in the dramatic declines in child deaths through better infant health and increased resistance to infection (Gandevia 1978). Infant mortality continued to decrease after the 1940s with the introduction of antibiotics and improved perinatal care, and reached a low of between 5 and 7 deaths per 1,000 live births in the late 1990s (AIHW 1998). Few infants (other than Indigenous infants) now die from infection or from conditions in the perinatal period such as low birthweight or birth trauma. Congenital anomalies, sudden infant death syndrome (SIDS) and accidents have become the leading causes of death in young children (AIHW 1998). Indigenous infant mortality was around 18 per 1,000 live births at the end of the twentieth century (ABS & AIHW 1999).



Source: AIHW unpublished data.

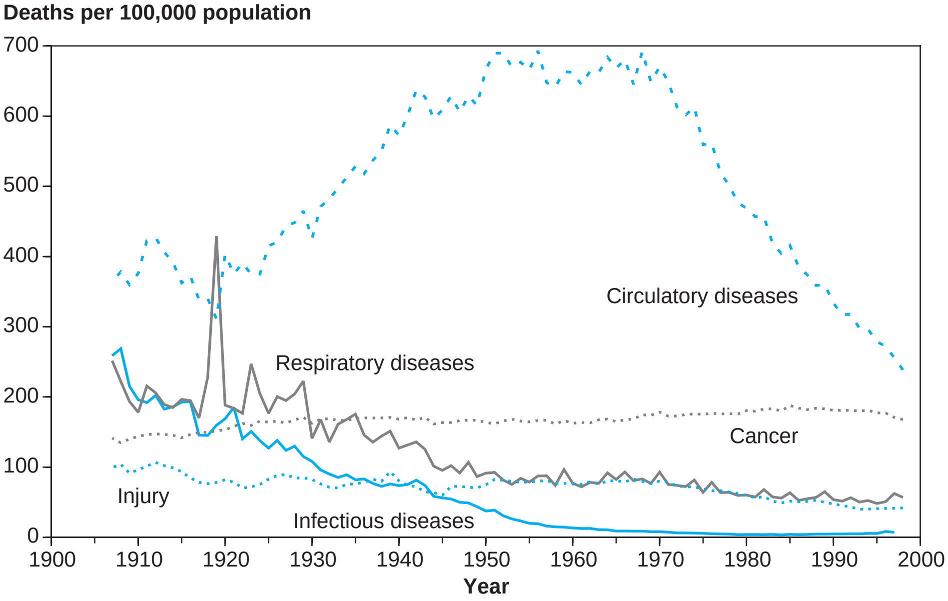
Figure 8.3: Trends in infant mortality, 1901 to 1998

Reductions in maternal mortality

As well as improvements in infant mortality, there has been a dramatic decline in mortality rates for women during childbirth in Australia. Childbirth was responsible for the death of around 6 women in every 1,000 live births (Cumpston 1989:138) in 1900. ‘Puerperal fever’, a condition now known as post-partum infection, was responsible for about one-third of these deaths. In the 1920s and 1930s, doctors attributed maternal death rates partly to the poor standards of obstetric care practised by some of their peers, especially the use of unnecessary caesarean sections (Hughes 1939). Maternal death rates remained relatively high until a dramatic decline in 1937, when antibacterial drugs became available (Taylor et al. 1998). Improved nutrition, better general health, the advent of medical interventions such as antiseptic procedures, a decrease in pregnancies (from contraception and family planning), use of blood transfusions and the professional training of those attending births have all contributed to a sustained decrease in deaths of women following childbirth (Weil & Fernandez 1999). By the late 1990s, maternal mortality in Australia was rare and it remains among the lowest in the world. In the early 1990s, maternal mortality was 10.9 per 100,000 confinements (NHMRC 1998), around 2% of the rate in 1900.

The transition from infectious to chronic disease

As in many other developed nations, Australia has experienced a 'health transition' from infectious to chronic diseases, with influenza and tuberculosis being replaced by circulatory (cardiovascular) diseases and cancer as the major causes of death (Beaglehole & Bonita 1997:6) (Figure 8.4). More specifically, there was a decrease in death rates from infectious diseases, particularly from the early 1900s, and an increase in coronary heart disease, stroke and lung cancer from the 1920s and 1930s.



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.4: Death rates by major causes, 1907 to 1998

Better nutrition and public health measures such as improved sanitation and housing made a major contribution to the decrease in deaths from infectious diseases. Lifestyle factors such as changes in diet and smoking are considered responsible for the increase (and partly for the subsequent decline) in deaths from circulatory diseases and some cancers, and the increasing number of motor vehicles led to an increase in transport-related deaths.

Since the late 1960s, death rates from cardiovascular causes (in particular heart attack and stroke) have declined steadily and more recently there has been a slight rise in death rates from infectious disease in males. The reduction in cardiovascular death rates is related to the success of prevention strategies and better treatment of cardiovascular conditions. The rise in infectious disease death rates, although slight in Australia, has been seen around the world with the emergence of infections such as the human immunodeficiency virus (HIV) and hepatitis C. This has led to speculation that a further transition in the disease profile of Western countries may occur (Beaglehole & Bonita 1997:7).

8.2 Trends in the major causes of death in Australia

The following sections describe trends in the major causes of death for Australians over the twentieth century. The disease categories are defined by the International Classification of Diseases and include infectious diseases, cardiovascular disease (circulatory system diseases), cancer (malignant neoplasms), respiratory diseases, and deaths from external causes (injury and poisoning). Interpreting trends in death statistics poses some difficulties as international definitions, classification frameworks and diagnoses of disease have changed over time (AIHW: Taylor 1992; Taylor et al. 1998). In the early 1900s, causes of death were classified initially using a system devised by Dr William Farr, and then according to the Bertillon Index. The International Classification of Diseases, version 2 (ICD-2) was used in Australia from 1918, and ICD-10 was introduced in 1999. Because of the different classifications used, the following sections focus on broad trends in the data.

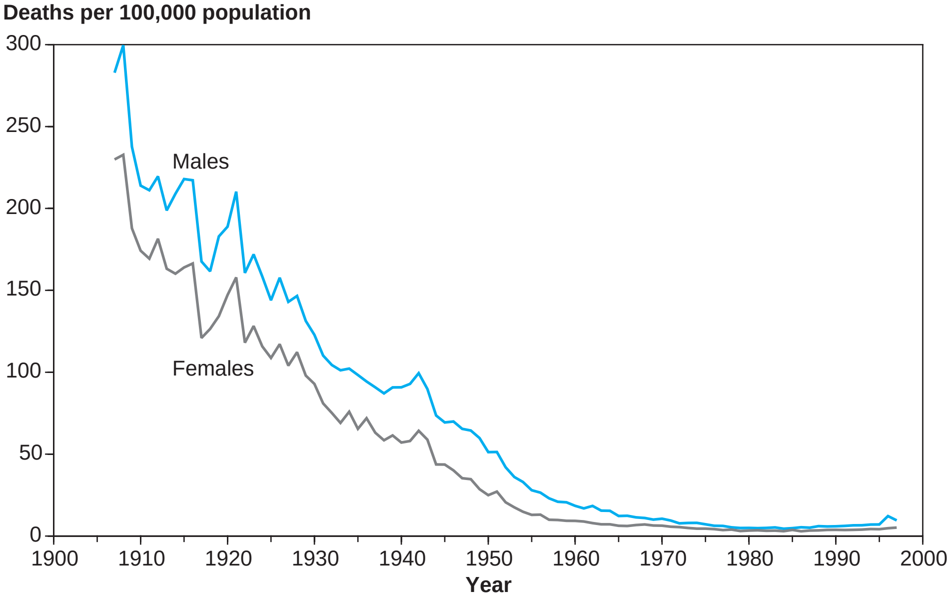
Infectious diseases

Infectious diseases were the main cause of death in Australia in the first 100 years after European settlement. Dysentery, scurvy and typhus were the major infections, but epidemics of smallpox, cholera, tuberculosis and other infections were also common (Sax 1984:15). Children bore the brunt of infectious diseases as did the Indigenous populations who, having not encountered these diseases before, had no resistance to them and suffered very high death rates (Gordon 1976:182).

In the early 1800s, infectious diseases were of enormous public and political concern around the industrialised world, and governments in many countries were called upon to enact public health measures to reduce their spread. At the time, it was thought that infections were the result of ‘miasmas’ or foul vapours that arose from decaying matter, and sanitation was seen as an important way of arresting the spread of disease (Davis & George 1988:166). During the late 1800s, a range of public health measures was introduced in Australia including publicly financed water and sewerage schemes, improved sanitation and better housing to reduce overcrowding (Davis & George

1988:167). These measures were largely responsible for the decreases in infectious diseases that were already under way at the beginning of the twentieth century (Cumpston 1989:114).

Despite declines, infectious diseases remained a major cause of death in the early 1900s (Figure 8.5) with tuberculosis and venereal diseases being the most common (Sax 1984:16). Public health legislation had been enacted across Australia but was beginning to extend beyond sanitation to the compulsory notification of infectious cases and the isolation of infected individuals. In 1900, for example, when bubonic plague arrived in Sydney, officials isolated infected individuals in the quarantine station at North Head, closed their dwellings and coated their possessions in lime (Hickman 2000). An Australian researcher, Ashburton Thompson, established the connection between rats, fleas and the spread of the plague (and was the first in the world to do so) and public health inspectors were despatched to find and destroy rats and their breeding grounds (Hickman 2000). Despite a public outcry about the plague and its effects, only 463 people died from the disease in Australia between 1900 and 1909 (Cumpston 1978). This small number was undoubtedly due to the timely action of public health officials. The plague outbreak was the trigger for the first Commonwealth action in quarantine.



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.5: Death rates from infectious and parasitic diseases, 1907 to 1998

Influenza, although classified as a respiratory condition, has been responsible for a large numbers of deaths over the twentieth century, none more significant than the 1919 pandemic (see Figure 8.11, page 358). In that year approximately 12,000 Australians died, making influenza the most common cause of death, exceeding the number of deaths attributed to circulatory disease (Cumpston 1989). This outbreak was also responsible for the deaths of approximately 20 million people worldwide. A smaller but significant influenza outbreak also occurred in 1907–1908 and was responsible for around 700 deaths in each of those years, compared with an expected 200–300 deaths.

There was a steady decline in deaths from infectious diseases over the century (Figure 8.5). Mass vaccination occurred from the 1930s for diphtheria, from the 1950s for pertussis (whooping cough), tetanus and poliomyelitis (for which no cases have been reported since 1978), and from the 1960s for measles (Hall 1993). Widespread immunisation continued in the 1980s and 1990s, as other vaccines became available, and has been the focus of recent public health campaigns as immunisation levels have fallen. Some declines have also been attributed to the introduction of antibiotics from 1937 onwards, the anti-tuberculosis campaign, and to continued improvements in environmental health and socioeconomic conditions (Taylor et al. 1998).

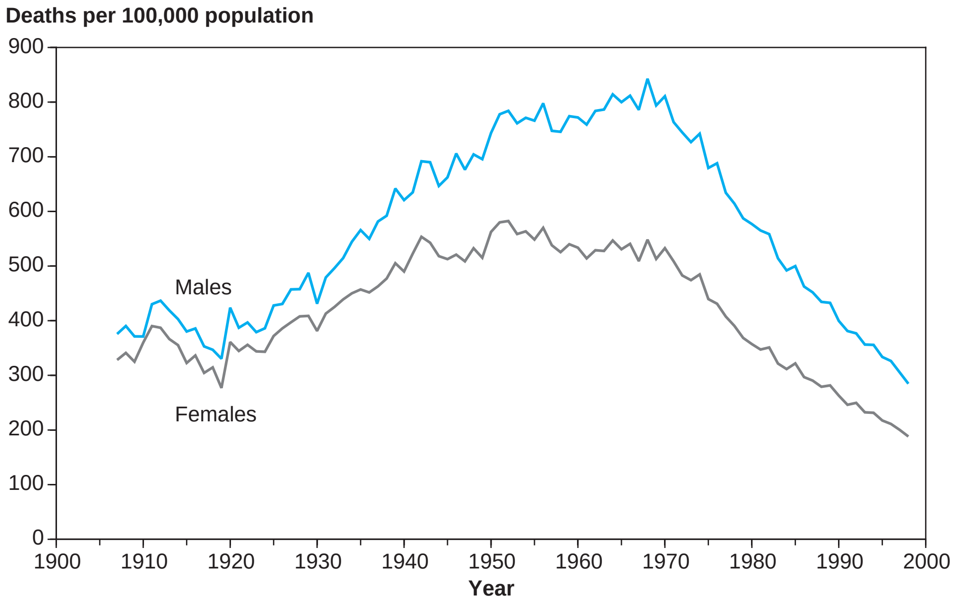
During the 1970s and 1980s a number of viral infections including hepatitis B, hepatitis C and the human papilloma virus were newly described, although it is likely that these diseases existed before this but had not been recognised. Viral conditions were largely untreatable and became a significant concern, especially with the emergence of HIV in the early 1980s. Acquired immunodeficiency syndrome (AIDS) (caused by HIV) has now led to the deaths of 13.9 million people worldwide and is among the top four causes of death globally (WHO 2000). The effect on overall life expectancy in many countries has been dramatic. In Australia, the epidemic has been controlled by relatively rapid public health interventions, and, although over 6,000 people have died in Australia from AIDS, the epidemic appears to have been slowing since 1994 (WHO 2000). Further information is contained in section 2.5 (page 112). Safe-sex and safe-injecting campaigns, blood supply regulation, infection-control guidelines and the introduction of new treatments have all contributed to the control of mortality from AIDS in this country.

In Australia, a combination of improved living conditions and access to readily available treatments over the twentieth century has resulted in many infectious diseases becoming comparatively rare (the 1998 death rate from infectious diseases was less than 1% of that in the 1930s). However, the levels of infectious diseases remain relatively high in the Indigenous populations. Diarrhoeal infections and infections that result in pre-term birth are still major problems for some Indigenous communities, reflected in their higher infant mortality rates (ABS & AIHW 1999).

Cardiovascular diseases

Another striking trend in mortality in Australia in the first half of the twentieth century was the significant increase in death rates from circulatory system diseases, followed by an even greater fall beginning in the late 1960s (Figure 8.6). The main conditions contributing to this pattern were heart attack and stroke.

The evolution of the epidemic of cardiovascular disease was paralleled by a rapid increase in the understanding of how the heart functions and of the contribution of risk factors to heart disease. It was also a time of significant development in methods to diagnose and treat heart and other circulatory problems. The application of this knowledge ultimately resulted in a decline in cardiovascular death rates.



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.6: Death rates from circulatory system diseases, 1907 to 1998

In the first years of the twentieth century, cardiovascular disease was already recognised as a significant contributor to the mortality of Australians. It was the fourth most common cause of death in Australia after pneumonia, tuberculosis, and diarrhoeal disease, and it was much more common than cancer (Cumpston 1989:133). In 1916, the Commonwealth Departmental Committee on Invalidity and Mortality, concerned at possible declines in the Australian population and its health status, recognised the risks of 'middle age' thus:

> It is commonly said that a man is as old as his arteries … about the age of 40, slow changes begin, which tend to make the coats more rigid … But at the age of 40 … when these quiet changes in the main arteries should be slowly beginning … more serious evil often sets in … more rapid in evolution … the whole circulation is in a condition of strain. The persons affected think themselves robust … But they often die suddenly … Men suffer in this way far more than women, but even women are affected in large numbers. What are the causes of this disastrous series of changes which cut off thousands of people in their full maturity?

In the early 1900s, knowledge of the heart was limited to an understanding of its anatomy, and relatively little was known about how it worked. There was only a rudimentary appreciation of the relationship between the heart and other important facets of the circulation such as blood pressure, and the function of the heart as an 'electrically driven pump' within the body was largely unknown. The introduction of a portable instrument, the sphygmomanometer, and the interpretation of the sounds heard via the stethoscope, enabled doctors to measure blood pressure for the first time, and this became part of a routine physical examination. However, there were no effective remedies for the treatment of elevated blood pressure once it had been diagnosed. The recognition of disturbances in heart rhythm had developed as a clinical skill, but it was difficult for doctors to predict which rhythms were harmful, and treatments were largely unavailable, other than bed rest and the use of digitalis (derived from the foxglove flower) which had been available since Roman times (Porter 1997).

By 1910, circulatory system disease had become the most common cause of death in Australia and, except for a brief period following the great influenza epidemic in 1919, it has remained the leading cause of death. Over the first half of the century, the percentage of deaths due to cardiovascular disease increased substantially in all age groups and in both sexes, and by mid-century the disease accounted for more than half of all deaths, not only in Australia but also in most of the industrialised world (Braunwald 1997). The link between heart disease and infections such as rheumatic fever and syphilis was well known, and by 1950 antibiotics were available to treat these conditions, thereby preventing their cardiac consequences for the first time. However, the major causes of death from heart disease—sudden death and heart attack—were still unexplained and continuing to rise. Lancaster (1990) observed that part of this increase could be explained by better cause-of-death coding, with ill-defined causes of death falling to near zero as the epidemic gathered momentum.

During the first half of the twentieth century, changes in death rates from heart disease occurred in Western countries, with rises tending to follow increasing prosperity. Increasing rates were noted, for example, in the United States among affluent men who smoked (Keys et al. 1963), but in postwar Europe, cardiovascular disease rates decreased sharply in the wake of reduced food supplies. Changes in incidence rates seemed to reflect powerful socioeconomic and behavioural influences in newly rich countries operating with a relatively short incubation period for the disease, perhaps as short as a decade (Rose 1989).

In 1941, new X-ray techniques allowed doctors to view the pumping action of the heart (and, later, the health of the coronary arteries) using radio-opaque dye introduced through a fine tube inserted into an arm or groin blood vessel in a conscious person (cardiac catheterisation).

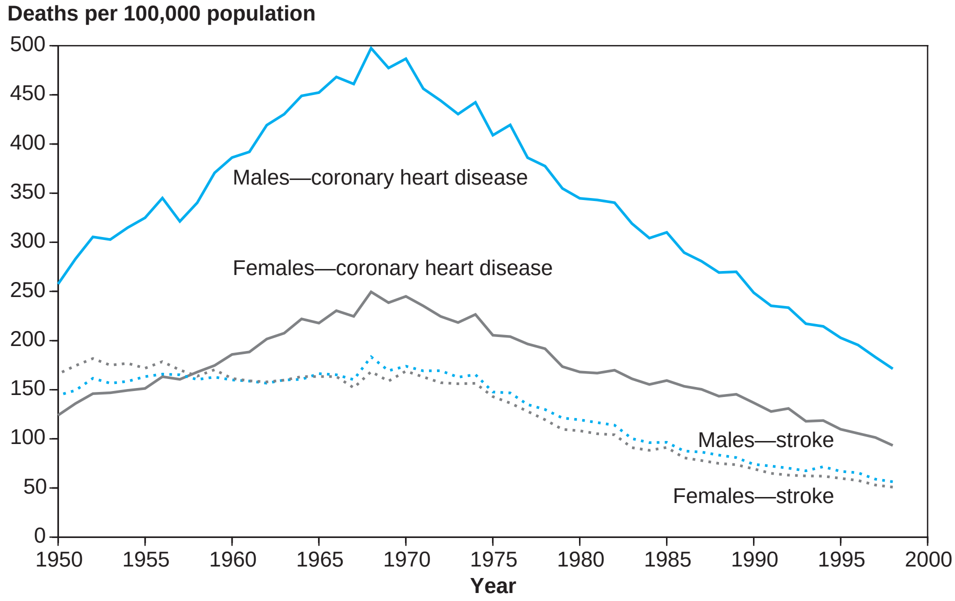
With improved diagnosis, attention was directed at treatment. In 1945 Blalock attempted surgical repair in a child with congenital heart disease, and this led to the development of open-heart surgery within a decade, providing some relief for those with congenital heart disease, disease of the heart valves and other conditions. In the mid-1950s, the invention of the heart–lung bypass machine (the pump-oxygenator), taking over the function of the heart and lungs outside the body, allowed surgeons enough time to undertake more complicated procedures.

From 1967 onwards, surgical techniques were used in Australia to bypass obstructions in the coronary arteries and so relieve the debilitating pain suffered by those with coronary artery disease. This operation, coronary artery bypass grafting, became one of the most frequently performed surgical procedures around the world (Mueller et al. 1997). Initially undertaken to relieve symptoms, it was also found to decrease mortality (Julian 1989). Other interventions followed including the use of specific drugs and anti-clotting agents. In-hospital care improved through the setting up of coronary care units with specifically trained nursing staff and intensive monitoring of patients. Other advances, including drugs and devices for correcting abnormal heart rhythm (pacemakers and defibrillators) and better training of emergency services personnel, also assisted survival in those with established coronary heart disease.

Attention was increasingly focused on the social and lifestyle factors that contribute to the development of cardiovascular disease in the healthy population. From this emerged the concept of risk factors for coronary heart disease and stroke. In 1961, results were published from a research project in the United States, the Framingham Heart Study, which became one of the cornerstones of cardiac epidemiology (Kannel et al. 1961). High blood pressure, smoking, elevated cholesterol in the blood and dietary factors (especially dietary saturated fat and salt) were identified as major contributors to the epidemic of cardiovascular disease. The importance of other factors such as socioeconomic status, obesity and physical inactivity was acknowledged (NHLBI 1994) as well as the significance of social, cultural and environmental factors.

Mortality rates from coronary heart disease increased dramatically after World War II, peaked in Australia in 1968 and then decreased substantially by over 60% among males and females (AIHW & HFA 1999) (Figure 8.7). Death rates for stroke remained constant through the 1950s and 1960s and have fallen by more than two-thirds since 1968 (Figure 8.7). These improvements are considerable, particularly as mortality from non-cardiovascular diseases decreased by about 20% only (AIHW & HFA 1999). The decline in coronary heart disease occurred in all age groups and for both sexes, with greater declines in the younger age groups and a greater rate of decrease for males than for females (Beaglehole et al. 1989). This implied that broadly operating effects such as market-led dietary change were responsible, more so than individual efforts to alter lifestyle, and that those changes acted with only a short lag period (Rose 1989). One suggested factor in Australia was the change in the balance and types of fats in the national diet (Hetzel & McMichael 1987).

Mortality rates from coronary heart disease in Australia declined by about 25% over the 1970s but the greatest declines were experienced by the professional occupations, whereas lower socioeconomic groups had higher mortality rates at the beginning of the period and experienced smaller declines. From a national survey in 1980, lower risk levels of blood pressure, cigarette smoking, body weight and exercise were significantly and consistently found among higher status occupation groups. This suggested that there was a pattern of coronary prevention behaviour spanning multiple risk factors that was associated with a reduction in coronary heart disease (Dobson et al. 1985).



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.7: Death rates from cardiovascular causes, 1950 to 1998

The relative contributions of alterations in lifestyle and changed levels of risk factors in the population, and of medical interventions to declines in mortality rates for cardiovascular disease is still being assessed. The most important advances in medical care for coronary heart disease and stroke may well have occurred after the beginning of the decline in mortality (Hetzel & McMichael 1987). Recent Australian research has found a decline in rates of coronary heart disease events as well as deaths, consistent with reductions in risk-factor levels and improved acute medical treatment for the period 1985 to 1993 (Dobson et al. 1999).

Although a significant proportion of cardiovascular disease is preventable, the prevalence of risk factors, such as tobacco smoking, high blood pressure, physical inactivity and poor nutrition, that are amenable to change still remains high in the Australian population. It has been estimated that 80% of all adult Australians have one modifiable cardiovascular risk factor and 10% have three or more such factors (Tonkin et al. 1999).

In Indigenous people, death rates from cardiovascular disease are about twice those of non-Indigenous people. Among Indigenous Australians living in the Northern Territory the occurrence of rheumatic heart disease is the highest recorded in the world; the annual incidence of its precursor, acute rheumatic fever, for the years 1989 to 1993 was between two and seven cases for every 1,000 children aged 5–14 years. In contrast, not one non-Indigenous child suffered rheumatic fever over the same period (Carapetis & Currie 1998).

Cancer

Over the twentieth century, there has been an increase in the proportion of deaths in Australia due to cancer. At the beginning of the century, cancer was the fifth leading cause of death among Australians after deaths from infectious diseases, cardiovascular disease, respiratory disease and injury (Cumpston 1989:133). Since then, cancer death rates have increased as a proportion of all-cause mortality, and cancer is now second only to cardiovascular disease as a major cause of death (AIHW 1998). Both the incidence and mortality of cancer are higher among males than among females, and there is also significant geographical and socioeconomic variation in cancer mortality within the Australian population (Armstrong 1985).

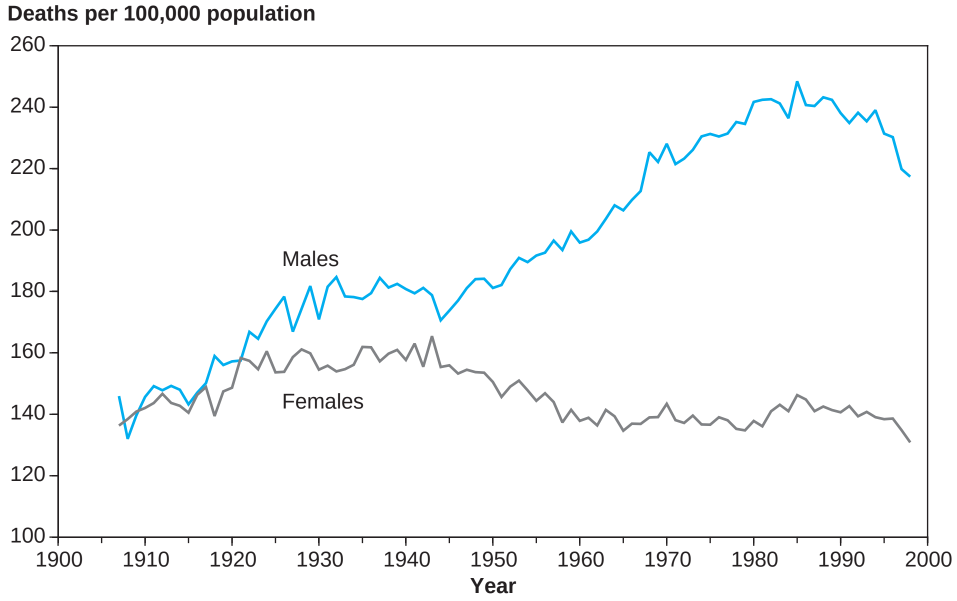
Trends in cancer mortality are difficult to interpret because there are many different types of cancer, each having different causes and some more amenable to treatment than others. Identifying carcinogens (cancer-causing agents) has been controversial, but it is now generally accepted that over 75% of cancers are associated with exposure to environmental factors that interact with an individual's genetic make-up (Carroquino et al. 1998). There is also a lag time of many years between contact with carcinogens and the emergence of disease which makes it difficult to identify all the factors which may have influenced the trends in death rates for cancer.

Over the century, public health turned its attention to environmental factors such as tobacco smoke, alcohol, air pollution, some industrial processes, manufactured products, sun exposure, certain viruses and diet in order to understand their relationship with cancer. Although some of these factors have proven amenable to public health control measures, others have proved more difficult. Changes in diagnosis, treatment and classification of cancers have also contributed to variations in mortality patterns, particularly for certain types of cancer (Armstrong 1985).

The overall increases in mortality from cancer over the twentieth century reflect changes in the age distribution of the population (due to increased life expectancy, postwar baby booms and significant immigration) and in exposure to various carcinogens, particularly tobacco.

Analyses of trends in death rates over the century (Figure 8.8) have indicated that overall cancer death rates among females increased between 1907 and 1920, plateaued until approximately 1942, then declined through to the 1960s. Female cancer death rates were stable in the 1960s and 1970s before increasing slightly in the 1980s through to the mid-1990s. In males, there was an increase in cancer death rates during the period 1907–30 and then a significant increase after 1945, largely the result of a substantial rise in lung cancer (Armstrong 1985).

Tobacco consumption is by far the largest contributor to the increase in total cancer deaths in the twentieth century, having its greatest effect on lung and oral cancers. By the 1950s, Australia was in the grip of a smoking epidemic with 92 different types of cigarettes on the market (Office of Prices, Victoria 1990). A rise in lung cancer deaths followed as a direct result of increased tobacco consumption (Giles, Hill & Silver 1991). Smoking rates have declined substantially in males over the last several decades (AIHW 1996) and male deaths from lung cancer have subsequently declined since the 1970s (Figure 8.9, page 354). Smoking rates in females were much lower than in males



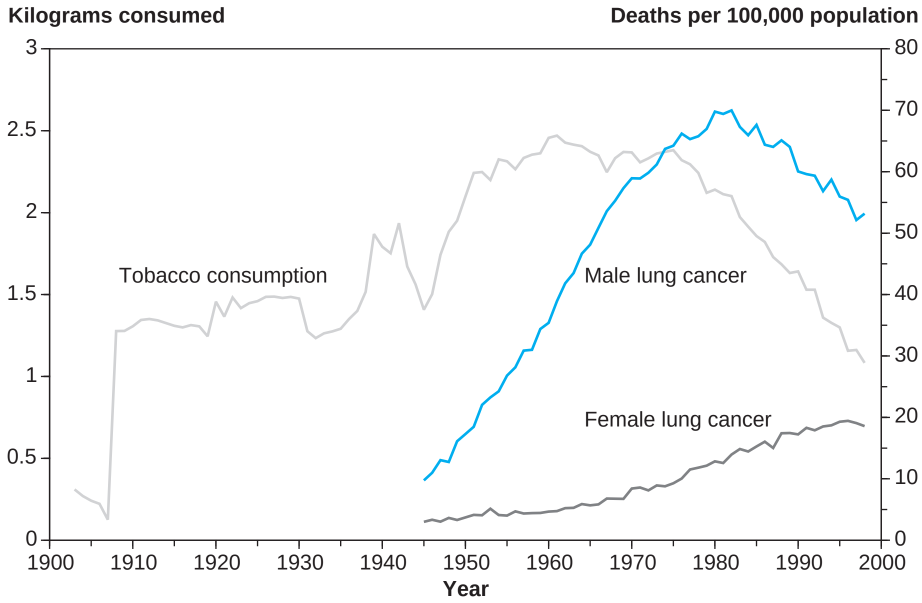
Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.8: Trends in death rates from all cancers in Australia, 1907 to 1998

until recent times, and consequently females have lower lung cancer rates. The decline in smoking in females was less than in males and began much later. Due to the timelag of about 20 years between exposure to carcinogens in tobacco smoke and the diagnosis of cancer, lung cancer rates in females are expected to increase in the early 2000s. Further information on trends in tobacco smoking can be found in section 3.4, page 148.

At the end of the twentieth century, tobacco smoking continued to be by far the most important cause of cancer of the lung and is estimated to be responsible for approximately 80% of lung cancer and 20% of all cancer deaths (English et al. 1995). Reductions in the lung cancer death rate in the 1980s and 1990s was influenced by changes in prices of tobacco products, decreases in tar content, tobacco advertising reforms, and behavioural changes, resulting in smoking cessation (Giles, Hill & Silver 1991). However, although there have been overall reductions in smoking by Australians over the last three decades, the gap in smoking prevalence between groups is widening; individuals of higher socioeconomic status are more likely to avoid smoking, whereas those who are socioeconomically disadvantaged continue to smoke at higher rates (Hill et al. 1998).



Note: Death rates are age standardised to the population at 30 June 1991.

Source: ABS Yearbooks, various years; AIHW National Mortality Database.

Figure 8.9: Per capita consumption of tobacco products in Australia and death rates for lung cancer, 1903 to 1998

Occupational exposures, including exposure to asbestos, are estimated to be responsible for 15% of lung cancers in males and air pollution is perhaps responsible for 5% of all cases of lung cancer (Giles et al. 1988). Asbestos was used widely throughout Australia by the 1950s and could be found in most homes, cars and workplaces. A substantial mining industry also existed, exposing thousands of workers to large doses of asbestos dust. In 1955, it was demonstrated that asbestos caused lung cancer.

In women, breast cancer is currently the major cause of cancer deaths (AIHW 1998) with deaths from colorectal (bowel) cancer and lung cancer in second and third places respectively. Breast cancer mortality rose steadily from the early decades of the twentieth century to peak in the early 1940s, decreased to the 1960s and 1970s before rising again in the late 1980s (Smith et al. 1998). It is thought that the increase to the mid-1940s was caused mainly by rapidly falling fertility in the late nineteenth century and the early twentieth century. The increase in mortality of women born in the first 30 years of the twentieth century is probably related to larger body size due to changes in nutrition resulting in an earlier age of menarche and, therefore, greater oestrogen exposure (Smith et al. 1998). Subsequent increases in fertility and earlier diagnosis may have contributed to the fall in mortality between the 1940s and early 1960s. However, it is also likely that improvements in survival have resulted from earlier detection through screening and newer medical treatments for breast cancer (Hermon & Beral 1996).

Alcohol consumption has been associated with cancers of the upper gastrointestinal tract and the liver and there is some evidence of changes in alcohol consumption paralleling a trend in death rates from these cancers (Armstrong 1985). Sun exposure is the main cause of skin cancers, and malignant melanoma of the skin is more common in Australia than anywhere else in the world. Increases in deaths from other types of cancer have been associated with a variety of carcinogens in the Australian environment. During the twentieth century, an array of potentially carcinogenic substances emerged as new industries and products were developed. These included radiation, pesticides, mining dusts, benzene (in petrol, paints and printing inks), chemicals used in the production of plastics and pharmaceuticals, and environmental pollutants. The contribution of many of these substances to the trends in cancer mortality remains to be measured.

Not all cancers have shown an increase in death rates. Mortality rates for cancers of the stomach, cervix, bowel (in females) and testes have all shown significant declines in the adult population. Mortality rates in children have fallen substantially for leukaemia and cancers of the brain and nervous system, due to an improvement in survival rates.

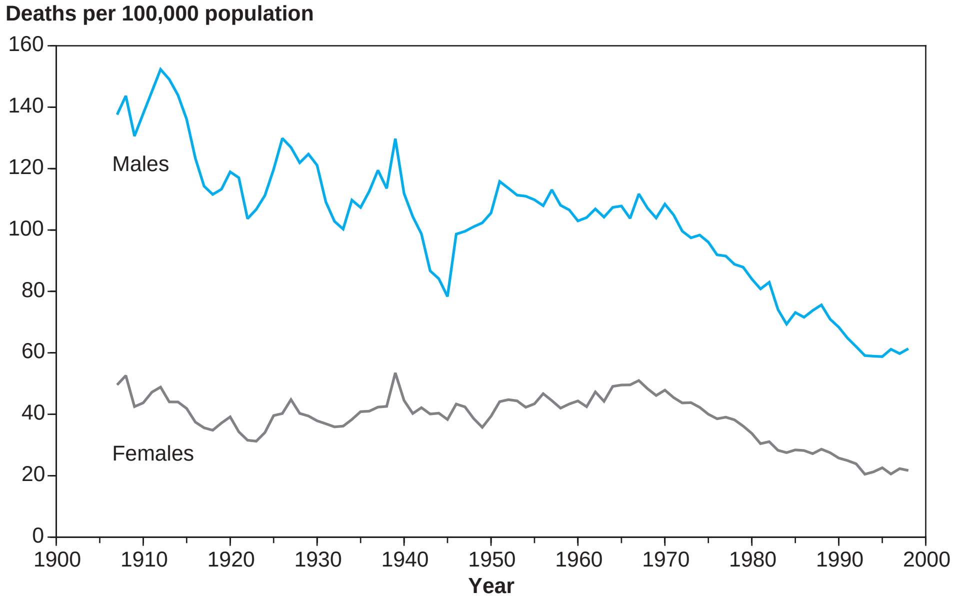
Patterns of exposure to risk factors differ according to occupation, socioeconomic groupings such as education and income, sex, race and ethnicity, and geographical location, and some of these patterns have changed over the twentieth century. In general, there is evidence of an inverse socioeconomic gradient for cancer mortality among both males and females in Australia (Glover et al. 1999). The persisting socioeconomic differences in cancer mortality at the end of the twentieth century are a reminder that there is much in the social environment that contributes to malignant disease.

Injury

Over the twentieth century, although the contribution of injury to overall deaths in Australia has remained relatively stable at around 6–7% of all deaths, there has been a steady decline in death rates from this cause (AIHW 1998). Injury rates have been consistently higher in males than in females in all categories for the entire period (AIHW: d'Espaignet et al. 1991) and there have been some substantial changes within the injury categories (Figure 8.10, page 356). Most change has occurred in the accidental death category with the emergence of motor vehicle accident deaths offset by a large decrease in deaths from all other accidental causes (AIHW NISU 1999). The contributions made by both suicide and homicide have remained relatively stable. In the 1990s, injury was the fourth leading cause of death in Australia and is a major cause of premature death.

Accidental deaths

Accidental deaths were relatively common in the early part of the twentieth century with drowning, burns, falls, work-related injuries and accidents with horses the most significant contributors to mortality rates (Gordon 1976:217). Deaths from accidents have always tended to have a greater impact on the younger age groups. In 1925, deaths from external causes were the leading cause of death (26%) for those aged 15 to 24 years (Cumpston 1989:132). This pattern still applies today, particularly to deaths from motor vehicle accidents. Drowning also remains a significant cause of injury deaths for children aged 1 to 4 years, many of whom drown in swimming pools.



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.10: Death rates from accident or injury, 1907 to 1998

The advent of motor vehicles in the early years of the twentieth century brought with it not only the advantages of more rapid transport and the ability to travel larger distances, but also a significant burden of mortality and morbidity for the population. For much of the century, road deaths accounted for a significant proportion of injury deaths in Australia. Fatality rates rose steeply in the 1950s and 1960s, peaking in 1970. Since then, the road accident death rates have decreased significantly despite an increase in the average amount of road travel per person (AIHW NISU: O'Connor 1995). This improvement can be attributed to a number of interventions, including better vehicle, road and traffic flow design; compulsory use of seat belts, child restraints and helmets for cyclists and motorcyclists; lower speed limits; restrictions on the use of alcohol and other drugs while driving; and public education campaigns (AIHW NISU: O'Connor 1995).

Work-related fatalities have also made up a significant proportion of accidental deaths through the century. Working conditions in the earlier part of the century were often dangerous, involving substantial exposure to a range of toxic substances or immediate physical risks. Occupational health and safety have only relatively recently become matters of legislative concern in Australia, with some employers and unions previously focusing more on agreed extra payments ('danger money') for working in risky or hazardous environments (Deery & Plowman 1985:415). Occupational health hazards are still present for many workers, with the complexity of modern work processes bringing new problems as well as some improvements.

Suicide

An analysis of trends in suicide over the past 100 years shows that the overall suicide rate has remained relatively stable, fluctuating within a range between about 10–14 deaths per 100,000 population (DHAC 1998). The highest rates were recorded during the Depression of the 1930s, and in the 1960s and into the 1990s (Hassan 1996). The higher rates in the 1960s are likely to be related to the availability of medications such as barbiturates that were then restricted in subsequent years (Oliver & Hetzel 1972).

However, this relative stability hides some significant internal differences in the rates of suicide of males and females in Australian society. The most striking feature over the last 100 years is the change that has occurred in the age groups affected. Until the mid-1960s, suicide was a problem mainly among the older age groups but since then there has been a dramatic shift to the young. This increase in the suicide rate for the younger age groups has been largely offset by significant reductions in suicide in middle-aged and older Australians (Goldney & Harrison 1998).

Suicide rates for males are significantly greater than those for females. The rate of suicide among males aged 15–29 years has been increasing gradually over the last 30 years, although this upward trend may be levelling off (Glover et al. 1999). The rate of suicide among males aged 15–24 years has trebled since 1960. There has been no equivalent rise in the rate of suicide among young females. However, there is evidence to suggest a higher rate of attempted suicide among females than males, particularly for women under the age of 25 years (Ruzicka & Choi 1999; AIHW: Moon et al. 1999).

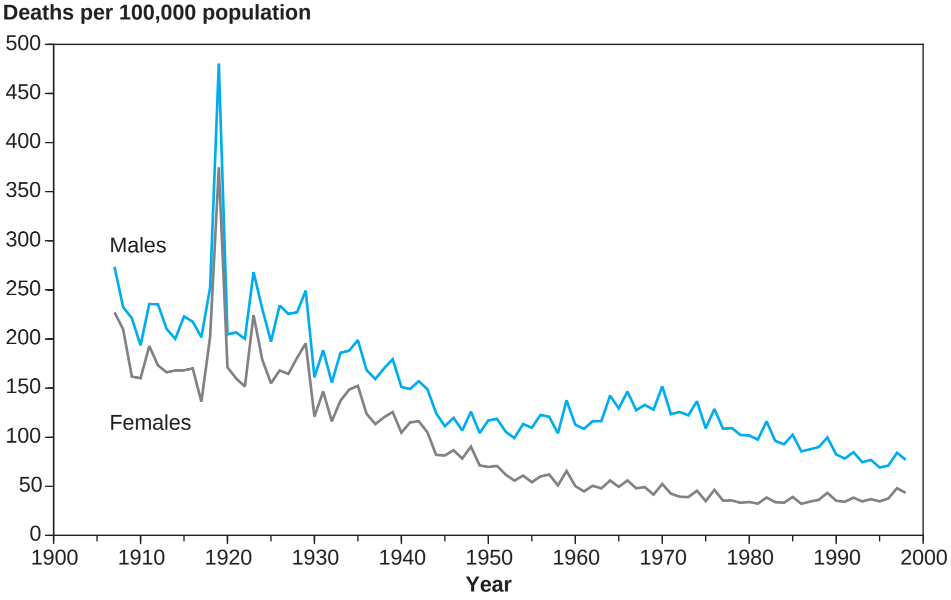
There is some evidence that risks for suicide increase significantly with decreasing socioeconomic status in males, but this is not the case in females. It has been noted that the fluctuations in male suicide rates over the century have coincided with periods of high unemployment, whereas the rates for females have remained fairly stable at those times (Morrell et al. 1993). Studies of the recent increase in suicides among the young have suggested a number of contributing factors, including unemployment, changing family structure, increasing violence and loss of autonomy (Hassan 1996). Suicide arises from a complex interaction of psychological, social and environmental factors. Social issues are important and there are also substantial data indicating the presence of psychiatric illness in the majority of those who commit suicide (Goldney 1993). Prevention efforts are now focusing on earlier detection of symptoms of illness and a range of other interventions.

Deaths from interpersonal violence

Death rates from interpersonal violence have remained fairly constant during the twentieth century and homicide remains a rare event relative to other forms of violent death in Australia, such as suicide and road traffic accidents (James & Carcach 1997). Between 1915 and 1997, the average homicide rate per year was 1.6 per 100,000 population (AIC 1999). The present rates of homicide are similar to those prevailing from 1915 to 1925 (James & Carcach 1997). The homicide rate in Australia fell during the period between 1930 and 1950 but then increased to a plateau of about 1.5 per 100,000 population in the 1960s and 1970s. An upward trend then once again became apparent, reaching a level of around 2.0 per 100,000 population in the late 1980s and 1990s (James & Carcach 1997). The lowest homicide rate this century was recorded in 1941, 0.8 per 100,000 population (AIC 1999).

Respiratory diseases

The death rate from respiratory diseases has decreased significantly over the twentieth century (Figure 8.11) to a rate now less than half of that in the early decades (AIHW 1998). The dramatic spike in death rates from respiratory disease in 1919–20 reflects the influenza pandemic. In 1921, the death rate from respiratory disease was 207 per 100,000 population. By 1941, the rate had fallen to 104 per 100,000 population. Between 1950 and 1996, the standardised death rate for diseases of the respiratory system fell for males from 107 to 61 per 100,000 and for females from 63 to 38 per 100,000 population (AIHW 1998). The causes of these respiratory deaths have also altered over the century. For example, the contribution of occupational exposure to substances that cause respiratory disease is thought to have decreased in importance. Early in the twentieth century, mining activity was responsible for various lung diseases and became the subject of government inquiries and trade union action, leading to major reforms throughout mining and related industries (Cumpston 1989:166). In contrast, tobacco smoking increased steadily throughout the century (with the exception of a fall in 1931–32) with substantial reductions in tobacco consumption occurring only since the 1970s. Pollution has also been associated with deaths from respiratory disease (Giles et al. 1988), and it is likely that levels of different pollutants have been significant contributors to deaths from respiratory disease over the twentieth century.



Note: Age standardised to the population at 30 June 1991.

Source: AIHW National Mortality Database.

Figure 8.11: Death rates from respiratory diseases, 1907 to 1998

Chronic obstructive pulmonary disease is the fourth leading cause of death in Australia (AIHW 1998). There was a marked increase in death rates for this condition in the postwar years with the death rate from chronic bronchitis in males doubling between 1950 and 1964 (Gordon 1976:222). This upward trend, like the rise in lung cancer, was associated with increased tobacco consumption over the century. Male age-standardised death rates for chronic obstructive pulmonary disease increased 160% between 1964 and 1970, followed by a decline (Crockett et al. 1994). By 1990, the death rate was 5% less than in 1964. Female age-standardised mortality, on the other hand, showed a 260% increase from 1964 to 1990 (Crockett et al. 1994). These trends in mortality from chronic obstructive pulmonary disease for males and females reflect significant differences in their smoking habits over time (Hill et al. 1998).

Deaths from pneumonia have fallen markedly with the availability of antibiotics in the 1940s. However, an even greater fall occurred in the three decades before this, probably as a result of improvements in living conditions (Gordon 1976:233). The proportion of deaths from pneumonia dropped from 47% of all male deaths from diseases of the respiratory system in 1950 to 14% in 1986, and a similar trend occurred for females. Death from pneumonia is now seen mainly in people at the extremes of the lifespan and in those whose immunity is impaired. However, death from pneumonia is still relatively frequent among Indigenous peoples.

Rates of death from asthma have risen in Australia, as they have worldwide from the middle of the century onwards (Meza & Gershwin 1997), although asthma is still a relatively infrequent cause of death. Asthma is a disease that is exacerbated by a wide range of factors including infection, allergens, tobacco smoke and some environmental pollutants (Landrigan et al. 1998). Early Australian studies found that the mortality rate for asthma remained stable between 1900 and 1948. There was then an upward trend with some peaking of death rates in the 1960s (AIH 1988). The evidence for an upward trend in asthma deaths since the late 1940s appears to be real, despite changes in classifications and differences in medical treatments (Bauman & Lee 1990). Death rates for asthma peaked again in 1989 but have since declined. This may be partly due to public health campaigns aimed at improving the awareness and management of the disease (AIHW: Abraham et al. 1995).

Conclusion

The decline in mortality over the twentieth century in Australia has been dramatic. Growth in income, increased educational levels and consequent improvements in food intake, water quality and sanitation have accounted for much of the decline. Access to new knowledge, medical treatments and vaccines has also been important. There have been far-reaching consequences for every aspect of life: populations have aged, fertility rates have decreased and better health has, in turn, contributed to social and economic wellbeing. This has led to a major shift in causes of death from infectious diseases to non-communicable diseases.

As the twenty-first century unfolds, there will be a number of challenges. Ironically, one of these challenges results from the success of the twentieth century—as a consequence of ageing and the effects of an affluent lifestyle, epidemics of non-communicable diseases may persist, driving the demand for health resources for some years to come. There is also the possibility of an emergence of new infectious diseases and the re-emergence of others. Finally, not everyone has shared equally in the benefits of better health over the last 100 years. In the year 2000, although life expectancy for most Australians has increased significantly, that of Indigenous peoples is at levels not seen in the rest of the population since 1900. Large inequalities in death rates from many causes also persist for disadvantaged populations in Australia, in spite of the long list of achievements in health during the twentieth century. Reducing the inequalities will also be a priority for the twenty-first century.

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Statistical tables

1.1 Population

Table S1: Estimated resident population by sex and age group, selected years, 1901 to 1999 (number)

Age group	1901	1921	1941	1961	1981	1991	1999[(a)]
Males							
0–4	172,957	307,300	299,900	573,700	583,218	652,302	653,209
5–14	450,067	570,800	575,300	1,056,600	1,321,340	1,290,729	1,357,900
15–24	366,146	457,900	627,900	776,100	1,320,618	1,405,897	1,378,722
25–34	320,455	451,800	593,900	728,000	1,244,663	1,416,512	1,447,687
35–44	279,558	369,500	496,000	737,900	931,360	1,319,366	1,460,891
45–54	156,674	281,300	432,400	627,800	772,879	960,260	1,277,628
55–64	99,170	208,400	307,600	427,800	661,984	734,081	845,044
65–74	64,716	90,900	173,100	266,300	426,174	548,636	621,531
75–84	18,731	29,300	70,900	102,300	158,247	243,406	323,697
85+	2,207	4,700	7,500	15,800	27,784	44,220	74,189
All ages	**1,977,928**	**2,771,900**	**3,584,500**	**5,312,300**	**7,448,267**	**8,615,409**	**9,440,498**
Females							
0–4	168,836	296,300	288,700	546,400	556,400	619,401	619,341
5–14	441,003	557,300	556,000	1,008,300	1,264,582	1,223,098	1,291,639
15–24	365,792	462,800	614,900	729,300	1,278,293	1,354,941	1,316,396
25–34	293,424	458,400	573,300	664,400	1,212,261	1,408,886	1,444,118
35–44	216,135	353,200	471,900	706,100	891,517	1,303,292	1,466,414
45–54	118,574	257,400	436,400	595,700	737,394	915,819	1,256,014
55–64	80,302	179,300	307,600	435,500	691,752	728,737	829,803
65–74	48,935	82,000	186,400	333,100	511,502	633,509	675,403
75–84	14,757	31,000	79,700	149,200	256,487	370,917	460,358
85+	2,038	5,500	10,500	27,900	74,805	110,027	166,804
All ages	**1,795,873**	**2,683,200**	**3,525,400**	**5,195,900**	**7,474,993**	**8,668,627**	**9,526,290**

(a) Preliminary data.

Note: Population estimates are for 30 June of each year.

Sources: Commonwealth Statistician 1925; ABS Cat. No. 3201.0; AIHW National Population Database.

Fertility and pregnancy

Table S2: Age-specific birth rates[(a)] and total fertility rates[(b)], 1921 to 1998 (live births per 1,000 females)

	Age group of mother (years)							Total fertility rate
	Less than 20	20–24	25–29	30–34	35–39	40–44	45 and over	
Annual averages								
1921–1925	27.3	133.7	167.0	137.0	96.9	40.4	4.2	3,032
1941–1945	23.9	126.9	152.8	114.3	66.3	21.1	1.7	2,535
1961–1965	46.5	204.0	207.2	122.4	59.2	17.5	1.2	3,289
1981–1985	25.7	100.8	144.5	82.0	25.4	4.4	0.3	1,915
1991–1995	21.2	71.6	128.3	104.2	39.3	6.4	0.3	1,857
Annual rates								
1996	20.1	65.2	117.1	105.7	43.7	7.5	0.3	1,797
1997	19.5	62.3	113.8	106.7	44.9	7.5	0.3	1,775
1998	18.5	60.0	111.2	107.2	45.7	8.0	0.3	1,755

(a) Age-specific birth rates are the live births registered during the calendar year, according to age of mother, per 1,000 of the female resident population of the same age as estimated for 30 June.

(b) Total fertility rate is obtained by summing the 5-year age-specific birth rates and multiplying by 5. It represents the number of children 1,000 women would bear during their lifetimes if they experienced the rates of the year shown.

Sources: ABS 1977; ABS Cat. No. 3301.0.

Table S3: Age-specific birth rates[(a)] and total fertility rates[(b)], States and Territories, 1998 (live births per 1,000 females)

	Age group of mother (years)							Total fertility rate
State/ Territory	Less than 20	20–24	25–29	30–34	35–39	40–44	45 and over	
NSW	18.5	63.3	113.4	107.6	46.8	8.7	0.3	1,793
Vic	12.4	46.9	104.7	113.2	49.4	8.3	0.3	1,676
Qld	23.3	70.2	115.0	101.9	40.8	6.7	0.3	1,791
WA	20.9	61.1	113.5	105.5	44.0	7.3	0.4	1,764
SA	15.3	55.1	109.4	107.1	44.8	8.6	0.4	1,704
Tas	24.2	75.9	121.2	96.7	37.4	6.1	0.4	1,810
ACT	11.9	40.2	100.3	102.9	46.9	8.6	0.2	1,555
NT	68.7	105.0	118.7	93.6	44.9	7.6	0.7	2,196
Australia	**18.5**	**60.0**	**111.2**	**107.2**	**45.7**	**8.0**	**0.3**	**1,755**

(a) Age-specific birth rates are the live births registered during the calendar year, according to age of mother, per 1,000 of the female resident population of the same age as estimated for 30 June.

(b) Total fertility rate is obtained by summing the 5-year age-specific birth rates and multiplying by 5. It represents the number of children 1,000 women would bear during their lifetimes if they experienced the rates of the year shown.

Source: ABS 1999a.

Table S4: Total fertility rates[(a)], crude birth rates[(b)] and male:female birth ratio, selected countries (latest available year)

	Total fertility rate		Crude birth rate		M:F birth ratio	
Country	**Year**	**Rate**	**Year**	**Rate**	**Year**	**ratio**
Australia	**1998**	**1,755**	**1998**	**13.3**	**1998**	**1.05**
Australia	***1996***	***1,797***	***1997***	***13.6***	***1996***	***1.06***
Canada	1995	1,638	1997	12.1	1995	1.05
China	1990–95	1,918	1995–2000	16.2	1994	1.12
Denmark	1995	1,807	1997	12.8	1995	1.06
France	1996	1,721	1996	12.6	1994	1.05
Germany	1996	1,316	1997	9.6	1996	1.06
Greece	1995	1,319	1996	9.7	1995	1.08
Ireland	1996	1,879	1997	14.3	1996	1.09
Israel	1995	2,881	1996	21.3	1995	1.05
Italy	1995	1,187	1997	9.4	1995	1.06
Japan	1996	1,425	1997	9.5	1996	1.06
Korea, Republic of	1995	1,658	1995	15.6	1995	1.13
Malaysia	1990–95	3,620	1997	25.8	1996	1.06
Netherlands	1996	1,529	1997	12.3	1996	1.06
New Zealand	1994	2,040	1997	15.4	1993	1.07
Norway	1996	1,889	1997	13.6	1996	1.07
Philippines	1994	3,522	1995–2000	28.4	1993	1.09
Poland	1996	1,580	1997	10.7	1996	1.06
Russian Federation	1995	1,344	1995	9.2	1995	1.06
Singapore	1997	1,637	1997	12.7	1997	1.08
Spain	1995	1,170	1996	9.0	1995	1.06
Sweden	1996	1,606	1997	10.1	1996	1.04
Switzerland	1996	1,500	1997	11.2	1996	1.06
United Kingdom	1996	1,725	1996	12.5	1996	1.05
United States	1995	2,019	1996	14.8	1994	1.05

(a) Total fertility rate is obtained by summing the 5-year age-specific birth rates and multiplying by 5. It represents the number of children 1,000 women would bear during their lifetimes if they experienced the rates of the year shown.

(b) Live births per 1,000 mid-year population.

Sources: UN 1999; WHO 1998; ABS 1999a.

Table S5: Birthweight distribution of total births(a), States and Territories, 1997

Births/birthweight	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Births					(Number)				
Less than 2,500 g	5,414	4,056	3,310	1,675	1,307	320	360	358	16,800
All births	**88,133**	**62,307**	**48,038**	**25,253**	**18,674**	**5,447**	**4,785**	**3,561**	**256,198**
Birthweight (g)					(Per cent)				
Less than 500	0.2	0.3	0.3	0.3	0.4	0.4	0.2	0.4	0.3
500 to 999	0.5	0.5	0.6	0.5	0.6	0.4	0.7	0.7	0.5
1,000 to 1,499	0.5	0.6	0.7	0.7	0.7	0.5	1.1	0.8	0.6
1,500 to 1,999	1.2	1.2	1.4	1.3	1.3	1.1	1.5	2.0	1.3
2,000 to 2,499	3.8	3.8	3.9	3.9	4.1	3.5	4.0	6.3	3.9
Less than 2,500	**6.1**	**6.5**	**6.9**	**6.6**	**7.0**	**5.9**	**7.5**	**10.2**	**6.6**
2,500 to 2,999	15.3	15.5	14.6	16.3	14.7	13.4	13.4	18.2	15.2
3,000 to 3,499	36.2	36.3	35.6	36.4	35.5	33.3	35.1	35.5	36.0
3,500 to 3,999	30.6	30.2	30.7	30.0	31.0	33.9	32.0	27.1	30.5
4,000 to 4,499	10.0	9.7	10.4	9.3	10.0	11.3	10.0	7.6	9.9
4,500+	1.7	1.8	1.8	1.4	1.8	2.2	1.9	1.3	1.7

(a) Includes live births and foetal deaths (stillbirths) with known birthweight. Totals include births with unstated birthweights.

Source: AIHW NPSU 1999.

Table S6: Infant mortality rates, States and Territories, selected years, 1901 to 1998 (per 1,000 live births)

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1901	103.7	102.9	101.9	128.9	100.1	89.0	(a)	62.5	103.6
1921	62.6	72.5	54.2	78.3	65.5	78.0	74.1	63.3	65.7
1941	43.8	36.2	39.1	35.3	32.5	49.0	16.4	83.3	39.7
1961	20.8	17.8	20.0	19.7	20.0	16.8	15.6	23.9	19.5
1981	10.2	9.3	10.4	8.9	8.0	12.3	8.9	23.5	10.0
1991	7.2	6.5	7.6	7.2	5.5	9.0	7.6	14.2	7.1
1992	7.4	5.6	7.9	7.0	6.1	6.6	6.3	15.5	7.0
1993	6.2	5.4	7.0	5.9	5.2	5.9	4.3	15.3	6.1
1994	6.3	5.1	6.2	5.6	4.7	7.5	4.7	11.3	5.9
1995	5.7	4.9	6.3	5.1	5.8	5.8	4.8	13.3	5.7
1996	5.8	5.0	6.4	6.5	4.9	4.5	5.7	11.5	5.8
1997	5.2	4.9	5.8	5.3	4.7	6.5	3.8	12.5	5.3
1998	4.3	4.7	6.4	5.0	4.0	5.7	6.0	12.4	5.0

(a) Part of New South Wales prior to 1911.

Source: ABS Cat. No. 3101.0.

Table S7: Perinatal mortality rates[(a)], by age group of mother, 1989 to 1998 (per 1,000 live births plus foetal deaths)

	Age group of mother (years)						
Year	Less than 20	20–24	25–29	30–34	35–39	40 and over	Aust
1989	14.6	11.4	9.3	10.5	12.3	19.5	11.0
1990	15.3	11.4	10.0	10.9	13.2	20.0	11.3
1991	15.2	11.0	9.0	10.3	11.3	20.8	10.6
1992	14.1	11.1	9.2	9.8	11.6	18.0	10.7
1993	12.7	9.6	8.1	8.1	10.4	13.1	9.2
1994	12.0	9.3	7.6	8.4	10.8	14.8	9.1
1995	14.2	10.2	8.0	7.9	9.5	13.4	9.4
1996	14.0	10.9	8.4	8.9	9.9	17.3	10.0
1997	15.0	9.6	8.0	7.6	10.7	12.1	9.2
1998	13.0	8.9	7.4	6.9	9.6	12.6	8.3

(a) Perinatal deaths consist of foetal deaths (stillbirths) and neonatal deaths (within 28 days of birth). The perinatal mortality rate is defined as the number of deaths per 1,000 live births and foetal deaths combined.

Note: Data are based on year of registration and use the ABS definition for perinatal deaths of at least 400 grams birthweight or, where birthweight is unknown, at least 20 weeks gestation. Previous editions of *Australia's Health* used the WHO definition of 500 grams birthweight and 22 weeks gestation.

Source: ABS Cat. No. 3303.0.

Table S8: Perinatal mortality rates[(a)], States and Territories, 1989 to 1998 (per 1,000 live births plus foetal deaths)

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
1989	11.5	10.1	10.8	9.6	11.8	11.4	9.8	23.6	11.0
1990	11.7	11.6	10.2	10.4	11.0	10.6	13.8	18.1	11.3
1991	11.0	9.8	11.1	10.3	9.0	11.9	12.5	18.2	10.6
1992	11.8	9.4	10.6	9.8	9.9	9.1	9.4	19.3	10.7
1993	9.5	8.5	9.4	8.3	8.8	10.0	7.7	21.1	9.2
1994	9.2	9.3	8.9	8.3	8.5	8.4	6.9	16.9	9.1
1995	8.9	9.2	9.8	9.3	9.9	9.7	9.2	16.3	9.4
1996	11.0	8.8	10.0	10.2	8.6	9.5	8.8	12.6	10.0
1997	9.8	8.5	9.1	8.1	8.2	11.6	6.6	15.5	9.2
1998	8.1	7.7	9.6	7.5	7.2	9.8	12.2	13.1	8.3

(a) Perinatal deaths consist of foetal deaths (stillbirths) and neonatal deaths (within 28 days of birth). The perinatal mortality rate is defined as the number of deaths per 1,000 live births and foetal deaths combined.

Note: Data are based on year of registration and use the ABS definition for perinatal deaths of at least 400 grams birthweight or, where birthweight is unknown, at least 20 weeks gestation. Previous editions of *Australia's Health* used the WHO definition of 500 grams birthweight and 22 weeks gestation.

Source: ABS Cat. No. 3303.0.

Table S9: Neonatal, postneonatal and infant mortality rates[(a)], selected countries (latest available year) (per 1,000 live births)

	Males			Females		
	Neonatal	Post-neonatal	Infant	Neonatal	Post-neonatal	Infant
Australia (1998)	**3.7**	**1.8**	**5.5**	**3.0**	**1.5**	**4.5**
Australia (1996)	***4.2***	***2.3***	***6.5***	***3.4***	***1.6***	***5.0***
Canada (1995)	4.5	2.2	6.7	3.8	1.7	5.5
China—rural (1994)	n.a.	n.a.	22.8	n.a.	n.a.	22.2
China—urban (1994)	n.a.	n.a.	14.0	n.a.	n.a.	12.1
Denmark (1995)	4.1	1.5	5.6	3.4	1.1	4.5
France (1995)	3.2	2.2	5.4	2.6	1.7	4.3
Germany (1996)	3.4	2.2	5.6	2.7	1.7	4.4
Greece (1995)	6.4	2.6	9.0	5.2	2.1	7.3
Ireland (1996)	4.3	1.6	5.9	3.5	1.6	5.1
Israel (1995)	5.1	2.4	7.5	4.0	2.2	6.2
Italy (1994)	5.3	1.9	7.2	4.3	1.5	5.8
Japan (1996)	2.2	1.9	4.1	1.8	1.6	3.4
Korea, Republic of (1995)	n.a.	n.a.	2.9	n.a.	n.a.	2.4
Malaysia (1996)	6.7	3.3	10.0	5.3	2.8	8.1
Netherlands (1996)	4.6	1.7	6.3	3.8	1.3	5.1
New Zealand (1993)	3.8	3.9	7.7	3.6	3.1	6.7
Norway (1996)	2.8	1.7	4.5	2.2	1.4	3.6
Philippines (1993)	11.3	11.7	23.0	8.6	9.4	18.0
Poland (1996)	9.9	3.5	13.4	7.8	3.1	10.9
Russian Federation (1995)	12.8	7.9	20.7	9.1	6.5	15.6
Singapore (1996)	2.4	1.4	3.8	2.2	1.5	3.6
Spain (1995)	3.9	2.0	5.9	3.2	1.9	5.1
Sweden (1996)	2.5	1.7	4.2	2.5	1.2	3.7
Switzerland (1996)	3.7	1.6	5.3	2.8	1.2	4.0
United Kingdom (1996)	4.5	2.3	6.8	3.6	1.8	5.3
United States (1995)	5.3	3.0	8.3	4.4	2.4	6.8

(a) Neonatal: less than 28 days. Postneonatal: 28 to 364 days. Infant: less than 1 year.

Sources: ABS 1999b; UN 1999.

Mortality

Table S10: Life expectancy at selected ages by sex, 1901 to 1996–98 (years)

	At birth		At age 15		At age 65	
Year	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Annual averages						
1901–10	55.2	58.8	49.0	51.9	11.3	12.9
1920–22	59.2	63.3	51.4	54.6	12.0	13.6
1946–48	66.1	70.6	54.3	58.3	12.3	14.4
1960–62	67.9	74.2	55.1	61.0	12.5	15.7
1980–82	71.2	78.3	57.4	64.3	13.8	18.0
Annual rates						
1990	73.9	80.1	59.8	65.8	15.2	19.0
1991	74.4	80.4	60.2	66.0	15.4	19.1
1992	74.5	80.4	60.3	66.1	15.4	19.2
1993	75.0	80.9	60.8	66.5	15.7	19.5
1994	75.0	80.9	60.8	67.0	15.7	19.7
1994–96(a)	75.2	81.1	60.9	66.7	15.8	19.6
1995–97(a)	75.6	81.3	61.3	66.9	16.1	19.8
1996–98(a)	75.9	81.5	61.5	67.1	16.3	20.0

(a) The methodology used to calculate this table has changed since 1995. Data on population and deaths averaged over 3 years are now used to minimise year-to-year statistical variations.

Sources: ABS Cat. No. 3302.0; ABS unpublished data.

Table S11: Life expectancy at selected ages by sex, States and Territories, 1996–98 (years)

	At birth		At age 15		At age 65	
State/Territory	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
New South Wales	75.8	81.6	61.4	67.1	16.3	20.0
Victoria	76.3	81.7	61.9	67.2	16.4	20.0
Queensland	75.6	81.5	61.4	67.2	16.5	20.2
Western Australia	76.1	81.9	61.8	67.4	16.6	20.3
South Australia	76.0	81.6	61.6	67.1	16.3	20.0
Tasmania	75.1	80.4	60.9	66.0	15.7	19.3
Australian Capital Territory	77.5	81.6	63.0	67.2	17.1	20.0
Northern Territory	70.6	75.0	56.8	61.2	15.0	16.9
Australia	**75.9**	**81.5**	**61.5**	**67.1**	**16.3**	**20.0**

Note: The methodology used to calculate this table has changed since 1995. Data on population and deaths averaged over 3 years are now used to minimise year-to-year statistical variations.

Sources: ABS Cat. No. 3302.0; ABS unpublished data.

Table S12: Life expectancy at selected ages, selected countries, latest year (years)

	At birth		At age 15		At age 65	
Country/year	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Australia (1996–98)	**75.9**	**81.5**	**61.5**	**67.1**	**16.3**	**20.0**
Australia (1995–97)	***75.6***	***81.3***	***61.3***	***66.9***	***16.1***	***19.8***
Canada (1995)	75.2	81.2	61.0	66.9	16.1	20.1
China (1990)	66.9	70.5	55.4	59.2	12.2	14.7
Denmark (1995)	72.8	77.9	58.5	63.4	14.1	17.6
France (1995)	73.9	81.9	59.5	67.4	16.1	20.6
Germany (1995)	73.3	79.8	58.9	65.4	14.7	18.6
Greece (1995)	75.0	80.2	60.9	66.0	16.1	18.4
Ireland (1993)	72.5	78.1	58.3	63.7	13.4	17.0
Israel (1995)	75.3	79.3	61.1	65.0	15.8	17.8
Italy (1994)	74.3	80.7	60.1	66.4	15.4	19.2
Japan (1996)	77.0	83.6	62.6	69.1	16.9	21.5
Korea, Republic of (1991)	67.7	75.7	53.9	61.9	12.3	16.1
Malaysia (1996)	69.3	74.1	55.7	60.2	12.7	14.7
Netherlands (1995)	74.6	80.4	60.3	66.0	14.7	19.1
New Zealand (1992–94)	73.4	79.1	59.3	64.9	15.0	18.8
Norway (1996)	75.4	81.1	60.9	66.5	15.5	19.5
Philippines (1991)	63.1	66.7	53.5	56.3	12.3	13.7
Poland (1995)	67.6	76.4	53.9	62.5	12.9	16.5
Russian Federation (1995)	58.3	71.7	45.1	58.4	10.8	14.9
Singapore (1997)	75.0	79.2	60.5	64.6	15.2	17.6
Spain (1994)	74.2	81.5	60.0	67.2	16.0	19.9
Sweden (1996)	76.5	81.5	62.0	66.9	16.1	19.7
Switzerland (1995–96)	75.7	81.9	61.3	67.4	16.3	20.3
United Kingdom (1996)	74.3	79.5	60.0	65.1	14.8	18.3
United States (1995)	72.5	78.9	58.4	64.7	15.6	18.9

Sources: UN 1999; ABS 1999b.

Table S13: Age-specific, crude and age-standardised death rates, all causes by sex, selected years, 1921 to 1998 (per 100,000 population)

Sex/age group (years)	1921	1941	1961	1981	1991	1998
Males						
0–4	2,213	1,289	564	281	191	137
5–9	200	139	49	34	20	15
10–14	172	108	52	29	22	19
15–19	219	159	123	124	88	75
20–24	321	205	161	153	128	125
25–29	373	199	146	133	127	134
30–34	442	232	169	123	133	151
35–39	584	339	229	165	161	152
40–44	730	461	380	261	198	188
45–49	994	737	588	455	313	248
50–54	1,299	1,161	992	790	517	398
55–59	1,895	1,775	1,614	1,294	885	684
60–64	2,878	2,774	2,619	1,983	1,543	1,180
65–69	4,199	4,251	4,117	3,231	2,489	2,002
70–74	6,199	6,479	6,252	5,195	3,927	3,359
75–79	10,076	10,054	9,312	8,018	6,547	5,351
80–84	15,368	15,264	14,084	12,112	10,548	9,292
85+	26,213	29,453	23,772	20,814	17,571	16,484
Crude rate	**1,106**	**1,099**	**946**	**815**	**744**	**719**
ASR(a)	**1,733**	**1,578**	**1,358**	**1,109**	**885**	**758**
Females						
0–4	1,771	1,022	443	216	151	111
5–9	192	103	38	18	14	9
10–14	128	73	30	20	15	14
15–19	205	104	47	45	37	37
20–24	290	155	61	48	45	39
25–29	377	202	74	51	54	42
30–34	426	234	92	57	54	53
35–39	535	311	146	87	77	77
40–44	563	374	209	143	111	108
45–49	690	565	347	265	187	163
50–54	943	780	542	378	307	264
55–59	1,289	1,103	785	617	484	398
60–64	1,915	1,805	1,298	971	797	654
65–69	3,112	2,884	2,178	1,568	1,305	1,043
70–74	5,041	4,789	3,652	2,552	2,187	1,819
75–79	8,295	8,275	6,271	4,426	3,797	3,145
80–84	13,136	12,704	10,241	7,597	6,487	5,994
85+	22,345	25,457	20,670	16,035	14,351	13,414
Crude rate	**873**	**901**	**745**	**646**	**635**	**638**
ASR(a)	**1,394**	**1,225**	**875**	**633**	**537**	**468**

(a) Age standardised to the total Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Table S14: Age-specific, crude and age-standardised death rates, all causes by sex, State or Territory of usual residence, 1998 (per 100,000 population)

Sex/age group (years)	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Males									
0–4	124	127	178	131	111	150	130	253	137
5–9	13	13	23	10	16	6	9	45	15
10–14	23	18	17	17	10	6	9	50	19
15–19	70	76	71	83	73	91	47	228	75
20–24	134	102	117	154	141	91	126	221	125
25–29	136	119	119	162	143	156	137	280	134
30–34	155	137	152	160	158	134	75	347	151
35–39	170	111	165	156	144	154	130	360	152
40–44	186	167	197	188	205	153	163	545	188
45–49	256	227	270	215	262	182	198	618	248
50–54	394	374	416	345	442	520	272	861	398
55–59	700	624	755	602	693	811	593	921	684
60–64	1,214	1,098	1,230	1,149	1,138	1,204	1,267	1,987	1,180
65–69	1,958	1,965	2,053	2,034	2,110	2,054	1,723	3,235	2,002
70–74	3,349	3,288	3,589	3,126	3,331	3,501	3,262	3,668	3,359
75–79	5,290	5,214	5,533	5,166	5,433	6,090	5,916	7,851	5,351
80–84	9,419	9,179	9,368	8,897	9,391	9,436	7,715	10,870	9,292
85+	16,593	16,310	16,398	16,273	16,710	17,493	18,695	6,707	16,484
Crude rate	**742**	**711**	**713**	**624**	**830**	**806**	**473**	**526**	**719**
ASR(a)	**761**	**730**	**781**	**737**	**768**	**795**	**733**	**997**	**758**
Females									
0–4	97	113	135	99	93	90	183	232	111
5–9	8	10	11	6	12	6	9	49	9
10–14	11	12	17	11	18	17	0	53	14
15–19	28	33	50	45	48	24	9	132	37
20–24	40	39	36	43	18	33	38	126	39
25–29	41	37	42	52	48	36	23	63	42
30–34	51	50	51	60	48	42	49	178	53
35–39	75	64	75	86	92	111	62	202	77
40–44	95	110	117	100	108	117	105	428	108
45–49	169	144	168	141	171	194	213	346	163
50–54	261	261	260	246	284	343	200	495	264
55–59	413	380	386	379	401	403	492	606	398
60–64	647	630	728	529	692	682	503	1,710	654
65–69	1,020	1,005	1,157	1,013	989	1,035	1,216	2,311	1,043
70–74	1,880	1,711	1,822	1,814	1,743	1,981	2,377	3,090	1,819
75–79	3,241	3,070	3,064	3,048	3,032	3,470	3,127	7,828	3,145
80–84	5,957	6,189	5,771	5,812	6,235	5,930	5,794	4,063	5,994
85+	13,256	13,813	13,202	12,773	13,513	13,860	15,440	13,200	13,414
Crude rate	**661**	**661**	**588**	**541**	**750**	**713**	**449**	**378**	**638**
ASR(a)	**467**	**464**	**472**	**450**	**469**	**489**	**503**	**783**	**468**

(a) Age standardised to the total Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Table S15: Age-specific, crude and age-standardised death rates, all causes, by sex, selected countries, latest year (per 100,000 population)

	Age group (years)					
Country/year	**0**[(a)]	**1–4**	**5–14**	**15–24**	**25–34**	**35–44**
Males						
Australia (1998)	**551**	**37**	**17**	**101**	**143**	**170**
Australia (1995)	***614***	***39***	***18***	***102***	***133***	***176***
Canada (1995)	673	30	20	93	122	194
China—selected rural areas (1994)	2,275	158	69	95	164	289
China—selected urban areas (1994)	1,404	59	39	52	94	201
Denmark (1995)	557	37	19	74	127	239
France (1994)	671	33	21	102	175	290
Germany (1995)	592	35	17	89	113	241
Greece (1995)	896	23	21	98	124	191
Ireland (1993)	666	34	25	85	117	164
Israel (1995)	748	42	19	80	92	146
Italy (1993)	765	37	23	90	141	180
Japan (1994)	471	45	19	63	76	153
Korea, Republic of (1995)	289	67	42	111	172	354
Malaysia (1991)	1,350	95	59	142	182	293
Netherlands (1995)	625	38	19	61	77	158
New Zealand (1993)	784	47	19	159	134	210
Norway (1994)	579	22	18	73	97	175
Philippines (1990)	2,714	379	101	185	338	497
Poland (1995)	1,471	47	28	111	199	473
Russian Federation (1995)	2,067	122	69	334	649	1,195
Singapore (1995)	455	40	26	92	131	198
Spain (1994)	670	42	22	87	206	250
Sweden (1995)	453	20	13	56	81	160
Switzerland (1994)	573	41	25	112	160	200
United Kingdom (1995)	692	28	18	77	99	170
United States (1994)	881	47	27	146	209	333

(continued)

(a) Infant mortality per 100,000 births.

Table S15 (continued): Age-specific, crude and age-standardised death rates, all causes, by sex, selected countries, latest year (per 100,000 population)

Country/year	Age group (years) 45–54	55–64	65–74	75+	Crude rate	ASR[(b)]
Males						
Australia (1998)	**320**	**909**	**2,622**	**8,550**	**720**	**742**
Australia (1995)	***349***	***1,025***	***2,889***	***9,135***	***737***	***802***
Canada (1995)	402	1,112	2,933	9,184	760	853
China—selected rural areas (1994)	642	1,644	4,469	11,047	691	1,212
China—selected urban areas (1994)	422	1,238	3,898	11,483	628	1,099
Denmark (1995)	505	1,477	3,965	11,691	1,204	1,073
France (1994)	570	1,297	2,803	9,684	960	878
Germany (1995)	565	1,380	3,481	11,662	1,034	1,013
Greece (1995)	423	1,126	2,800	9,922	1,024	846
Ireland (1993)	447	1,489	4,317	12,456	959	1,133
Israel (1995)	376	1,124	3,014	10,153	657	859
Italy (1993)	433	1,228	3,106	10,050	1,029	907
Japan (1994)	380	1,039	2,387	8,895	783	768
Korea, Republic of (1995)	821	1,771	4,330	11,218	588	1,230
Malaysia (1991)	721	1,879	4,239	10,967	520	1,166
Netherlands (1995)	381	1,173	3,413	11,250	893	955
New Zealand (1993)	445	1,296	3,368	10,307	831	970
Norway (1994)	396	1,157	3,325	10,385	1,043	912
Philippines (1990)	922	1,822	3,765	10,832	610	1,247
Poland (1995)	1,052	2,395	4,810	12,831	1,095	1,423
Russian Federation (1995)	2,228	3,885	6,479	14,154	1,693	2,171
Singapore (1995)	493	1,489	3,772	9,192	589	975
Spain (1994)	500	1,194	2,876	9,544	939	893
Sweden (1995)	370	986	2,835	10,075	1,088	826
Switzerland (1994)	407	988	2,833	9,868	914	847
United Kingdom (1995)	422	1,267	3,669	11,016	1,082	974
United States (1994)	599	1,444	3,332	9,431	915	990

(continued)

(b) Age-standardised rate. Reference population is the European standard population (WHO 1995). Standard death rates in this table are different from standard rates in other tables because of the use of a different reference population.

Table S15 (continued): Age-specific, crude and age-standardised death rates, all causes, by sex, selected countries, latest year (per 100,000 population)

	Age group (years)					
Country/year	**0[(a)]**	**1–4**	**5–14**	**15–24**	**25–34**	**35–44**
Females						
Australia (1998)	**449**	**29**	**12**	**38**	**47**	**92**
Australia (1995)	***515***	***30***	***16***	***38***	***50***	***89***
Canada (1995)	553	25	16	33	47	96
China—selected rural areas (1994)	2,216	145	46	80	125	189
China—selected urban areas (1994)	1,208	50	25	33	55	116
Denmark (1995)	452	24	13	30	50	149
France (1994)	504	25	15	35	62	117
Germany (1995)	464	26	14	34	47	117
Greece (1995)	728	21	14	28	44	88
Ireland (1993)	555	28	13	25	44	106
Israel (1995)	615	39	13	30	35	94
Italy (1993)	645	35	17	29	51	94
Japan (1994)	376	36	12	25	38	84
Korea, Republic of (1995)	244	60	28	53	68	123
Malaysia (1991)	1,160	80	38	57	88	171
Netherlands (1995)	464	28	14	28	45	110
New Zealand (1993)	677	48	20	53	64	116
Norway (1994)	463	30	16	30	39	91
Philippines (1990)	2,122	340	81	90	146	240
Poland (1995)	1,243	38	17	34	56	157
Russian Federation (1995)	1,562	96	39	95	155	317
Singapore (1995)	330	28	21	39	50	109
Spain (1994)	536	32	17	28	65	96
Sweden (1995)	349	14	9	26	40	86
Switzerland (1994)	446	30	13	39	62	99
United Kingdom (1995)	541	24	13	29	46	107
United States (1994)	720	38	18	48	78	146

(continued)

(a) Infant mortality per 100,000 births.

Table S15 (continued): Age-specific, crude and age-standardised death rates, all causes, by sex, selected countries, latest year (per 100,000 population)

	Age group (years)				Crude	
Country/year	**45–54**	**55–64**	**65–74**	**75+**	**rate**	**ASR[b]**
Females						
Australia (1998)	210	516	1419	6697	639	489
Australia (1995)	216	567	1,563	7,078	649	522
Canada (1995)	248	639	1,622	6,797	665	522
China—selected rural areas (1994)	445	1,074	2,750	8,437	586	845
China—selected urban areas (1994)	279	851	2,577	9,230	544	776
Denmark (1995)	368	970	2,430	9,023	1,199	707
France (1994)	237	502	1,211	7,406	839	454
Germany (1995)	284	628	1,831	8,980	1,130	596
Greece (1995)	187	491	1,540	8,872	894	571
Ireland (1993)	279	809	2,353	9,477	842	709
Israel (1995)	196	697	2,040	8,704	618	631
Italy (1993)	222	548	1,510	7,787	911	535
Japan (1994)	192	440	1,133	6,025	632	423
Korea, Republic of (1995)	289	684	2,106	8,463	456	667
Malaysia (1991)	427	1,176	3,192	9,087	402	850
Netherlands (1995)	257	638	1,668	8,101	863	565
New Zealand (1993)	307	838	1,977	7,685	743	625
Norway (1994)	253	621	1,663	7,828	991	551
Philippines (1990)	452	963	2,373	9,307	425	837
Poland (1995)	379	911	2,453	10,485	911	791
Russian Federation (1995)	684	1,390	3,189	11,574	1,330	1,058
Singapore (1995)	278	839	2,308	7,092	452	634
Spain (1994)	206	473	1,300	7,417	792	501
Sweden (1995)	233	570	1,502	7,634	1,035	512
Switzerland (1994)	217	516	1,338	7,405	860	486
United Kingdom (1995)	279	750	2,180	8,601	1,121	624
United States (1994)	330	842	1,990	7,449	838	612

(b) Age-standardised rate. Reference population is the European standard population (WHO 1995). Standard death rates in this table are different from standard rates in other tables because of the use of a different reference population.

Sources: WHO 1998; AIHW National Mortality Database.

Table S16: Age-standardised death rates[a], by sex and ICD-9 chapter, selected years, 1921 to 1998 (per 100,000 population)

ICD-9 chapter or disease	1921	1941	1961	1971	1981	1991	1996	1997	1998
Males									
Infectious and parasitic[b]	210	93	17	10	5	6	12	10	8
Neoplasms	157	179	197	222	242	237	234	223	220
Endocrine, nutritional[c]	16	24	16	23	18	24	24	22	22
Blood diseases	10	6	4	3	3	3	2	2	2
Mental disorders	7	4	5	9	9	13	19	17	18
Nervous system diseases	47	26	15	12	13	16	19	15	16
Circulatory diseases	387	635	759	763	565	381	326	305	284
Respiratory diseases	207	149	108	124	98	78	71	84	77
Digestive diseases	59	57	39	31	36	29	24	23	22
Genito-urinary diseases	126	138	44	24	16	14	13	13	13
Skin diseases	5	3	2	1	1	1	1	1	1
Musculoskeletal diseases	7	5	4	4	3	3	3	2	2
Congenital diseases	9	10	10	8	7	5	4	5	4
Perinatal diseases	54	43	20	17	7	5	4	4	4
Ill-defined conditions	315	103	15	7	6	5	3	3	4
Injury and poisoning	117	104	104	105	81	65	61	60	61
All causes	**1,733**	**1,577**	**1,358**	**1,361**	**1,109**	**885**	**820**	**790**	**758**
Females									
Infectious and parasitic[b]	158	58	9	6	4	4	5	5	5
Neoplasms	159	163	139	138	136	144	141	137	133
Endocrine, nutritional[c]	26	40	20	22	15	15	16	16	15
Blood diseases	13	6	5	3	3	2	2	2	2
Mental disorders	3	3	2	6	6	9	15	12	12
Nervous system diseases	36	22	9	9	8	12	13	12	11
Circulatory diseases	345	523	514	509	347	246	211	200	187
Respiratory diseases	160	115	45	43	32	34	38	48	43
Digestive diseases	58	40	23	18	20	19	15	15	15
Genito-urinary diseases	67	76	20	17	12	10	10	10	10
Complications of pregnancy	24	14	2	1	—	—	—	—	—
Skin diseases	5	3	2	1	—	1	1	1	1
Musculoskeletal diseases	9	6	4	5	4	5	5	4	4
Congenital diseases	7	9	8	8	6	4	3	4	3
Perinatal diseases	40	33	15	13	5	4	4	3	3
Ill-defined conditions	250	74	14	6	4	3	2	2	2
Injury and poisoning	34	40	42	46	30	25	21	22	22
All causes	**1,394**	**1,225**	**875**	**848**	**633**	**537**	**501**	**494**	**468**

(a) Age standardised to the total Australian population at 30 June 1991.

(b) From 1996, includes AIDS and AIDS-related deaths.

(c) Prior to 1996, includes AIDS and AIDS-related deaths.

Source: AIHW National Mortality Database.

Table S17: Age-standardised death rates[(a)], by sex and ICD-9 chapter, States and Territories, 1998 (per 100,000 population)

ICD-9 chapter or disease	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Males									
Infectious and parasitic[(b)]	10	7	8	6	9	5	8	20	8
Neoplasms	217	222	229	215	212	225	232	201	220
Endocrine, nutritional	18	27	22	19	25	15	9	43	22
Blood diseases	3	2	2	1	3	2	6	—	2
Mental disorders	21	20	13	14	17	13	9	19	18
Nervous system diseases	16	15	14	18	14	20	16	25	16
Circulatory diseases	291	265	296	265	291	312	270	327	284
Respiratory diseases	77	71	80	73	83	85	69	126	77
Digestive diseases	22	21	21	21	26	20	28	43	22
Genito-urinary diseases	12	14	12	15	13	14	15	14	13
Skin diseases	1	1	1	2	1	1	—	1	1
Musculoskeletal diseases	2	3	2	2	2	1	2	—	2
Congenital diseases	3	4	5	4	3	3	3	3	4
Perinatal diseases	3	4	5	3	3	5	4	10	4
Ill-defined conditions	2	3	5	11	4	13	2	14	4
Injury and poisoning	62	50	65	72	62	61	60	151	61
All causes	**761**	**730**	**781**	**737**	**768**	**795**	**733**	**997**	**758**
Females									
Infectious and parasitic[(b)]	5	4	3	5	5	5	4	17	5
Neoplasms	131	135	132	129	134	136	157	156	133
Endocrine, nutritional	12	19	16	16	14	10	15	66	15
Blood diseases	1	2	2	1	2	1	2	4	2
Mental disorders	12	14	11	13	10	10	12	15	12
Nervous system diseases	11	12	10	13	10	14	13	13	11
Circulatory diseases	193	177	193	172	189	199	183	257	187
Respiratory diseases	44	42	40	40	47	49	47	114	43
Digestive diseases	15	15	16	16	15	16	20	26	15
Genito-urinary diseases	11	11	10	8	9	9	14	35	10
Complications of pregnancy	—	—	—	—	—	—	—	—	—
Skin diseases	1	1	1	1	1	1	—	—	1
Musculoskeletal diseases	3	4	4	3	3	4	6	5	4
Congenital diseases	2	3	3	2	3	3	5	6	3
Perinatal diseases	3	3	4	2	3	2	5	7	3
Ill-defined conditions	2	2	3	5	2	7	3	3	2
Injury and poisoning	20	20	25	25	21	22	16	58	22
All causes	**467**	**464**	**472**	**450**	**469**	**489**	**503**	**783**	**468**

(a) Age standardised to the total Australian population at 30 June 1991.

(b) Includes AIDS and AIDS-related deaths.

Source: AIHW National Mortality Database.

Table S18: Age-standardised death rates[(a)], by selected ICD-9 chapters and sex, selected countries, latest year (per 100,000 population)

	ICD-9 chapter					
	Infectious & parasitic	**Neoplasms**	**Circulatory**	**Respiratory**	**Injury & poisoning**	**All causes**
Males						
Australia (1998)	**8**	**221**	**273**	**72**	**59**	**742**
Australia (1995)	***7***	***235***	***320***	***66***	***57***	***802***
Canada (1995)	6	238	307	79	63	841
China—selected rural areas (1994)	40	206	371	326	106	1,212
China—selected urban areas (1994)	18	234	428	203	58	1,099
Denmark (1995)	14	275	408	94	75	1,073
France (1994)	12	285	240	60	92	878
Germany (1995)	7	263	443	72	60	1,013
Greece (1995)	6	221	381	48	61	846
Ireland (1993)	6	274	515	159	55	1,133
Israel (1995)	14	197	366	37	52	859
Italy (1993)	4	276	350	62	59	907
Japan (1994)	14	228	233	117	64	768
Korea, Republic of (1995)	31	276	316	73	131	1,230
Netherlands (1995)	7	282	358	100	40	955
New Zealand (1993)	5	261	421	100	71	970
Norway (1994)	7	229	390	83	61	912
Poland (1995)	11	301	687	59	123	1,423
Russian Federation (1995)	38	307	1,052	142	395	2,171
Singapore (1995)	23	257	338	208	60	975
Spain (1994)	11	261	292	93	59	893
Sweden (1995)	6	191	393	60	58	826
Switzerland (1994)	20	248	322	64	82	847
United Kingdom (1995)	6	258	411	144	41	974
United States (1994)	14	244	389	90	85	990

(continued)

(a) Reference population is the European standard population (WHO 1998). Standard death rates in this table are different from the rates in other tables because of the use of a different reference population.

Table S18 (continued): Age-standardised death rates[(a)], by selected ICD-9 chapters and sex, selected countries, latest year (per 100,000 population)

	ICD-9 chapter					
	Infectious & parasitic	Neoplasms	Circulatory	Respiratory	Injury & poisoning	All causes
Females						
Australia (1998)	**5**	**139**	**194**	**45**	**22**	**489**
Australia (1995)	**4**	**146**	**222**	**36**	**23**	**522**
Canada (1995)	5	156	185	42	25	515
China—selected rural areas (1994)	22	115	267	241	71	845
China—selected urban areas (1994)	8	126	319	142	38	776
Denmark (1995)	6	209	247	62	38	707
France (1994)	7	127	140	27	39	454
Germany (1995)	4	156	278	29	24	596
Greece (1995)	4	115	303	31	19	571
Ireland (1993)	4	181	308	95	22	709
Israel (1995)	10	160	268	26	26	631
Italy (1993)	2	144	235	23	24	535
Japan (1994)	7	111	154	48	25	423
Korea, Republic of (1995)	9	109	212	32	48	667
Netherlands (1995)	6	159	205	43	20	565
New Zealand (1993)	3	179	267	59	27	625
Norway (1994)	5	154	219	52	26	551
Poland (1995)	4	156	421	21	34	791
Russian Federation (1995)	8	140	633	38	94	1,058
Singapore (1995)	15	146	254	125	20	634
Spain (1994)	6	119	206	34	17	501
Sweden (1995)	5	142	221	36	24	512
Switzerland (1994)	8	139	198	29	36	486
United Kingdom (1995)	4	174	245	90	17	624
United States (1994)	10	162	245	55	29	612

(a) Reference population is the European standard population (WHO 1998). Standard death rates in this table are different from the rates in other tables because of the use of a different reference population.

Sources: WHO 1996, 1998.

Table S19: Age-standardised death rates[(a)], States and Territories, by major causes of death, 1994–98 and changes from 1989–93 to 1994–98

Cause of death	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Ischaemic heart disease								
Males	195.3	182.4	203.2	181.3	196.2	207.7	170.6	184.4
% change 89–93 to 94–98	*–17.9*	*–20.6*	*–16.9*	*–19.8*	*–21.0*	*–16.7*	*–8.7*	*–16.5*
Females	111.2	100.7	113.0	98.3	105.9	110.2	85.2	97.5
% change 89–93 to 94–98	*–21.7*	*–20.0*	*–17.0*	*–18.0*	*–21.3*	*–22.5*	*–12.9*	*–18.8*
Cerebrovascular disease (stroke)								
Males	67.1	59.1	62.0	60.7	64.3	70.8	60.8	81.7
% change 89–93 to 94–98	*–11.9*	*–8.6*	*–14.4*	*–10.4*	*–14.9*	*–2.9*	*4.7*	*20.0*
Females	60.4	52.6	56.6	52.7	57.4	61.3	53.1	68.5
% change 89–93 to 94–98	*–21.4*	*–19.0*	*–14.2*	*–8.7*	*–9.4*	*–16.6*	*5.8*	*42.8*
Lung cancer								
Males	53.8	55.9	56.2	55.0	52.9	61.2	40.1	88.2
% change 89–93 to 94–98	*–8.6*	*–7.6*	*–4.9*	*–6.6*	*–8.5*	*–8.5*	*–23.0*	*28.4*
Females	18.3	19.8	17.3	19.8	16.7	21.4	16.9	34.8
% change 89–93 to 94–98	*14.9*	*22.4*	*35.4*	*8.7*	*14.5*	*12.3*	*–9.3*	*49.5*
Chronic obstructive pulmonary disease								
Males	44.7	45.5	43.9	39.7	39.3	55.6	38.7	86.8
% change 89–93 to 94–98	*–15.9*	*–19.0*	*–19.4*	*–19.8*	*–24.2*	*–15.1*	*–25.7*	*–26.6*
Females	19.0	18.8	15.9	15.7	15.0	25.0	18.2	58.6
% change 89–93 to 94–98	*13.2*	*13.6*	*19.4*	*20.1*	*28.2*	*26.2*	*–9.3*	*–0.9*
Colorectal cancer								
Males	27.6	30.9	28.5	28.8	28.0	33.7	32.9	20.7
% change 89–93 to 94–98	*–5.1*	*–4.9*	*–2.2*	*6.6*	*–1.9*	*9.2*	*–4.2*	*–8.2*
Females	17.7	20.7	18.3	18.4	18.9	23.8	22.3	22.3
% change 89–93 to 94–98	*–7.6*	*–7.4*	*–5.1*	*–6.7*	*–0.3*	*2.1*	*–11.2*	*47.6*
All causes								
Males	816.3	793.5	807.0	784.9	805.4	885.1	729.2	1,107.2
% change 89–93 to 94–98	*–8.6*	*–10.8*	*–9.7*	*–7.4*	*–9.9*	*–9.1*	*–8.0*	*–14.7*
Females	499.0	492.2	484.5	474.6	489.0	548.8	456.0	764.1
% change 89–93 to 94–98	*–10.3*	*–8.5*	*–5.3*	*–2.0*	*–4.9*	*–7.7*	*–4.2*	*–3.1*

(a) Age standardised to the total Australian population at 30 June 1991.

Source: AIHW National Mortality Database.

Infectious diseases

Table S20: Selected notifiable diseases, 1995 to 1998

	Notifications				Rate per 100,000 population			
Disease	**1995**	**1996**	**1997**	**1998**	**1995**	**1996**	**1997**	**1998**
Arbovirus infection, nec	67	52	18	81	0.4	0.3	0.1	0.4
Barmah Forest virus infection	756	837	704	558	4.7	4.6	3.8	3.0
Brucellosis	29	38	41	45	0.2	0.2	0.2	0.2
Campylobacteriosis	10,933	12,158	11,848	13,439	91.6	100.4	96.7	108.3
Chancroid	2	3	1	1	—	—	—	—
Chlamydial infection(a)	6,411	8,420	9,126	11,405	53.7	69.6	74.5	87.7
Cholera	5	4	3	4	—	—	—	—
Dengue fever	34	43	210	557	0.2	0.2	1.1	3.0
Donovanosis(a)	85	50	45	31	0.8	0.5	0.4	0.3
Gonococcal infection	3,259	4,173	4,689	5,428	18.1	22.8	25.3	29.0
Haemophilus influenzae type b	74	51	53	35	0.4	0.3	0.3	0.2
Hepatitis A	1,601	2,150	3,076	2,503	8.9	11.7	16.6	13.4
Hepatitis B—incident	321	225	247	261	1.8	1.2	1.3	1.4
Hepatitis B—unspecified	npr	npr	7,114	6,682	npr	npr	38.4	35.6
Hepatitis C—incident	69	72	81	343	0.8	0.8	0.5	2.2
Hepatitis C—unspecified(b)	9,601	9,489	19,689	19,261	91.8	89.3	106.3	102.7
Hepatitis, nec	55	36	29	19	0.3	0.2	0.2	0.1
Hydatid infection	46	45	61	46	0.3	0.2	0.3	0.4
Legionellosis	160	192	161	271	0.9	1.0	0.9	1.4
Leprosy	7	10	14	3	—	0.1	0.1	—
Leptospirosis	148	227	126	197	0.8	1.2	0.7	1.1
Listeriosis	58	70	71	58	0.3	0.4	0.4	0.3
Malaria	625	849	746	705	3.5	4.6	4.0	3.8
Measles	1,324	498	852	306	7.3	2.7	4.6	1.6
Meningococcal infection	382	426	499	455	2.1	2.3	2.7	2.4
Mumps	153	128	191	183	1.0	0.9	1.0	1.0
Ornithosis	176	85	46	56	1.5	0.7	0.4	0.6
Pertussis	4,297	4,031	10,668	6,432	23.8	22.0	57.6	34.3
Q fever	473	555	593	571	2.6	3.0	3.2	3.0
Ross River virus infection	2,602	7,823	6,683	3,094	14.4	42.7	36.1	16.5
Rubella	4,380	2,845	1,446	772	24.3	15.5	7.8	4.1
Salmonellosis, nec	5,895	5,819	7,004	7,700	32.7	31.8	37.8	41.1
Shigellosis	734	676	799	615	6.1	5.6	6.5	5.0
Syphilis	1,854	1,523	1,304	1,689	10.3	8.3	7.0	9.0
Tetanus	7	2	8	7	—	—	—	—
Tuberculosis	1,073	1,067	1,008	982	5.9	5.8	5.4	5.2
Typhoid(c)	69	84	77	69	0.4	0.5	0.4	0.4
Yersiniosis, nec	306	268	245	207	2.6	2.2	2.0	1.7

(a) New South Wales not included in the calculation rates for 1998 as only notifiable since September 1998.

(b) Data for South Australia and New South Wales were included for the first time in 1997.

(c) Includes paratyphoid in New South Wales and Victoria, and Queensland from July 1996.

Note: In the period 1995–98 there were no reported cases of the following notifiable diseases: diphtheria, plague, poliomyelitis, rabies, viral haemorrhagic fever, yellow fever. There was 1 case of lymphogranuloma venereum in 1995. There was 1 case of botulism in 1998.

Source: DHAC 1999a.

Table S21: Characteristics of AIDS cases, by age, sex, State/Territory, exposure category and defining condition, 1987 to 1998

Description	1987–89	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total cases	**1,947**	**674**	**802**	**787**	**844**	**950**	**798**	**653**	**351**	**265**
Median age (years)										
Males	36	37	37	38	37	37	37	37	39	39
Females	35	33	32	32	38	31	34	34	31	35
Per cent males	**96.6**	**97.2**	**96.4**	**95.2**	**94.4**	**94.8**	**95.5**	**95.0**	**92.3**	**94.0**
State/Territory (per cent)										
NSW	62.4	62.9	55.1	54.5	57.0	57.8	58.0	54.8	51.9	57.4
Vic	20.2	18.2	23.0	21.1	21.3	20.0	20.2	20.7	20.8	19.2
Qld	7.5	8.5	10.5	11.4	10.8	10.3	12.6	11.5	16.2	12.5
WA	4.7	4.2	4.7	5.8	3.8	4.3	3.8	5.8	4.0	4.2
SA	3.4	3.7	4.7	4.2	5.3	5.3	3.8	4.6	5.7	3.0
Tas	0.5	0.6	0.4	1.3	0.1	0.5	0.2	1.1	0.6	0.7
NT	0.1	0.4	0.6	0.6	0.6	0.3	0.4	0.1	0.8	1.1
ACT	1.1	1.5	1.0	1.0	1.1	1.5	1.0	1.4	—	1.9
Exposure category (per cent)										
Male homosexual/bisexual contact	88.1	87.3	83.5	82.1	81.0	83.3	81.7	79.9	75.5	69.7
Male homosexual/bisexual contact and ID use	3.2	2.9	3.9	5.0	6.9	5.0	5.2	5.8	3.3	3.3
ID use (female and heterosexual male)	1.6	2.3	3.9	2.1	3.3	3.2	3.5	3.9	4.9	6.6
Heterosexual contact	1.3	3.1	4.9	6.6	6.4	5.8	6.4	8.3	14.5	18.0
Haemophilia/coagulation disorder	1.8	1.8	1.4	1.7	1.4	1.1	2.0	1.0	1.2	0.4
Receipt of blood/tissue	3.9	2.1	2.0	2.0	1.0	1.0	0.7	1.1	0.3	1.2
Mother with/at risk for HIV infection	0.1	0.5	0.4	0.5	—	0.6	0.5	—	0.3	0.8
Other/undetermined	1.8	2.7	3.1	3.2	3.8	3.6	4.4	5.5	6.0	7.9
AIDS-defining condition (per cent)										
Pneumocystis carinii pneumonia (PCP)	38.8	29.8	31.3	26.9	22.1	22.4	19.8	22.5	25.9	23.8
Kaposi's sarcoma (KS)	15.8	10.7	12.1	12.3	11.0	10.0	10.9	11.5	10.0	9.4
PCP and other (not KS)	6.6	8.5	6.0	6.3	3.8	2.5	4.1	4.4	7.4	8.3
Oesophageal candidiasis	5.1	7.5	7.7	8.8	11.7	14.4	16.4	14.7	8.8	8.7
Other[(a)]	33.7	47.5	42.8	45.7	51.4	50.7	48.8	46.9	47.8	49.8

(a) Includes *Mycobacterium avium* and HIV wasting disease.

Source: NCHECR 1999.

Cancer

Table S22: Leading cancers[a], new cases and deaths by type and sex, 1996

	New cases				Deaths			
Cancer	**Number**	**Per cent**	**ASR[b]**	**Lifetime risk[c]**	**Number**	**Per cent**	**ASR[b]**	**PYLL[d]**
Males								
Prostate	10,055	23.5	117.4	1 in 10	2,644	13.8	33.0	6,228
Colorectal	6,067	14.2	69.2	1 in 17	2,474	12.9	28.8	17,788
Lung	5,228	12.2	60.1	1 in 19	4,743	24.7	55.0	31,038
Melanoma	4,313	10.1	48.0	1 in 25	580	3.0	6.7	6,955
Bladder	1,921	4.5	22.4	1 in 56	543	2.8	6.6	2,108
NHL[e]	1,718	4.0	19.4	1 in 63	707	3.7	8.2	6,750
Unknown primary	1,625	3.8	19.0	1 in 72	1,189	6.2	14.1	7,663
Kidney	1,209	2.8	13.7	1 in 84	460	2.4	5.4	3,583
Stomach	1,190	2.8	13.8	1 in 91	752	3.9	8.8	5,373
Lip	826	1.9	9.2	1 in 131	5	0.0	0.1	63
All cancers	**42,733**	**100.0**	**489.1**	**1 in 3**	**19,196**	**100.0**	**225.5**	**140,070**
Females								
Breast	9,621	27.5	95.5	1 in 12	2,619	17.6	24.9	30,955
Colorectal	4,931	14.1	46.0	1 in 26	2,132	14.3	19.0	13,115
Melanoma	3,448	9.9	35.0	1 in 34	323	2.2	3.0	3,820
Lung	2,393	6.9	23.0	1 in 47	2,021	13.6	19.1	14,983
Unknown primary	1,406	4.0	12.5	1 in 109	1,142	7.7	10.0	6,015
NHL[e]	1,387	4.0	13.3	1 in 85	681	4.6	6.2	5,135
Uterus	1,316	3.8	12.9	1 in 83	273	1.8	2.5	1,468
Ovary	1,166	3.3	11.4	1 in 98	797	5.4	7.6	7,290
Cervix	923	2.6	9.4	1 in 130	301	2.0	2.9	4,253
Pancreas	801	2.3	7.2	1 in 201	822	5.5	7.2	3,413
All cancers	**34,933**	**100.0**	**338.8**	**1 in 4**	**14,893**	**100.0**	**136.9**	**121,228**

(a) Rankings are based on the number of new cases; excludes non-melanocytic skin cancers.

(b) Per 100,000 population, age standardised to the Australian population at 30 June 1991.

(c) Lifetime risk—a measure which approximates the risk of contracting a particular cancer in a lifetime if the risks at the year of estimation remained throughout a person's life. For the purposes of this table, 'lifetime' is defined as ages 0–74.

(d) Potential years of life lost between the ages of 0 and 74 years.

(e) Non-Hodgkin's lymphoma.

Sources: AIHW & AACR 1999; AIHW National Mortality Database.

Table S23: Major cancers, age-standardised incidence rates[(a)], by sex, 1988 to 1996 (per 100,000 population)

Cancer	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Males									
Prostate	70.6	75.5	85.3	92.4	104.2	140.9	158.3	144.0	117.4
Colorectal	62.1	63.8	64.3	67.4	66.0	66.3	67.4	68.1	69.2
Lung	66.9	67.0	68.5	66.0	64.9	62.7	64.8	60.6	60.1
Melanoma	40.9	38.7	39.0	39.1	42.4	43.8	43.7	46.4	48.0
Bladder	23.6	22.4	21.9	20.5	22.1	22.4	23.9	23.7	22.4
NHL[(b)]	15.8	16.0	17.3	18.2	19.0	18.7	17.7	17.6	19.4
Stomach	16.5	15.3	16.4	15.3	15.2	15.3	14.7	15.1	13.8
Kidney	10.9	11.4	12.0	13.3	13.0	12.8	13.1	13.7	13.7
Pancreas	9.4	9.7	10.0	9.6	9.7	9.5	10.2	9.3	9.4
Testis	4.3	4.6	4.8	5.2	5.6	5.5	6.0	5.7	6.0
All cancers	**427.7**	**431.6**	**448.4**	**457.9**	**476.5**	**507.5**	**530.6**	**510.4**	**489.1**
Females									
Breast	79.1	81.9	83.2	88.2	85.7	92.7	100.3	101.1	95.5
Colorectal	43.4	44.3	44.5	47.2	47.3	46.0	47.5	46.1	46.0
Melanoma	33.4	29.6	30.5	30.7	32.5	32.7	32.6	34.4	35.0
Lung	19.5	20.0	21.0	21.5	21.3	22.4	22.5	22.7	23.0
NHL[(b)]	10.8	11.2	11.1	12.2	12.6	12.3	12.7	13.4	13.3
Uterus	12.3	11.8	12.0	12.6	13.2	13.1	13.9	13.6	12.9
Cervix	12.8	12.3	12.3	12.4	11.2	11.0	11.9	9.9	9.4
Kidney	6.6	6.3	6.8	7.4	8.1	7.4	7.2	7.3	7.6
Pancreas	6.9	6.5	6.8	7.1	7.3	7.2	7.0	7.2	7.2
Stomach	6.8	6.7	6.5	6.8	6.4	6.1	5.9	6.4	6.0
Bladder	6.9	6.1	5.9	5.3	5.3	5.9	6.1	6.1	5.7
All cancer	**309.8**	**308.0**	**314.2**	**327.0**	**327.9**	**332.2**	**342.1**	**345.7**	**338.8**

(a) Age standardised to the Australian population at 30 June 1991.

(b) Non-Hodgkin's lymphoma.

Source: AIHW & AACR 1999.

Table S24: Major cancers, average annual age-standardised incidence rates[(a)], by sex, States and Territories 1992–96 and Australia 1996 (per 100,000 population)

Cancer	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust[(b)]
Males									
Prostate	135.2	124.0	127.0	150.5	142.8	156.7	149.0	74.7	117.4
Colorectal	66.5	68.8	69.7	64.1	67.0	67.8	65.9	50.5	69.2
Lung	61.2	62.0	66.0	64.7	61.8	68.2	46.4	85.5	60.1
Melanoma	45.8	33.3	63.2	49.5	39.4	34.7	37.4	32.8	48.0
Bladder	18.3	30.0	28.9	15.1	17.0	28.5	17.6	11.5	22.4
NHL[(c)]	19.2	19.3	18.0	16.1	18.0	16.5	20.5	10.7	19.4
Stomach	14.3	15.5	14.2	16.0	14.6	16.0	14.7	10.2	13.8
Kidney	13.9	12.1	15.0	10.3	13.5	14.3	11.9	10.1	13.7
Pancreas	9.6	9.5	9.8	9.7	9.8	10.7	9.4	11.0	9.4
Testis	5.7	5.8	6.0	5.5	6.0	5.9	5.6	4.5	6.0
Females									
Breast	94.4	96.6	93.5	98.2	96.3	93.8	95.2	65.2	95.5
Colorectal	44.3	47.6	50.3	43.5	48.2	50.9	44.3	42.7	46.0
Melanoma	30.8	28.3	45.6	36.1	34.5	30.5	28.4	18.9	35.0
Lung	56.1	57.8	58.0	57.4	55.3	60.7	46.4	92.8	23.0
NHL[(c)]	12.9	13.4	12.7	11.8	13.0	12.3	14.8	9.5	13.3
Uterus	12.3	14.9	14.0	11.8	14.6	12.4	11.8	12.7	12.9
Cervix	10.8	10.5	12.0	11.1	7.8	11.5	9.0	21.8	9.4
Kidney	8.2	6.7	8.7	6.2	7.1	5.8	5.5	6.0	7.6
Pancreas	7.7	6.8	6.9	6.9	7.3	6.9	5.7	5.6	7.2
Stomach	5.7	6.6	6.3	6.5	6.3	6.7	5.5	4.9	6.0
Bladder	4.6	7.5	8.2	3.2	4.0	6.7	3.7	4.6	5.7

(a) Age standardised to the Australian population at 30 June 1991.

(b) State and Territory averages for 1992–96 do not equate to a single-year average for Australia.

(c) Non-Hodgkin's lymphoma.

Source: AIHW & AACR 1999.

Table S25: Major cancers, age-standardised incidence rates[(a)], by sex, selected countries 1988–92 and Australia 1992 and 1996 (per 100,000 population)

Males	Colorectal	Lung	Melanoma	Prostate	Stomach	All cancers[(b)]
Australia 1992	***46.6***	***44.3***	***32.4***	***63.4***	***10.4***	***327.2***
Australia 1996	**49.5**	**41.9**	**37.3**	**79.1**	**9.3**	**351.6**
Canada	43.0	65.4	7.7	64.7	10.6	322.1
England and Wales[(c)]	33.9	62.4	4.6	28.0	16.1	261.1
Italy (Venice)	35.4	81.9	6.1	26.8	19.9	355.9
Japan (Osaka)	34.2	43.5	0.2	6.8	65.0	272.8
Netherlands	36.4	73.0	6.9	39.6	15.4	288.4
New Zealand (non-Maori)	51.3	46.5	25.0	37.8	11.0	290.3
United States (black)	46.4	99.1	0.7	137.0	14.5	454.5
United States (white)	42.4	61.3	13.1	100.8	7.5	370.9
Females	**Colorectal**	**Lung**	**Melanoma**	**Breast**	**Stomach**	**All cancers[(b)]**
Australia 1992	***32.6***	***15.0***	***26.3***	***69.4***	***4.1***	***247.2***
Australia 1996	**33.0**	**16.9**	**29.0**	**78.4**	**4.1**	**263.5**
Canada	30.5	28.0	6.9	76.8	4.5	252.8
England and Wales[(c)]	23.7	22.8	6.6	68.8	6.3	225.5
Italy (Venice)	24.3	13.9	7.0	72.6	8.8	230.6
Japan (Osaka)	19.9	12.4	0.2	24.3	27.3	154.8
Netherlands	27.8	13.0	9.8	79.6	6.1	225.0
New Zealand (non-Maori)	40.8	18.2	29.8	77.2	4.8	274.6
United States (black)	35.3	38.5	0.5	79.3	5.9	271.6
United States (white)	29.5	33.8	10.2	90.7	3.1	280.9

(a) Age standardised to the World Standard Population.

(b) Excludes non-melanocytic skin cancer.

(c) 1988–90.

Source: Parkin et al. 1997.

Oral health

Table S26: Primary teeth with caries experience(a), 5- to 10-year-old school children, 1989 to 1996 (mean number of teeth)

	Age (years)					
	5	6	7	8	9	10
1989	2.07	2.15	2.38	2.31	2.26	1.88
1990	1.85	2.06	2.20	2.31	2.28	1.78
1991	1.78	1.94	2.13	2.24	2.22	1.81
1992	1.80	1.95	1.93	2.21	2.11	1.74
1993	1.76	1.90	2.01	2.15	2.13	1.73
1994	1.56	1.79	1.95	2.13	2.01	1.71
1995	1.49	1.73	1.87	2.05	1.97	1.61
1996	1.26	1.45	1.66	1.68	1.72	1.47

(a) As measured by dmft index (number of decayed, missing and filled primary teeth).

Source: AIHW Dental Statistics and Research Unit Child Dental Health Survey.

Table S27: Permanent teeth with caries experience(a), 6- to 12-year-old school children, 1989 to 1996 (mean number of teeth)

	Age (years)						
	6	7	8	9	10	11	12
1989	0.09	0.26	0.46	0.65	0.83	1.37	1.56
1990	0.10	0.24	0.42	0.63	0.76	1.00	1.44
1991	0.09	0.24	0.40	0.56	0.83	0.91	1.29
1992	0.09	0.21	0.38	0.53	0.69	0.90	1.22
1993	0.08	0.22	0.36	0.51	0.66	0.90	1.10
1994	0.11	0.23	0.37	0.47	0.65	0.88	1.09
1995	0.10	0.20	0.36	0.46	0.57	0.79	1.01
1996	0.07	0.18	0.30	0.38	0.49	0.66	0.90

(a) As measured by DMFT index (number of decayed, missing and filled permanent teeth).

Source: AIHW Dental Statistics and Research Unit Child Dental Health Survey.

Table S28: Dental caries experience[a] of 6-year-old and 12-year-old school children, States and Territories, 1989 to 1996 (mean number of teeth)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
6-year-olds (dmft)									
1989	2.21	2.16	2.34	1.62	2.21	1.70	1.17	2.04	2.15
1990	2.20	2.10	2.43	1.54	1.88	1.59	1.15	2.08	2.06
1991	2.05	2.04	2.48	1.29	1.98	1.57	1.14	1.96	1.94
1992	2.00	2.05	2.37	1.32	1.53	1.48	1.09	1.99	1.95
1993	2.04	1.81	2.18	1.48	1.38	1.35	1.33	1.81	1.90
1994	1.93	1.67	2.27	1.37	1.17	(c)	1.17	1.99	1.79
1995	1.75	1.78	1.99	1.39	1.47	1.48	1.39	1.99	1.73
1996	0.94	1.61	2.25	1.30	1.17	1.37	0.89	1.79	1.45
12-year-olds (DMFT)									
1989	1.32	1.54	1.65	2.04	1.52	1.06	1.14	1.08	1.56
1990	1.32	(b)	1.69	1.75	1.26	1.11	1.03	1.18	1.44
1991	1.18	1.38	1.54	1.43	1.06	1.18	0.91	1.26	1.29
1992	1.19	1.77	1.50	1.22	1.04	0.98	0.76	0.91	1.22
1993	1.04	1.52	1.44	1.20	0.64	0.96	0.77	0.85	1.10
1994	1.11	1.28	1.37	1.07	0.59	(c)	0.69	0.81	1.09
1995	0.93	1.02	1.37	1.04	0.64	0.86	0.61	0.82	1.01
1996	0.64	1.09	1.30	0.99	0.47	0.96	0.56	0.71	0.90

(a) As measured by dmft or DMFT index (number of decayed, missing and filled primary or permanent teeth).

(b) Insufficient numbers examined to provide an estimate.

(c) Data not available for Tasmania in 1994.

Source: AIHW Dental Statistics and Research Unit unpublished data.

Cardiovascular risk factors

Table S29: Cardiovascular disease risk factors by age, 1995 (per cent)

		Age group							
Risk factor	**Sex**	**18–24**	**25–34**	**35–44**	**45–54**	**55–64**	**65–74**	**75+**	**18+(a)**
Diabetes type 2	Male	0.0(b)	0.1*	0.8	2.7	5.3*	8.7	8.7*	1.9(c)
	Female	0.2(b)*	0.4*	0.6	2.2	4.1	6.6*	6.8	1.5(c)
High blood cholesterol(d)	Male	18.1(e)	32.4	52.7	66.7	60.5	61.7(f)	—	46.6(g)
	Female	17.2(e)	32.2	30.9	52.3	66.7	97.0(f)	—	38.6(g)
High blood pressure(h)	Male	2.5*	3.7	9.6	20.2	34.3*	45.3*	49.0*	17.3
	Female	0.6	0.9*	4.3	15.1	32.2*	46.8	60.8*	15.0
Overweight(i)	Male	35.6	58.1	66.0	75.6	75.6	70.5	60.1	63.1
	Female	25.9	33.9	44.4	56.4	66.5	62.1	53.1	47.8
Physical inactivity(j)	Male	24.1	30.7	35.9	38.6	38.4	35.7	45.5	33.5
	Female	27.4	30.0	34.2	34.7	36.9	43.6	54.1	33.8
Smoking(k)	Male	29.7	34.4	29.7	25.6	21.6*	16.4	10.0	27.1
	Female	26.8	**	21.3	18.2	16.0	10.6	6.1	20.3

* Should be interpreted with caution as the relative standard error is between 25% and 50%.

** Not included as the relative standard error is greater than 50%.

(a) Age standardised to the Australian population at 30 June 1991.

(b) Persons aged 15–24 years.

(c) Persons aged 15 years and over.

(d) Most recent data are for 1989. High blood cholesterol is defined as above 5.5 mmol/L.

(e) Persons aged 20–24 years.

(f) Persons aged 65–69 years.

(g) Persons aged 20–69 years.

(h) High blood pressure is defined as systolic blood pressure ≥ 160 mm Hg and/or diastolic blood pressure ≥ 95 mm Hg and/or receiving treatment for high blood pressure.

(i) Overweight is defined as Body Mass Index (BMI) ≥ 25.

(j) Physical inactivity is defined as no leisure-time physical activity for recreation or exercise in the previous two weeks.

(k) The daily smoking of tobacco products, including packet cigarettes, roll-your-own cigarettes, pipes and cigars.

Sources: AIHW analysis of the 1995 National Health Survey and 1995 National Nutrition Survey; Risk Factor Prevalence Study Management Committee 1990.

Use of hospitals

Table S30: Separations from public hospitals, by age group and sex, States and Territories, 1997–98

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Males									
Under 1	25,586	16,342	12,608	5,916	6,380	964	919	1,619	70,334
1–4	32,779	19,738	17,849	8,768	8,758	1,453	1,303	1,586	92,234
5–14	39,815	22,865	21,397	10,276	9,687	1,915	1,548	1,340	108,843
15–24	41,599	27,943	29,460	11,190	10,458	2,569	2,436	1,652	127,307
25–34	50,372	37,465	33,919	18,172	14,884	3,946	2,457	2,731	163,946
35–44	56,557	43,170	38,479	18,871	17,101	4,221	3,871	4,625	186,895
45–54	66,933	50,877	41,854	19,821	19,037	4,687	4,245	3,838	211,292
55–64	77,202	65,174	46,375	21,060	20,839	5,814	4,445	3,221	244,130
65–74	108,680	85,736	51,233	27,299	28,261	7,444	4,530	2,191	315,374
75+	92,155	62,257	36,702	20,212	26,593	5,965	2,273	636	246,793
Total	**591,679**	**431,569**	**329,876**	**161,585**	**161,998**	**38,978**	**28,027**	**23,441**	**1,767,153**
Females									
Under 1	18,213	11,210	9,797	4,006	4,380	711	724	1,377	50,418
1–4	21,387	12,580	12,529	6,213	5,937	1,151	1,009	1,182	61,988
5–14	25,636	16,128	15,136	7,590	7,287	1,537	1,093	959	75,366
15–24	69,650	51,273	46,758	21,280	21,431	4,892	3,147	4,146	222,577
25–34	118,654	96,493	66,422	34,182	34,059	7,506	5,670	6,224	369,210
35–44	79,017	62,602	44,954	25,112	22,272	5,196	4,121	4,920	248,194
45–54	66,257	53,800	39,136	20,109	18,854	5,015	3,328	4,234	210,733
55–64	69,614	52,939	35,537	18,793	17,960	4,038	3,566	3,758	206,205
65–74	94,701	64,557	40,894	22,535	23,865	5,620	3,718	1,465	257,355
75+	117,988	75,691	44,306	24,955	28,739	5,737	2,772	672	300,860
Total	**681,118**	**497,277**	**355,469**	**184,775**	**184,784**	**41,403**	**29,148**	**28,940**	**2,002,914**
Total separations	**1,272,797**	**928,847**	**685,345**	**346,363**	**346,782**	**80,389**	**57,175**	**52,400**	**3,770,098**

Note: Totals include separations for which age and/or sex was not reported.

Source: AIHW 1999.

Table S31: Separations from private hospitals, by age group and sex, States and Territories, 1997–98

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Males									
Under 1	3,332	3,150	2,360	1,274	626	626	738	n.a.	12,106
1–4	5,176	3,846	4,168	1,976	1,479	628	215	n.a.	17,488
5–14	7,049	6,026	5,599	2,712	1,899	1,032	341	n.a.	24,658
15–24	14,500	13,340	9,048	5,155	4,404	1,197	671	n.a.	48,315
25–34	18,993	15,986	10,508	6,109	5,020	1,481	537	n.a.	58,634
35–44	27,074	22,613	15,991	7,631	6,984	2,241	764	n.a.	83,298
45–54	39,216	31,723	26,578	11,209	10,520	3,508	1,083	n.a.	123,837
55–64	38,737	34,090	28,016	10,483	9,709	3,008	1,087	n.a.	125,130
65–74	47,368	42,850	36,541	12,040	12,637	4,044	1,241	n.a.	156,721
75+	38,852	36,610	36,444	12,524	10,819	3,563	958	n.a.	139,770
Total	**240,297**	**210,234**	**175,253**	**71,113**	**64,097**	**21,328**	**7,635**	**n.a.**	**789,957**
Females									
Under 1	2,156	2,007	1,559	896	387	495	660	n.a.	8,160
1–4	3,052	2,348	2,787	1,368	1,000	390	130	n.a.	11,075
5–14	5,956	5,232	4,524	2,260	1,685	808	235	n.a.	20,700
15–24	24,133	17,774	12,912	8,546	5,096	2,403	744	n.a.	71,608
25–34	50,411	41,951	32,397	16,535	10,575	5,103	1,879	n.a.	158,851
35–44	46,437	39,458	29,959	14,268	10,968	4,326	1,743	n.a.	147,159
45–54	46,297	42,309	32,110	13,822	13,287	4,495	1,499	n.a.	153,819
55–64	37,908	34,441	26,810	10,518	10,512	3,244	1,098	n.a.	124,531
65–74	43,493	40,785	33,505	9,999	12,728	3,833	1,039	n.a.	145,382
75+	44,140	47,660	36,262	11,030	17,085	4,572	908	n.a.	161,657
Total	**303,999**	**273,965**	**212,825**	**89,242**	**83,323**	**29,669**	**9,935**	**n.a.**	**1,002,958**
Total separations	**544,351**	**484,201**	**388,078**	**160,358**	**147,420**	**50,997**	**17,571**	**n.a.**	**1,792,976**

Note: Totals include separations for which age and/or sex was not reported.

Source: AIHW 1999.

Table S32: Patient-days in public hospitals, by age group and sex, States and Territories, 1997–98[(a)]

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Males									
Under 1	128,242	90,705	61,661	31,832	30,319	4,343	7,198	11,240	365,540
1–4	64,392	35,590	33,394	18,188	15,540	2,732	2,933	7,097	179,866
5–14	79,855	45,036	72,626	24,774	19,951	4,205	3,673	5,057	255,177
15–24	175,560	91,404	174,292	45,563	38,061	8,416	10,034	7,160	550,490
25–34	252,224	120,330	173,207	65,306	49,661	17,982	7,904	10,214	696,828
35–44	213,862	138,006	163,151	62,007	53,917	32,993	13,974	13,731	691,641
45–54	274,117	165,420	173,645	75,563	65,338	16,116	12,425	11,253	793,877
55–64	374,446	216,218	196,317	81,876	76,905	20,912	15,430	10,874	992,978
65–74	580,883	360,979	250,083	115,074	137,215	41,719	23,002	9,877	1,518,832
75+	687,921	437,745	270,916	149,148	203,419	49,039	17,940	4,814	1,820,942
Total	**2,831,520**	**1,701,448**	**1,569,292**	**669,331**	**690,326**	**198,457**	**114,513**	**91,337**	**7,866,224**
Females									
Under 1	99,416	69,192	51,977	23,621	25,612	4,164	5,291	10,171	289,444
1–4	43,970	22,906	23,877	13,426	11,410	2,004	2,018	5,994	125,605
5–14	57,807	34,959	33,126	19,369	15,502	3,327	2,636	4,023	170,749
15–24	208,225	134,380	125,873	67,323	53,860	14,922	9,487	14,111	628,181
25–34	399,124	276,274	201,875	111,361	97,726	23,042	18,105	18,653	1,146,160
35–44	268,074	177,174	156,034	80,009	67,457	16,120	12,751	13,056	790,675
45–54	234,674	157,255	143,471	69,931	58,613	15,499	11,619	10,496	701,558
55–64	267,807	180,426	170,199	65,272	61,007	19,139	18,341	8,339	790,530
65–74	489,553	311,301	216,353	111,184	118,870	38,967	18,987	5,432	1,310,647
75+	1,066,911	662,837	398,002	229,838	286,489	61,347	29,496	5,350	2,740,270
Total	**3,135,563**	**2,027,013**	**1,520,787**	**791,334**	**796,546**	**198,531**	**128,731**	**95,643**	**8,694,148**
Total patient-days	**5,967,083**	**3,728,462**	**3,090,079**	**1,460,677**	**1,486,872**	**396,996**	**243,244**	**187,016**	**16,560,429**

(a) Information on patient-days has been updated since it was published in AIHW 1999.

Note: Totals include separations for which age and/or sex was not reported.

Source: AIHW 1999.

Table S33: Patient-days in private hospitals, by age group and sex, States and Territories, 1997–98(a)

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Males									
Under 1	16,227	12,744	11,956	5,968	2,301	2,552	4,085	n.a.	55,838
1–4	7,121	4,558	5,525	2,496	1,619	790	223	n.a.	22,427
5–14	12,153	12,092	8,242	3,487	2,479	1,674	390	n.a.	40,518
15–24	24,687	27,799	17,129	8,473	8,529	2,415	1,035	n.a.	90,066
25–34	35,724	40,608	20,570	11,532	9,651	3,099	931	n.a.	122,115
35–44	51,222	47,539	34,022	15,183	15,464	5,234	1,564	n.a.	170,228
45–54	85,271	72,523	65,285	24,984	25,182	9,122	2,696	n.a.	285,063
55–64	97,530	86,823	73,195	28,127	27,455	8,893	3,592	n.a.	325,615
65–74	154,371	148,791	137,983	46,498	43,550	15,740	4,807	n.a.	551,740
75+	183,413	203,856	212,840	70,775	56,528	19,590	5,992	n.a.	752,994
Total	**667,719**	**657,333**	**586,747**	**217,523**	**192,758**	**69,109**	**25,315**	**n.a.**	**2,416,504**
Females									
Under 1	12,750	9,825	9,904	5,121	1,879	2,294	3,783	n.a.	45,556
1–4	4,219	2,792	3,895	1,705	1,115	558	131	n.a.	14,415
5–14	11,130	9,281	6,717	2,983	2,272	1,365	290	n.a.	34,038
15–24	45,095	40,088	29,166	16,056	11,224	5,637	1,523	n.a.	148,789
25–34	144,649	137,542	102,216	54,310	36,474	16,206	7,632	n.a.	499,029
35–44	113,474	108,977	80,662	39,831	34,193	12,746	5,945	n.a.	395,828
45–54	111,235	110,534	81,080	36,393	38,942	13,086	4,642	n.a.	395,912
55–64	102,074	101,145	73,914	31,002	34,690	11,214	3,845	n.a.	357,884
65–74	152,754	159,594	129,529	41,773	56,478	18,053	5,029	n.a.	563,210
75+	265,661	347,064	270,531	75,935	126,734	30,716	6,726	n.a.	1,123,369
Total	**963,076**	**1,026,842**	**787,614**	**305,109**	**344,001**	**111,875**	**39,546**	**n.a.**	**3,578,063**
Total patient-days	**1,630,910**	**1,684,185**	**1,374,361**	**522,636**	**536,759**	**180,984**	**64,866**	**n.a.**	**5,994,701**

(a) Information on patient-days has been updated since it was published in AIHW 1999.

Note: Totals include separations for which age and/or sex was not reported.

Source: AIHW 1999.

Table S34: Separations, same-day separations, patient-days and average length of stay by principal diagnosis, grouped into ICD-9-CM chapters, public hospitals, 1997–98

Principal diagnosis		Separations	Per cent same-day separations	Patient-days[(a)]	ALOS (days)	ALOS (days) excluding same-day
001–139	Infectious and parasitic	67,861	21.4	259,010	3.8	4.6
140–239	Neoplasms	221,538	40.4	1,181,853	5.3	8.3
240–279	Endocrine, nutritional	53,892	32.6	280,775	5.2	7.2
280–289	Blood diseases	53,060	59.3	129,169	2.4	4.5
290–319	Mental disorders	160,651	25.0	2,652,540	16.5	21.7
320–389	Nervous system diseases	152,063	54.5	470,354	3.1	5.6
390–459	Circulatory diseases	313,282	17.6	1,828,424	5.8	6.9
460–519	Respiratory diseases	260,595	12.0	1,173,208	4.5	5.0
520–579	Digestive diseases	351,952	46.6	1,023,890	2.9	4.6
580–629	Genito-urinary diseases	218,135	48.2	612,599	2.8	4.5
630–677	Complications of pregnancy	330,624	22.0	1,039,342	3.1	3.7
680–709	Skin disorders	68,104	36.6	319,765	4.7	6.8
710–739	Musculoskeletal diseases	142,081	37.3	628,340	4.4	6.5
740–759	Congenital anomalies	25,067	42.5	96,161	3.8	5.9
760–779	Perinatal diseases	39,033	8.9	378,955	9.7	10.6
780–799	Ill-defined conditions	228,293	36.5	593,884	2.6	3.5
800–999	Injuries and poisoning	328,652	28.1	1,372,673	4.2	5.4
V01–V82	Other	754,186	86.5	2,462,850	3.3	17.8
	Not reported	1,029	18.2	56,637	55.0	67.0
Total		**3,770,098**	**43.1**	**16,560,429**	**4.4**	**7.0**

(a) Information on patient-days has been updated since it was published in AIHW 1999.

Note: ALOS = average length of stay.

Source: AIHW 1999.

Table S35: Separations, same-day separations, patient-days and average length of stay by principal diagnosis, grouped into ICD-9-CM chapters, private hospitals, 1997–98

Principal diagnosis		Separations	Per cent same-day separations	Patient-days[a]	ALOS (days)	ALOS (days) excluding same-day
001–139	Infectious and parasitic	11,313	28.3	48,587	4.3	5.6
140–239	Neoplasms	156,532	52.9	595,599	3.8	7.0
240–279	Endocrine, nutritional	14,713	26.6	73,948	5.0	6.5
280–289	Blood diseases	14,612	53.3	37,633	2.6	4.4
290–319	Mental disorders	74,306	60.8	535,559	7.2	16.8
320–389	Nervous system diseases	143,573	67.1	240,088	1.7	3.0
390–459	Circulatory diseases	120,300	22.9	631,892	5.3	6.5
460–519	Respiratory diseases	70,899	10.8	329,843	4.7	5.1
520–579	Digestive diseases	311,589	70.3	575,739	1.8	3.9
580–629	Genito-urinary diseases	145,205	58.2	340,524	2.3	4.2
630–677	Complications of pregnancy	103,510	30.6	428,610	4.1	5.5
680–709	Skin disorders	29,874	57.6	107,438	3.6	7.1
710–739	Musculoskeletal diseases	170,302	37.2	662,923	3.9	5.6
740–759	Congenital anomalies	9,546	48.8	21,451	2.2	3.4
760–779	Perinatal diseases	9,066	6.0	66,046	7.3	7.7
780–799	Ill-defined conditions	89,795	49.4	195,062	2.2	3.3
800–999	Injuries and poisoning	74,734	22.6	392,803	5.3	6.5
V01–V82	Other	242,601	80.7	706,880	2.9	10.9
	Not reported	506	54.9	4,076	8.1	16.7
Total		**1,792,976**	**53.1**	**5,994,701**	**3.3**	**6.0**

(a) Information on patient-days has been updated since it was published in AIHW 1999.

Note: ALOS = average length of stay.

Source: AIHW 1999.

Table S36: Separations, same-day separations, patient-days and average length of stay by principal procedure, grouped into ICD-9-CM chapters, public hospitals, 1997–98

Principal procedure		Separations	Per cent same-day separations	Patient-days[(a)]	ALOS (days)	ALOS (days) excluding same-day
010–059	Operations on the nervous system	51,577	41.3	238,030	4.6	7.9
060–079	Operations on the endocrine system	5,433	2.9	23,177	4.3	4.4
080–169	Operations on the eye	63,053	67.1	99,620	1.6	4.8
180–209	Operations on the ear	27,566	70.9	36,600	1.3	4.6
210–299	Operations on the nose, mouth and pharynx	86,410	48.0	170,908	2.0	3.8
300–349	Operations on the respiratory system	33,901	36.4	251,046	7.4	11.6
350–399	Operations on the cardiovascular system	489,280	81.9	1,000,362	2.0	11.3
400–419	Operations on the haemic and lymphatic system	15,669	45.7	98,384	6.3	11.6
420–549	Operations on the digestive system	379,546	54.7	1,284,139	3.4	7.5
550–599	Operations on the urinary system	67,328	48.6	242,519	3.6	7.0
600–649	Operations on the male genital organs	40,858	53.3	106,732	2.6	5.6
650–719	Operations on the female genital organs	165,188	64.5	322,108	1.9	5.5
720–759	Obstetrical procedures	167,728	6.2	703,431	4.2	4.5
760–849	Operations on the musculoskeletal system	189,156	28.6	935,857	4.9	6.9
850–869	Operations on the integumentary system[(b)]	123,586	51.6	489,428	4.0	8.2
870–999	Miscellaneous diagnostic and therapeutic proceudres	766,870	38.1	4,997,384	6.5	10.5
	No principal procedure or not reported	1,096,949	26.5	5,560,704	5.1	6.9
Total		**3,770,098**	**43.1**	**16,560,429**	**4.4**	**7.0**

(a) Information on patient-days has been updated since it was published in AIHW 1999.

(b) Breast, skin and subcutaneous tissue.

Source: AIHW 1999.

Table S37: Separations, same-day separations, patient-days and average length of stay by principal procedure, grouped into ICD-9-CM chapters, private hospitals, 1997–98

Principal procedure		Separations	Per cent same-day separations	Patient-days[(a)]	ALOS (days)	ALOS (days) excluding same-day
010–059	Operations on the nervous system	37,473	54.5	115,362	3.1	6.8
060–079	Operations on the endocrine system	3,414	1.6	12,987	3.8	3.9
080–169	Operations on the eye	100,754	70.5	117,474	1.2	4.0
180–209	Operations on the ear	27,389	78.1	31,602	1.2	5.3
210–299	Operations on the nose, mouth and pharynx	108,904	57.0	132,946	1.2	2.8
300–349	Operations on the respiratory system	10,499	45.6	58,713	5.6	10.3
350–399	Operations on the cardiovascular system	108,220	52.2	332,797	3.1	6.4
400–419	Operations on the haemic and lymphatic system	5,868	48.0	23,887	4.1	7.8
420–549	Operations on the digestive system	374,314	75.1	758,067	2.0	8.1
550–599	Operations on the urinary system	54,688	59.8	134,678	2.5	6.1
600–649	Operations on the male genital organs	31,832	47.5	89,328	2.8	5.3
650–719	Operations on the female genital organs	123,006	72.5	242,038	2.0	7.2
720–759	Obstetrical procedures	54,826	1.1	332,636	6.1	6.1
760–849	Operations on the musculoskeletal system	178,671	36.4	684,907	3.8	6.0
850–869	Operations on the integumentary system[(b)]	90,922	58.3	224,992	2.5	5.9
870–999	Miscellaneous diagnostic and therapeutic proceudres	257,579	47.2	1,468,021	5.7	10.8
	No principal procedure or not reported	224,617	24.7	1,234,266	5.5	7.3
Total		**1,792,976**	**53.1**	**5,994,701**	**3.3**	**6.0**

(a) Information on patient-days has been updated since it was published in AIHW 1999.

(b) Breast, skin and subcutaneous tissue.

Source: AIHW 1999.

Table S38: Separations[(a)], same-day separations, patient-days, average length of stay and cost by major diagnostic category, public hospitals, 1997–98

Major diagnostic category		Separations	Per cent same-day separations	Patient-days[(b)]	ALOS (days)	ALOS (days) excluding same-day	Estimated cost ($'000)[(c)]
01	Nervous system	183,343	27.7	1,198,714	6.5	8.7	615,799
02	Eye diseases, disorders	69,294	63.7	110,275	1.6	2.6	130,727
03	Ear, nose, mouth, throat	174,061	42.3	310,673	1.8	2.4	257,713
04	Respiratory system	240,621	12.9	1,218,736	5.1	5.7	683,977
05	Circulatory system	308,450	19.3	1,432,227	4.6	5.5	1,129,699
06	Digestive system	406,414	46.8	1,125,655	2.8	4.3	791,455
07	Hepatobiliary, pancreas	72,901	16.8	327,891	4.5	5.2	248,051
08	Musculoskeletal system and connective tissue	288,386	31.8	1,324,235	4.6	6.3	969,782
09	Skin, subcutaneous tissue and breast	146,834	49.7	472,976	3.2	5.4	308,455
10	Endocrine, nutritional and metabolic	42,378	20.6	212,371	5.0	6.1	131,623
11	Kidney and urinary tract	495,962	84.1	803,407	1.6	4.9	467,688
12	Male reproductive	48,910	50.5	126,436	2.6	4.2	96,400
13	Female reproductive	142,340	60.6	311,225	2.2	4.0	260,776
14	Pregnancy, childbirth and puerperium	336,086	21.9	1,054,020	3.1	3.7	706,489
15	Newborns, neonates	54,175	11.7	449,520	8.3	9.3	278,540
16	Blood, blood forming organs, immunological	63,556	64.8	143,440	2.3	4.6	92,580
17	Neoplastic disorders	167,765	89.6	291,203	1.7	2.9	190,727
18	Infectious and parasitic diseases	45,532	18.0	220,688	4.8	5.7	139,488
19	Mental diseases and disorders	120,315	26.8	1,391,271	11.6	15.4	446,657
20	Alcohol/drug use and disorders	24,459	18.8	113,814	4.7	5.5	44,728
21	Injury, poison, toxic effects of drugs	104,822	34.9	308,102	2.9	4.0	231,558
22	Burns	5,963	22.1	37,033	6.2	7.7	31,653
23	Factors influencing health status, other contacts	95,740	68.5	321,608	3.4	8.5	136,065
ED	Edit DRG[(d)]	8,975	27.4	97,606	10.9	14.6	52,964
PR	pre-MDC[(d)]	9,165	2.7	259,128	28.2	29.0	405,540
Total		**3,656,447**	**43.4**	**13,662,254**	**3.7**	**5.7**	**8,849,132**

(a) Separations for acute and unspecified episode of care only.

(b) Information on patient-days has been updated since it was published in AIHW 1999.

(c) The estimated total hospital cost is the sum of the estimated costs for each AN-DRG within the major diagnostic category, calculated using the estimated average cost for all public hospital separations ($2,422) and relative cost weights for each AN-DRG.

(d) Major diagnostic categories (MDCs) are groupings of AN-DRGs within the AN-DRG (casemix) classification. 'Pre-MDC' is a group of particularly resource-intensive AN-DRGs such as transplants. Separations in the 'Edit DRG' grouping did not have a valid AN-DRG.

Note: Abbreviations: ALOS = average length of stay; MDC = major diagnostic category; DRG = diagnosis related group.

Source: AIHW 1999.

Table S39: Separations[(a)], same-day separations, patient-days, average length of stay and cost by major diagnostic category, private hospitals, 1997–98

Major diagnostic category		Separations	Per cent same-day separations	Patient-days(b)	ALOS (days)	ALOS (days) excluding same-day	Estimated cost ($'000)(c)
01	Nervous system	50,183	32.0	288,551	5.7	8.0	131,580
02	Eye diseases, disorders	99,322	70.0	116,934	1.2	1.6	153,078
03	Ear, nose, mouth, throat	132,418	56.3	180,016	1.4	1.8	137,690
04	Respiratory system	57,141	10.6	342,916	6.0	6.6	138,129
05	Circulatory system	103,869	16.4	507,523	4.9	5.6	342,606
06	Digestive system	330,718	72.8	667,651	2.0	4.8	414,598
07	Hepatobiliary, pancreas	25,525	8.9	111,923	4.4	4.7	70,263
08	Musculoskeletal system and connective tissue	222,701	35.5	928,272	4.2	5.9	646,710
09	Skin, subcutaneous tissue and breast	106,747	59.8	266,263	2.5	4.7	182,664
10	Endocrine, nutritional and metabolic	13,382	17.5	65,043	4.9	5.7	34,554
11	Kidney and urinary tract	99,647	70.7	198,825	2.0	4.4	100,107
12	Male reproductive	34,543	48.7	95,573	2.8	4.4	57,309
13	Female reproductive	101,670	64.1	235,105	2.3	4.7	168,830
14	Pregnancy, childbirth and puerperium	106,843	29.7	444,960	4.2	5.5	220,110
15	Newborns, neonates	13,243	11.9	84,086	6.3	7.1	29,524
16	Blood, blood forming organs, immunological	17,255	57.8	41,453	2.4	4.3	19,921
17	Neoplastic disorders	74,210	89.8	117,840	1.6	6.8	49,957
18	Infectious and parasitic diseases	9,023	10.5	55,079	6.1	6.7	25,819
19	Mental diseases and disorders	55,407	63.8	357,168	6.4	16.0	101,142
20	Alcohol/drug use and disorders	6,721	43.1	46,536	6.9	11.4	14,984
21	Injury, poison, toxic effects of drugs	15,475	24.8	62,091	4.0	5.0	30,870
22	Burns	429	19.3	2,894	6.7	8.1	1,889
23	Factors influencing health status, other contacts	63,702	79.5	148,897	2.3	7.5	95,171
ED	Edit DRG(d)	9,527	60.2	41,200	4.3	9.3	33,888
PR	Pre-MDC(d)	943	1.6	28,305	30.0	30.5	29,244
Total		**1,750,644**	**53.3**	**5,435,104**	**3.1**	**5.5**	**3,230,637**

(a) Separations for acute and unspecified episode of care only.

(b) Information on patient-days has been updated since it was published in AIHW 1999.

(c) The estimated total hospital cost is the sum of the estimated costs for each AN-DRG within the major diagnostic category, calculated using the estimated average cost for all private hospital separations ($1,932) and relative cost weights for each AN-DRG.

(d) Major diagnostic categories (MDCs) are groupings of AN-DRGs within the AN-DRG (casemix) classification. Pre-MDC' is a group of particularly resource-intensive AN-DRGs such as transplants. Separations in the 'Edit DRG' grouping did not have a valid AN-DRG.

Note: Abbreviations: ALOS = average length of stay; MDC = major diagnostic category; DRG = diagnosis related group.

Source: AIHW 1999.

Health expenditure

Table S40: Proportion of recurrent expenditure on health services (current prices), by area of expenditure, 1960–61 to 1997–98 (per cent)

Area of expenditure	1960–61	1975–76	1984–85	1988–89	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98
Total hospitals	37.9	46.1	43.9	41.8	38.6	37.7	37.6	37.5	37.9	38.4
Recognised public hospitals	(a)	34.8	32.7	31.5	28.2	27.8	27.8	28.3	28.5	29.2
Repatriation hospitals	(a)	1.8	1.6	1.7	1.5	1.0	0.6	—	—	—
Private hospitals	(a)	4.5	5.6	5.6	7.3	7.5	7.8	8.1	8.4	8.3
Public psychiatric hospitals	5.5	5.0	4.0	3.0	1.6	1.4	1.3	1.1	1.0	0.9
Nursing homes	4.3	7.5	9.2	8.7	8.1	7.8	7.5	7.5	7.5	7.5
Ambulance	0.9	1.3	1.7	1.4	1.4	1.4	1.2	1.3	1.2	1.5
Other institutional (nec)	n.a.	0.1	0.2	0.2	0.2	0.3	0.3	0.4	—	—
Total institutional	*43.2*	*54.9*	*55.0*	*52.1*	*48.3*	*47.2*	*46.6*	*46.7*	*46.6*	*47.4*
Medical services	15.4	18.2	17.6	18.1	19.6	20.0	20.2	20.0	19.6	19.3
Other professional services	0.1 (b)	1.8	3.2	4.0	3.7	3.6	3.6	3.4	3.9	3.8
Total pharmaceuticals	22.2	11.1	8.7	9.0	10.4	11.0	11.6	11.8	12.1	12.1
Benefit-paid pharmaceuticals	(c)	8.1	5.6	5.3	6.0	6.6	7.0	7.6	7.8	7.7
All other pharmaceuticals	(c)	3.0	3.1	3.7	4.5	4.4	4.6	4.2	4.3	4.5
Aids and appliances	2.2	1.4	2.0	2.1	2.2	2.2	2.1	2.0	2.0	1.9
Community and public health(d)	4.2	3.5	3.9	4.4	4.9	5.2	4.7	5.1	5.0	4.8
Dental services	7.5 (b)	4.2	4.7	5.2	5.9	6.0	5.9	6.0	6.1	5.9
Administration	3.3	4.2	3.5	3.6	3.6	3.2	3.6	3.3	3.0	3.3
Research	1.7	0.7	1.4	1.4	1.5	1.6	1.6	1.6	1.6	1.5
Total non-institutional	*56.8*	*45.1*	*45.0*	*47.9*	*51.7*	*52.8*	*53.4*	*53.3*	*53.4*	*52.6*
Total recurrent expenditure	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Separate estimates not available, included in total hospitals.

(b) Some other professional services were included with dental services in 1960–61 data.

(c) Separate estimates not available, included in total pharmaceuticals.

(d) Includes expenditure classified as ‘Other non-institutional’.

Source: AIHW Health Expenditure Database.

Table S41: Total health services expenditure (current prices), by area of expenditure and source of funds, 1997–98(a) ($ million)

	Government sector			Non-government sector				
Area of expenditure	**Common-wealth**	**State and local**	**Total**	**Health insurance funds**	**Indi-viduals**	**Other(b)**	**Total**	**Total all sectors**
Total hospitals	6,343	6,437	12,780	2,607	418	1,095	4,120	16,900
Recognised public hospitals	5,771	6,080	11,851	311	79	595	986	12,836
Private hospitals	550	—	550	2,295	321	493	3,109	3,658
Repatriation hospitals	15	—	15	—	—	—	—	15
Public psychiatric hospitals	7	357	365	—	18	7	25	390
Nursing homes	2,575	137	2,712	—	608	—	608	3,320
Ambulance	90	281	370	106	129	38	273	643
Total institutional	*9,007*	*6,855*	*15,862*	*2,712*	*1,155*	*1,133*	*5,000*	*20,863*
Medical services	6,970	—	6,970	217	897	419	1,533	8,503
Other professional services	219	—	219	214	1,046	173	1,434	1,653
Total pharmaceuticals	2,785	16	2,801	34	2,463	37	2,534	5,335
Benefit paid pharmaceuticals	2,783	—	2,783	—	593	—	593	3,377
All other pharmaceuticals	2	16	18	34	1,869	37	1,941	1,959
Aids and appliances	174	—	174	177	435	38	649	823
Other non-institutional services	1,380	2,086	3,466	1,080	1,611	8	2,699	6,165
Community and public health(c)	775	1,357	2,132	1	—	—	1	2,133
Dental services	76	328	404	568	1,611	8	2,187	2,591
Administration	529	401	930	511	—	—	511	1,441
Research	427	96	523	—	—	129	129	652
Total non-institutional	*11,956*	*2,197*	*14,154*	*1,721*	*6,452*	*805*	*8,978*	*23,132*
Total recurrent expenditure	**20,964**	**9,053**	**30,016**	**4,434**	**7,606**	**1,938**	**13,978**	**43,994**
Capital expenditure	*70*	*1,400*	*1,470*	*n.a.*	*n.a.*	*n.a.*	*994 (d)*	*2,464*
Capital consumption	*34*	*538*	*572*	*..*	*..*	*..*	*.. (e)*	*572*
Total health expenditure	**21,068**	**10,990**	**32,058**	**n.a.**	**n.a.**	**n.a.**	**14,972**	**47,030**

(a) This table shows the amounts provided by the Commonwealth Government, State and Territory Governments, local government authorities and by the non-government sector to fund expenditure on health services. It does not show gross outlays on health services by the different levels of government or by the non-government sector.

(b) 'Other' includes expenditure on health services by providers of Workers' Compensation and Compulsory Motor Vehicle Third Party insurance cover.

(c) Includes expenditure classified as 'Other non-institutional'.

(d) Capital outlays for the non-government sector cannot be allocated according to 'source of funds'.

(e) Private capital consumption (depreciation) expenditure is included as part of recurrent expenditure.

Source: AIHW Health Expenditure Database.

Table S42: Annual growth in recurrent expenditure on health services (constant prices)[(a)], by area of expenditure, 1960–61 to 1997–98 (per cent)

Area of expenditure	1960–61 to 1974–75	1975–76 to 1984–85	1984–85 to 1988–89	1988–89 to 1992–93	1993–94 to 1994–95	1994–95 to 1995–96	1995–96 to 1996–97	1996–97 to 1997–98	1960–61 to 1997–98	1975–76 to 1997–98	1992–93 to 1997–98
Total hospitals	6.4	2.4	4.0	2.3	4.2	5.3	5.3	4.7	4.6	3.1	4.2
Recognised public hospitals	(b)	2.3	4.3	1.5	4.7	7.1	5.3	5.6	n.a.	3.1	5.0
Repatriation hospitals	(b)	1.7	7.2	1.2	–35.1	–93.4	3.6	–8.9	n.a.	–13.0	–50.9
Private hospitals	(b)	5.4	5.1	11.4	9.6	8.9	7.8	2.8	n.a.	6.8	7.2
Public psychiatric hospitals	5.1	0.5	–2.0	–11.4	–4.2	–7.3	–11.1	–6.5	–0.5	–3.9	–6.9
Nursing homes	9.3	5.4	3.8	2.4	1.0	5.6	4.9	3.3	6.1	4.0	2.9
Ambulance	8.1	5.8	1.4	4.6	–7.6	11.8	–3.0	24.1	5.9	4.5	4.6
Other institutional (nec)	n.a.	12.0	15.2	1.6	5.2	7.6	—	—	n.a.	n.a.	—
Total institutional	*6.8*	*3.0*	*3.9*	*2.4*	*3.4*	*5.5*	*4.2*	*4.9*	*4.3*	*0.1*	*–26.7*
Medical services	7.7	3.0	6.4	5.0	5.7	4.9	2.9	1.9	6.1	4.3	4.3
Other professional services	30.0[(c)]	9.9	11.8	0.9	4.1	1.2	17.8	0.9	15.5	7.4	5.0
Total pharmaceuticals	3.7	2.3	3.6	7.4	7.1	6.7	4.1	4.0	3.8	4.3	6.0
Benefit-paid pharmaceuticals	(d)	0.9	1.3	6.6	6.8	14.5	4.6	1.8	n.a.	3.6	8.2
All other pharmaceuticals	(d)	5.6	7.5	8.4	7.5	–5.0	3.4	7.9	n.a.	5.8	2.8
Aids and appliances	5.8	9.4	3.7	5.0	–3.0	–1.3	2.3	–3.7	5.0	5.3	–0.3
Other non-institutional services	6.2	2.7	5.3	5.2	2.7	5.4	1.0	1.4	4.8	3.6	2.6
Community and public health	2.7	5.5	8.9	6.7	–5.4	14.6	2.4	–0.1	5.0	5.4	4.0
Dental services	7.6[(c)]	2.8	3.2	4.7	1.5	4.2	3.0	–2.2	4.8	3.0	1.6
Administration	6.3	1.1	5.5	4.4	18.6	–2.9	–5.0	11.2	4.5	2.8	2.6
Research	–7.1	12.4	4.7	5.2	8.9	5.8	5.2	–6.3	4.1	7.9	4.8
Total non-institutional	*5.8*	*3.5*	*5.7*	*5.2*	*4.8*	*5.1*	*3.7*	*1.7*	*5.1*	*4.4*	*4.1*
Total recurrent expenditure	**6.3**	**3.2**	**4.8**	**3.8**	**4.1**	**5.3**	**3.9**	**3.2**	**5.0**	**3.8**	**4.0**

(a) See Box 5.2, page 236, for explanation of constant price estimating method.

(b) Separate estimates not available, included in total hospitals.

(c) Some other professional services were included with dental services in 1960–61 data.

(d) Separate estimates not available, included in total pharmaceuticals.

Source: AIHW Health Expenditure Database.

Table S43: Total recurrent expenditure on health services, constant prices[(a)], by area of expenditure, selected years ($ million)

Area of expenditure	1960–61	1974–75	1975–76	1984–85	1988–89	1992–93	1997–98
Total hospitals	3,191	7,573	8,644	10,740	12,571	13,747	16,900
Recognised public hospitals	(b)	5,765	6,522	7,996	9,476	10,063	12,836
Repatriation hospitals	(b)	324	334	390	516	541	15
Private hospitals	(b)	557	853	1,375	1,678	2,587	3,658
Public psychiatric hospitals	463	928	935	979	902	556	390
Nursing homes	366	1,269	1,403	2,250	2,612	2,874	3,320
Ambulance	78	233	245	405	429	513	643
Other institutional (nec)	n.a.	13	15	41	73	77	—
Total institutional	*3,635*	*9,087*	*10,307*	*13,436*	*15,684*	*17,211*	*20,863*
Medical services	942	2,659	3,390	4,427	5,668	6,897	8,503
Other professional services	460	1,278	1,366	1,758	1,991	2,395	2,591
Total pharmaceuticals	1,354	2,263	2,110	2,600	3,001	3,986	5,335
Benefit-paid pharmaceuticals	(c)	1,442	1,541	1,675	1,765	2,277	3,377
All other pharmaceuticals	(c)	821	569	926	1,236	1,709	1,959
Aids and appliances	137	302	264	593	687	836	823
Other non-institutional services	1,091	2,452	2,736	3,568	4,395	5,396	6,165
Community and public health	350	509	586	948	1,335	1,733	2,133
Dental services	460	1,278	1,366	1,758	1,991	2,395	2,591
Administration	281	665	783	862	1,069	1,268	1,441
Research	146	52	122	351	422	517	652
Total non-institutional	*3,678*	*8,114*	*9,044*	*12,357*	*15,441*	*18,943*	*23,132*
Total recurrent expenditure	**7,313**	**17,201**	**19,350**	**25,793**	**31,124**	**36,154**	**43,994**

(a) See Box 5.2, page 236, for explanation of constant price estimating method.

(b) Separate estimates not available, included in total hospitals.

(c) Separate estimates not available, included in total pharmaceuticals.

Source: AIHW Health Expenditure Database.

Table S44: Total health expenditure, current and constant prices [(a)] and average annual growth rates, 1960–61 to 1997–98

	Amount ($ million)		Average annual growth rates (%)	
Year	Current	Constant	Current	Constant
1960–61	692	7,313	. .	. .
1963–64	870	8,505	7.9	5.2
1966–67	1,139	10,010	9.4	5.6
1969–70	1,627	12,275	12.6	7.0
1974–75	4,233	18,707	21.1	8.8
1975–76	5,684	21,423	34.3	14.5
1983–84	14,802	26,681	12.7	2.8
1984–85	16,371	27,429	10.6	2.8
1988–89	25,795	33,118	12.0	4.8
1992–93	34,993	38,304	7.9	3.7
1993–94	36,787	39,798	5.1	3.9
1994–95	38,967	41,324	5.9	3.8
1995–96	41,783	43,392	7.2	5.0
1996–97	44,482	45,330	6.5	4.5
1997–98	47,030	47,030	6.1	4.2
1960–61 to 1974–75			13.8	6.9
1975–76 to 1997–98			10.1	3.6
1960–61 to 1997–98			11.7	5.0

(a) See Box 5.2, page 236, for explanation of constant price estimating method.

Source: AIHW Health Expenditure Database.

Table S45: Total health expenditure as a proportion of GDP, Australia and selected OECD countries, 1961 to 1997 (per cent)

Year	Aust	Can	Fra	Ger	Jpn	NZ	UK	USA	Seven-country mean[(a)]	Eight-country mean[(b)]
1961	4.3	5.8	4.5	4.8	3.4	n.a.	4.0	5.4	4.3	4.9
1964	4.5	5.9	5.0	4.9	3.5	n.a.	4.1	5.8	4.5	5.2
1967	4.6	6.3	5.6	5.7	4.7	n.a.	4.4	6.3	5.2	5.8
1970	4.8	7.0	5.8	6.3	4.6	5.2	4.5	7.3	5.4	6.3
1975	6.3	7.2	7.0	8.8	5.6	6.7	5.5	8.2	6.7	7.5
1976	7.2	7.1	7.0	8.7	5.6	6.3	5.5	8.5	6.7	7.6
1984	7.3	8.3	8.5	9.1	6.6	5.7	5.9	10.3	7.5	8.9
1985	7.3	8.3	8.5	9.3	6.7	5.3	5.9	10.6	7.5	9.0
1989	7.4	8.7	8.7	8.8	6.2	6.6	5.8	11.9	7.3	9.5
1993	8.2	10.1	9.8	9.9	6.6	7.2	6.9	14.2	8.2	11.0
1994	8.2	9.8	9.7	10.0	6.9	7.3	6.9	14.1	8.3	11.0
1995	8.2	9.4	9.8	10.4	7.2	7.3	6.9	14.1	8.5	11.1
1996	8.2	9.3	9.8	10.8	7.1	7.3	6.9	14.1	8.5	11.1
1997	8.3	9.2	9.6	10.7	7.2	7.6	6.8	13.9	8.4	11.0

(a) Weighted mean, excludes United States.

(b) Weighted mean.

Sources: AIHW Health Expenditure Database; OECD 1999.

Table S46: Components of growth in health services expenditure, Australia and other selected OECD member countries, 1961 to 1997 (per cent)

	Aust	Can[(a)]	Fra	Ger[(a)]	Jpn[(b)]	NZ[(c)]	UK[(a)]	USA
Nominal growth in health services expenditure	12.1	10.2	10.2	10.6	7.9	9.2	8.8	10.5
Health services inflation	6.6	5.8	5.4	4.5	2.0	12.8	7.5	5.8
General inflation	6.1	5.0	5.9	3.8	1.4	8.9	7.3	4.5
Excess health inflation[(d)]	0.5	0.8	–0.5	0.7	0.6	3.6	0.2	1.3
Real growth in health services expenditure	5.2	4.1	4.6	5.8	5.8	–3.2	1.2	4.4
Population growth	1.6	1.4	0.7	1.1	0.5	1.1	0.3	1.1
Per person real growth	3.5	2.7	3.9	4.7	5.3	–4.2	0.9	3.3

(a) Canada, Germany and the United Kingdom from 1961 to 1996.

(b) Japan from 1980 to 1997.

(c) New Zealand from 1968 to 1996.

(d) Excess health inflation rate is the rate by which changes in the prices of health services exceed changes in prices throughout the general community. A positive excess health inflation rate indicates that health prices are rising faster than the general rate of inflation; a negative rate indicates that health prices are falling or not rising as fast as the general rate of inflation.

Sources: AIHW Health Expenditure Database; OECD unpublished data.

Health labour force

Table S47: Employment in the health industry, August 1981 to August 1999

Year	Employed in health industry ('000)	All employed persons ('000)	Proportion of all employed persons (%)	Civilian labour force[(a)] ('000)	Proportion of civilian labour force[(a)] (%)
1981	406.1	6,393.7	6.4	6,774.3	6.0
1982	424.5	6,379.3	6.7	6,840.7	6.2
1983	440.6	6,241.1	7.1	6,927.9	6.4
1984	453.6	6,466.1	7.0	7,070.1	6.4
1985	461.6	6,675.6	6.9	7,248.3	6.4
1986	489.2	6,918.6	7.1	7,516.2	6.5
1987	510.5	7,092.3	7.2	7,694.4	6.6
1988	530.7	7,353.4	7.2	7,892.1	6.7
1989	520.3	7,727.6	6.7	8,197.0	6.3
1990	557.9	7,825.0	7.1	8,412.5	6.6
1991	580.0	7,669.2	7.6	8,475.2	6.8
1992	575.3	7,679.3	7.5	8,585.7	6.7
1993	561.4	7,621.0	7.4	8,537.0	6.6
1994	547.2	7,885.7	6.9	8,683.5	6.3
1995	591.9	8,217.7	7.2	8,939.6	6.6
1996	590.2	8,319.7	7.1	9,090.8	6.5
1997	610.2	8,315.5	7.3	9,080.1	6.7
1998	598.7	8,535.9	7.0	9,261.5	6.5
1999	600.4	8,731.6	6.9	9,384.4	6.4
1989 to 1999 increase (%)	**15.4**	**13.0**		**14.5**	

(a) Includes unemployed persons looking for work.

Sources: ABS Cat No. 6203.0; Labour Force Survey estimates on microfiche.

Use of professional services

Table S48: Medical and optometrical services, fees and benefits under Medicare, 1992–93 to 1998–99

Year	Number of services (million)	Fees charged ($ million)	Schedule fees ($ million)	Benefits paid ($ million)
GP attendances				
1992–93	93.2	2,166.2	2,353.4	1,997.8
1993–94	96.7	2,288.7	2,503.1	2,126.1
1994–95	98.4	2,361.5	2,582.7	2,195.6
1995–96	102.1	2,484.4	2,722.3	2,314.4
1996–97	102.5	2,517.8	2,752.6	2,339.7
1997–98	103.1	2,564.5	2,786.6	2,367.8
1998–99	102.6	2,605.0	2,818.6	2,395.4
Special attendances				
1992–93	16.3	930.9	908.0	763.3
1993–94	16.8	977.4	957.4	806.2
1994–95	17.5	1,031.2	1,005.7	847.3
1995–96	18.1	1,084.0	1,053.5	887.8
1996–97	18.2	1,109.3	1,066.6	897.7
1997–98	18.2	1,133.1	1,078.9	907.5
1998–99	18.6	1,183.3	1,119.2	941.3
Obstetrics				
1992–93	0.7	93.7	71.8	55.3
1993–94	0.7	92.0	70.0	54.1
1994–95	0.7	93.9	70.8	55.0
1995–96	1.3	100.7	74.1	58.7
1996–97	1.6	98.9	70.7	56.8
1997–98	1.6	97.4	68.2	54.9
1998–99	1.6	101.3	71.9	57.7
Anaesthetics				
1992–93	1.6	165.4	137.9	104.4
1993–94	1.6	171.2	142.4	107.7
1994–95	1.7	184.0	152.1	115.0
1995–96	1.7	201.6	160.6	121.6
1996–97	1.7	218.6	166.0	125.7
1997–98	1.7	225.2	168.9	127.9
1998–99	1.8	235.2	175.5	132.9
Pathology[(a)]				
1992–93	39.7	734.5	757.0	634.0
1993–94	42.9	795.5	837.8	703.1
1994–95	47.0	869.9	926.3	778.3
1995–96	48.6	901.4	966.7	812.8
1996–97	50.3	945.3	1,020.2	857.8
1997–98	52.4	1,014.5	1,099.6	924.2
1998–99	55.6	1,096.3	1,199.0	1,008.4

(continued)

(a) In February 1992, a patient episode initiation item was introduced artificially inflating the number of pathology services.

Table S48 (continued): Medical and optometrical services, fees and benefits under Medicare, 1992–93 to 1998–99

Year	Number of services (million)	Fees charged ($million)	Schedule fees ($million)	Benefits paid ($million)
Diagnostic imaging				
1992–93	9.1	762.7	765.7	655.2
1993–94	9.5	833.7	848.4	728.7
1994–95	9.9	904.2	925.9	797.1
1995–96	10.5	983.7	1,016.1	875.9
1996–97	10.4	992.2	1,029.9	880.1
1997–98	10.8	1,063.8	1,105.6	938.2
1998–99	11.4	1,199.9	1,250.9	1,064.7
Operations				
1992–93	4.9	718.4	643.4	509.3
1993–94	5.0	727.6	652.6	515.8
1994–95	5.2	761.6	679.6	537.2
1995–96	5.3	799.6	708.6	560.7
1996–97	5.4	841.2	736.2	682.1
1997–98	5.4	861.4	744.7	587.2
1998–99	5.5	898.0	770.6	607.8
Optometry				
1992–93	3.0	119.1	137.6	117.0
1993–94	3.2	125.7	145.6	123.9
1994–95	3.3	131.5	152.7	129.8
1995–96	3.6	143.2	166.9	141.9
1996–97	3.7	147.3	172.0	146.2
1997–98	3.8	144.2	167.8	142.7
1998–99	3.9	147.9	171.7	146.1
All other services(b)				
1992–93	3.8	197.0	193.4	165.1
1993–94	4.2	227.9	225.0	191.2
1994–95	4.4	257.9	255.0	216.4
1995–96	4.5	283.3	280.9	238.2
1996–97	4.7	301.2	292.9	247.6
1997–98	4.8	321.0	309.8	260.7
1998–99	5.5	394.8	377.7	314.9
Total services				
1992–93	172.3	5,922.1	5,998.5	5,023.7
1993–94	180.6	6,275.2	6,414.0	5,380.1
1994–95	188.1	6,633.3	6,784.2	5,696.4
1995–96	196.0	7,022.4	7,185.0	6,038.4
1996–97	198.8	7,209.1	7,339.5	6,158.0
1997–98	202.2	7,460.7	7,560.1	6,333.5
1998–99	206.3	7,861.8	7,955.2	6,669.1

(a) In February 1992, a patient episode initiation item was introduced artificially inflating the number of pathology services.

(b) Includes radiotherapy and nuclear medicine therapy, assistance at operations and other miscellaneous services.

Source: DHAC 1999b.

Table S49: Medicare services, age-specific rates, by sex, 1991–92 to 1998–99 (services per person)

Sex/age group	1991–92	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99
Males								
0–4	8.90	9.73	9.85	9.60	9.80	9.60	9.47	9.27
5–9	5.00	5.39	5.43	5.24	5.30	5.31	5.25	5.12
10–14	4.22	4.50	4.60	4.50	4.54	4.48	4.53	4.44
15–19	4.37	4.68	4.68	4.67	4.86	4.83	4.77	4.73
20–24	4.57	4.90	5.00	5.02	5.32	5.26	5.12	5.02
25–34	5.14	5.49	5.58	5.77	5.97	5.93	5.84	5.75
35–44	6.00	6.39	6.60	6.91	7.11	7.07	7.05	7.08
45–54	7.66	8.22	8.82	9.23	9.48	9.45	9.54	9.61
55–64	11.70	12.72	13.35	14.01	14.41	14.42	14.59	14.74
65–74	12.55	14.18	15.82	17.11	18.35	19.07	20.11	21.09
75+	17.35	18.85	19.85	20.38	20.69	20.54	20.66	20.26
Crude rate	**7.11**	**7.73**	**8.07**	**8.35**	**8.68**	**8.71**	**8.81**	**8.87**
ASR[(a)]	**7.24**	**7.85**	**8.20**	**8.45**	**9.01**	**9.01**	**8.79**	**8.81**
Females								
0–4	8.10	8.88	9.01	8.80	8.98	8.82	8.67	8.52
5–9	4.99	5.39	5.44	5.23	5.26	5.21	5.23	5.15
10–14	4.39	4.68	4.79	4.67	4.66	4.60	4.64	4.62
15–19	7.63	8.18	8.27	8.37	8.64	8.43	8.26	8.28
20–24	10.20	11.13	11.43	11.64	12.12	11.72	11.35	11.16
25–34	11.38	12.40	12.62	13.05	13.57	13.51	13.36	13.30
35–44	10.36	11.27	11.61	12.11	12.23	12.17	12.13	12.21
45–54	11.71	12.77	13.52	14.00	14.06	14.02	14.04	14.19
55–64	13.85	15.03	15.54	16.20	16.67	16.87	17.19	17.56
65–74	16.46	17.73	18.57	19.21	20.08	20.45	20.97	21.60
75+	20.41	21.94	22.87	23.43	24.10	24.36	24.63	24.88
Crude rate	**10.81**	**11.75**	**12.14**	**12.49**	**12.84**	**12.85**	**12.89**	**13.01**
ASR[(a)]	**10.61**	**11.51**	**11.88**	**12.19**	**12.28**	**12.24**	**12.46**	**12.53**

(a) Age standardised to the Australian population at 30 June 1991.

Sources: HIC 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999.

Table S50: Medicare services, age-specific rates, by sex, States and Territories, 1998–99 (services per person)

Sex/age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
Males									
0–4	9.88	9.34	9.41	7.85	9.25	7.77	8.32	5.36	9.27
5–9	5.54	5.29	5.01	4.27	4.98	4.23	4.74	2.63	5.12
10–14	4.68	4.43	4.61	3.96	4.28	3.78	4.24	2.17	4.44
15–19	5.05	4.67	4.88	4.16	4.59	4.07	4.25	2.27	4.73
20–24	5.47	5.18	4.95	4.11	4.90	4.49	4.01	2.29	5.02
25–34	6.31	5.93	5.52	4.76	5.48	5.10	4.87	3.07	5.75
35–44	7.83	7.11	6.95	5.99	6.49	5.92	5.92	4.59	7.08
45–54	10.56	9.45	9.63	8.49	8.58	8.39	8.02	6.67	9.61
55–64	16.22	14.56	14.63	12.99	12.84	12.87	12.44	9.95	14.74
65–74	22.75	21.19	20.64	19.02	18.80	17.78	18.51	12.86	21.09
75+	21.00	21.26	19.25	19.41	19.27	15.09	18.85	11.90	20.26
Crude rate	**9.70**	**8.98**	**8.66**	**7.52**	**8.46**	**7.67**	**7.08**	**4.47**	**8.87**
ASR[(a)]	**9.54**	**8.88**	**8.69**	**7.71**	**8.16**	**7.46**	**7.65**	**5.28**	**8.81**
Females									
0–4	9.15	8.40	8.69	7.27	8.56	7.18	7.90	4.84	8.52
5–9	5.52	5.32	5.06	4.34	4.99	4.37	4.86	2.62	5.15
10–14	4.81	4.63	4.79	4.14	4.56	4.07	4.38	2.47	4.62
15–19	8.52	7.89	8.99	7.99	7.64	8.22	7.66	5.08	8.28
20–24	11.78	10.95	11.67	10.34	10.05	11.36	9.35	7.33	11.16
25–34	13.86	13.63	13.21	12.64	12.08	12.53	11.74	8.73	13.30
35–44	12.97	12.29	12.24	11.36	11.02	10.97	10.69	8.49	12.21
45–54	15.12	14.02	14.48	13.10	12.73	13.21	12.21	10.06	14.19
55–64	18.79	17.37	17.94	15.76	15.49	15.92	15.61	11.11	17.56
65–74	22.90	21.44	22.06	19.73	19.16	19.09	19.05	12.86	21.60
75+	25.27	25.70	25.38	22.92	23.22	21.90	23.11	15.39	24.88
Crude rate	**13.79**	**13.15**	**13.04**	**11.69**	**12.19**	**11.96**	**10.98**	**7.28**	**13.01**
ASR[(a)]	**13.20**	**12.54**	**12.75**	**11.53**	**11.42**	**11.48**	**11.13**	**8.03**	**12.53**

(a) Age standardised to the Australian population at 30 June 1991.

Source: HIC 1999.

Table S51: Medicare services, percentage of enrolled persons by number of items, by age group and sex, 1998–99

	Number of services					
Sex/age group	**0**	**1**	**2**	**3**	**4**	**5 or more**
Males						
0–4	8.60	5.93	6.70	7.00	6.98	64.79
5–9	12.83	11.85	11.32	10.05	8.65	45.30
10–14	18.28	14.95	12.77	10.52	8.46	35.02
15–19	19.52	14.93	12.19	9.84	7.84	35.68
20–24	21.20	14.02	11.15	8.88	7.22	37.53
25–34	23.74	13.81	10.56	8.26	6.73	36.90
35–44	21.30	12.66	9.65	7.58	6.30	42.51
45–54	16.34	10.79	8.20	6.55	5.72	52.40
55–64	11.98	7.10	5.63	4.81	4.49	65.99
65–74	10.79	3.94	3.48	3.15	3.15	75.49
75+	24.87	3.81	3.10	2.49	2.53	63.20
All ages	**17.94**	**11.00**	**8.92**	**7.33**	**6.24**	**48.57**
Females						
0–4	9.17	6.72	7.46	7.70	7.61	61.34
5–9	13.26	12.31	11.50	10.14	8.68	44.11
10–14	18.12	15.14	12.90	10.47	8.39	34.98
15–19	13.97	12.18	10.84	8.99	7.51	46.51
20–24	7.87	6.31	6.44	6.30	6.07	67.01
25–34	9.28	5.56	5.33	5.39	5.30	69.14
35–44	9.99	6.64	5.78	5.95	5.71	65.93
45–54	8.21	5.95	5.09	5.10	5.04	70.61
55–64	7.09	4.26	3.96	3.96	4.02	76.71
65–74	8.23	2.97	2.86	2.86	3.01	80.07
75+	15.84	2.04	2.10	2.09	2.24	75.69
All ages	**10.57**	**6.84**	**6.28**	**5.95**	**5.56**	**64.80**

Source: HIC 1999.

Table S52: Indicators for cardiovascular health

Descriptor	Baseline Year	Baseline Value	Most recent data Year	Most recent data Value
Incidence rate for myocardial infarction, ages 30–79[a] (events per 100,000 population)				
Males	1993–94	441	1997–98	377
Females	1993–94	144	1997–98	119
Hospital separation rate for principal diagnosis of unstable angina pectoris, ages 0–79 (per 100,000 population)				
Males	1993–94	178	1997–98	333
Females	1993–94	100	1997–98	166
Hospital separation rate for principal diagnosis of congestive heart failure, ages 0–79 (per 100,000 population)				
Males	1993–94	102	1997–98	98
Females	1993–94	63	1997–98	56
Death rate for coronary heart disease, ages 0–79 (deaths per 100,000 population)				
Males	1986	200.8	1998	103.3
Females	1986	87.9	1998	41.6
Death rate for coronary heart disease among rural and remote area residents, ages 0–79 (deaths per 100,000 population)				
Males, remote	1988–90	199.9	1996–98	143.8
Males, rural	1988–90	182.3	1996–98	118.7
Males, urban	1988–90	174.3	1996–98	106.6
Females, remote	1988–90	100.3	1996–98	63.6
Females, rural	1988–90	81.5	1996–98	47.8
Females, urban	1988–90	73.6	1996–98	43.9
Proportion of people whose main/underlying disabling condition is stroke, ages 25 or more[b] (per 100,000 population)				
Males	1993	297	1998	474
Females	1993	268	1998	490
Death rate for stroke, ages 0–79 (deaths per 100,000 population)				
Males	1986	47.4	1998	26.4
Females	1986	36.4	1998	19.5
Death rate for stroke among rural and remote area residents, ages 0–79 (deaths per 100,000 population)				
Males, remote	1988–90	49.7	1996–98	31.3
Males, rural	1988–90	42.0	1996–98	29.8
Males, urban	1988–90	41.0	1996–98	27.9
Females, remote	1988–90	37.7	1996–98	27.0
Females, rural	1988–90	31.6	1996–98	21.8
Females, urban	1988–90	30.9	1996–98	20.5

(continued)

(a) Currently data are available only for ages 35–69. Rates are standardised to the 1993 Australian population.

(b) Although the prevalence of stroke may have increased between 1993 and 1998, a change in the data collection method may also have contributed to the increased reported rate. In 1993, it was based on the underlying cause of the main disabling condition, whereas in 1998, survey participants were asked directly whether they had had a stroke.

Table S52 (continued): Indicators for cardiovascular health

	Baseline		Most recent data	
Descriptor	**Year**	**Value**	**Year**	**Value**
Hospital separation rate for major amputation for peripheral vascular disease, ages 0–79 (per 100,000 population)				
Males	1993–94	0.8	1997–98	3.6
Females	1993–94	0.3	1997–98	1.5
Hospital separation rate for emergency and elective surgery for abdominal aortic aneurysm, ages 0–79 (per 100,000 population)				
Males	1993–94	19.0	1997–98	17.8
Females	1993–94	3.4	1997–98	3.3

(a) Currently data are available only for ages 35–69. Rates are standardised to the 1993 Australian population.

(b) Although the prevalence of stroke may have increased between 1993 and 1998, a change in the data collection methods may also have contributed to the increased rate reported. In 1993, it was based on the underlying cause of the main disabling condition, whereas in 1998, survey participants were asked directly whether they had had a stroke.

Note: Except for the incidence of myocardial infarction, rates have been age standardised to the 1991 Australian population.

Sources: AIHW National Mortality Database; AIHW National Hospital Morbidity Database; DHAC & AIHW 1999a.

Table S53: Indicators for health risk factors

	Baseline		Most recent data	
Descriptor	**Year**	**Value**	**Year**	**Value**
Proportion of adults who smoke regularly, ages 18 or more (per cent)				
Males	1989–90	31.6	1995	27.1
Females	1989–90	25.1	1995	20.8
Proportion of secondary school students who smoke, age 15 (per cent)[(a)]				
Males	1984	29	1996	24
Females	1984	34	1996	29
Proportion of adults not engaged in regular physical activity, ages 18 or more (per cent)				
Males	1989–90	35.6	1995	33.5
Females	1989–90	36.0	1995	33.8
Proportion of adults who are overweight, ages 18 or more (per cent)				
Males	1989–90	44.4	1995	51.0
Females	1989–90	30.9	1995	36.1
Proportion of adults with high blood pressure and/or on antihypertensive treatment, ages 20–69 (per cent)				
Males	1989	19.5	1995	17.1
Females	1989	12.6	1995	10.1
Mean blood pressure levels, ages 20–69 (mm Hg)				
Males, systolic BP	1989	129	1995	128
Males, diastolic BP	1989	82	1995	78
Females, systolic BP	1989	122	1995	122
Females, diastolic BP	1989	76	1995	74
Proportion of adults with high blood cholesterol, ages 20–69 (per cent)				
Males	1989	46.6	n.a.	n.a.
Females	1989	38.6	n.a.	n.a.
Contribution of saturated fat as a proportion of total energy intake, ages 25–64 (per cent)				
Males	1983	15.9	1995	12.7
Females	1983	16.3	1995	12.8

(a) Age-specific smoking rate among 15-year-olds.

Note: Age standardised to the 1991 Australian population.

Source: DHAC & AIHW 1999a.

Table S54: Indicators for cancer control

Descriptor	Baseline Year	Baseline Value	Most recent data Year	Most recent data Value
Incidence of cancer of the trachea, bronchus and lung (new cases per 100,000 population)				
Males	1983	74.8	1996	60.1
Females	1983	17.1	1996	23.0
Death rate for cancer of the trachea, bronchus and lung (deaths per 100,000 population)				
Males	1986	64.4	1998	53.1
Females	1986	16.1	1998	18.6
Incidence of melanoma of the skin (new cases per 100,000 population)				
Males	1988	40.1	1996	48.0
Females	1988	32.9	1996	35.0
Death rate for melanoma of the skin (deaths per 100,000 population)				
Males	1991	6.5	1998	6.9
Females	1991	3.2	1998	3.0
Incidence of (treated) non-melanocytic skin cancer (new cases per 100,000 population)				
Males	1990	1,187	n.a.	n.a.
Females	1990	769	n.a.	n.a.
Death rate for non-melanocytic skin cancer (deaths per 100,000 population)				
Males	1991	2.8	1998	2.5
Females	1991	0.6	1998	0.8
Incidence of cervical cancer among women aged 20–74 years (new cases per 100,000 population)				
Females	1988	17.6	1996	13.0
Death rate for cervical cancer among women aged 20–74 years (deaths per 100,000 population)				
Females	1991	4.3	1998	2.9
Incidence of breast cancer among women aged 50–74 years (new cases per 100,000 population)				
Females	1988	202.4	1997	286.0
Death rate for breast cancer among women aged 50–74 years (deaths per 100,000 population)				
Females	1992	68.7	1998	62.6
Incidence of colorectal cancer (new cases per 100,000 population)				
Males	1988	60.2	1996	69.2
Females	1988	42.0	1996	46.0
Death rate for colorectal cancer (deaths per 100,000 population)				
Males	1992	29.7	1998	27.3
Females	1992	19.7	1998	18.6
Incidence of prostate cancer (new cases per 100,000 population)				
Males	1988	68.4	1996	117.4
Death rate for prostate cancer (deaths per 100,000 population)				
Males	1992	33.7	1998	29.2
Proportion of females aged 50–69 years screened for breast cancer (per cent)				
Females	1996–97	52.2	n.a.	n.a.
Proportion of females aged 20–69 years screened within specified intervals for cervical cancer (per cent)				
Females	1996–97	62.4	n.a.	n.a.
Five-year survival rate for breast cancer (per cent)				
Females	1982–94	76.8	n.a.	n.a.

Note: Age standardised to the Australian population at 30 June 1991.

Sources: AIHW National Mortality Database; AIHW National Hospital Morbidity Database; DHFS & AIHW 1998a.

Table S55: Indicators for diabetes mellitus

Descriptor	Baseline Year	Baseline Value
Prevalence rates for Type 1 and Type 2 diabetes in the general population, in the Indigenous population, and among people from culturally and linguistically diverse backgrounds (C&LDB) (per 100,000 population)		
Males, Type 1 diabetes, general population	1995	223
Males, Type 2 diabetes, general population	1995	1,846
Females, Type 1 diabetes, general population	1995	210
Females, Type 2 diabetes, general population	1995	1,508
Males, Type 1 diabetes, C&LDB	1995	146
Males, Type 2 diabetes, C&LDB	1995	2,627
Females, Type 1 diabetes, C&LDB	1995	158
Females, Type 2 diabetes, C&LDB	1995	3,609
Males, Indigenous population	1994	7,597
Females, Indigenous population	1994	9,763
Prevalence rates for obesity and overweight (as measured by BMI) in the general population, and among persons with Type 2 diabetes (per 1,000 population)		
Males, Type 2 diabetes, overweight	1995	445
Males, Type 2 diabetes, obese	1995	317
Females, Type 2 diabetes, overweight	1995	313
Females, Type 2 diabetes, obese	1995	428
Males, general population, overweight	1995	430
Males, general population, obese	1995	129
Females, general population, overweight	1995	274
Females, general population, obese	1995	139
Rates for non-participation in regular, sustained, moderate aerobic exercise in the general population, and among persons with Type 2 diabetes (per 1,000 persons aged 30 years and over)		
Males, Type 2 diabetes, low	1995	259
Males, Type 2 diabetes, sedentary	1995	496
Females, Type 2 diabetes, low	1995	323
Females, Type 2 diabetes, sedentary	1995	418
Males, general population, low	1995	307
Males, general population, sedentary	1995	373
Females, general population, low	1995	377
Females, general population, sedentary	1995	370
Prevalence rates for high blood pressure among persons with Type 2 diabetes, aged less than 60 years and 60 years and over (per 1,000 persons)		
Males, aged less than 60 years	1999	261
Males, aged 60 years and over	1999	220
Females, aged less than 60 years	1999	266
Females, aged 60 years and over	1999	341

(continued)

Table S55 (continued): Indicators for diabetes mellitus

Descriptor	Baseline Year	Baseline Value
Prevalence rates for high levels of lipoproteins among persons with Type 1 and Type 2 diabetes (per 1,000 persons aged 20 years and over)		
Males, Type 1 diabetes	1999	208
Males, Type 2 diabetes	1999	328
Females, Type 1 diabetes	1999	260
Females, Type 2 diabetes	1999	355
Prevalence rates for fasting hypertriglyceridaemia among persons with Type 1 and Type 2 diabetes (per 1,000 persons aged 20 years and over)		
Males, Type 1 diabetes	1999	14.8
Males, Type 2 diabetes	1999	107
Females, Type 1 diabetes	1999	13.3
Females, Type 2 diabetes	1999	114
Proportion of persons with end-stage renal disease with diabetic nephropathy as a causal factor (per 1,000 persons aged 25–84 years)		
Type 1	1997	68.0
Type 2, non-insulin-requiring	1997	64.5
Type 2, insulin-requiring	1997	83.5
Prevalence rate for foot problems among clinically diagnosed persons with diabetes (per 1,000 persons aged 20 years and over)		
Current foot ulcers	1999	20.4
Previous foot ulcers	1999	40.3
Incidence rates for myocardial infarction and stroke among clinically diagnosed persons with diabetes (per 1,000 persons aged 35–69 years)		
Myocardial infarction	1999	18.6
Stroke	1999	12.6
Hospital separations for end-stage renal disease (ICD 584–585) as the principal diagnosis with diabetes (ICD 250) as an associated diagnosis (per 1,000 persons)		
Males	1997–98	0.15
Females	1997–98	0.13
Hospital separations for coronary heart disease (ICD 410-414) or stroke (ICD 430-438) as the principal diagnosis with diabetes as an associated diagnosis (per 1,000 persons)		
Males	1997–98	2.39
Females	1997–98	1.32
Hospital separations for diabetes both as a principal diagnosis and as an associated diagnosis with conditions other than end-stage renal disease and coronary heart disease/stroke (per 1,000 persons)		
Males	1997–98	14.87
Females	1997–98	12.01

(continued)

Table S55 (continued): Indicators for diabetes mellitus

Descriptor	Baseline Year	 Value
Death rates for diabetes in the general population, in the Indigenous population, and among people from culturally and linguistically diverse backgrounds (C&LDB) (per 100,000 population)		
Males, Indigenous population	1998	102.26
Females, Indigenous population	1998	108.69
Males, C&LDB	1998	19.84
Females, C&LDB	1998	15.32
Males, general population	1998	16.05
Females, general population	1998	10.62
Self-assessed health status of persons with and without diabetes (per 1,000 persons aged 30 years and over)		
Good, very good or excellent		
Males, with diabetes	1995	543
Males, without diabetes	1995	827
Females, with diabetes	1995	626
Females, without diabetes	1995	834
Fair or poor		
Males, with diabetes	1995	457
Males, without diabetes	1995	173
Females, with diabetes	1995	374
Females, without diabetes	1995	166

Sources: AIHW National Mortality Database; AIHW National Hospital Morbidity Database; DHAC & AIHW 1999b; NADC 1999 Australian National Diabetes Information Audit and Benchmarking Survey unpublished data; Disney et al. 1998.

Table S56: Indicators for injury prevention and control

Descriptor	Baseline Year	Baseline Value	Most recent data Year	Most recent data Value
Death rate for injury and poisoning (per 100,000 population)				
Persons	1992	42.0	1998	40.8
Hospital separation rate for injury and poisoning in the total population (per 100,000 population)				
Persons	1991–92	1,714	1997–98	1,932
Death rate ratio comparing the injury status of Indigenous and non-Indigenous populations				
Males	1991–92	3.7	1996–98	3.0
Females	1991–92	4.2	1996–98	3.3
Death rate ratio comparing the injury status of males and females				
Male:female	1992	2.6	1998	2.9
Death rate ratio comparing the injury status among people living in rural and remote areas with the general population				
Males, capital cities	1991–95	0.89	1994–98	0.88
Males, other metropolitan centres	1991–95	0.98	1994–98	1.00
Males, large rural centres	1991–95	1.10	1994–98	1.12
Males, small rural centres	1991–95	1.08	1994–98	1.13
Males, other rural areas	1991–95	1.28	1994–98	1.30
Males, remote centres	1991–95	1.51	1994–98	1.63
Males, other remote areas	1991–95	1.90	1994–98	1.84
Females, capital cities	1991–95	0.94	1994–98	0.92
Females, other metropolitan centres	1991–95	0.98	1994–98	1.04
Females, large rural centres	1991–95	0.98	1994–98	1.00
Females, small rural centres	1991–95	1.03	1994–98	1.02
Females, other rural areas	1991–95	1.19	1994–98	1.19
Females, remote centres	1991–95	1.33	1994–98	1.74
Females, other remote areas	1991–95	1.96	1994–98	1.87
Death rate for road transport-related injury in the total population, and among males aged 15–24 years (per 100,000 population)				
Total population	1992	12.0	1998	9.4
Males aged 15–24 years	1992	31.5	1998	27.0
Hospital separation rate for road transport-related injury in the total population, and among males aged 15–24 years (per 100,000 population)				
Total population	1990	232	1997–98	234
Males aged 15–24 years	1990	858	1997–98	596
Death rate due to falls among people aged 65 years and over (per 100,000 population)				
Persons aged 65 years and over	1992	39.9	1998	38.9
Hospital separation rate due to falls among people aged 65 years and over (per 100,000 population)				
Males aged 65–74 years	1991–92	668	1997–98	851
Males aged 75 years and over	1991–92	2,242	1997–98	3,198
Females aged 65–74 years	1991–92	1,225	1997–98	1,408
Females aged 75 years and over	1991–92	4,554	1997–98	5,519

(continued)

Table S56 (continued): Indicators for injury prevention and control

Descriptor	Baseline Year	Baseline Value	Most recent data Year	Most recent data Value
Hospital separation rate due to falls among children aged 0–4 and 5–9 years (per 100,000 population)				
Children aged 0–4 years	1991–92	502	1997–98	571
Children aged 5–9 years	1991–92	868	1997–98	778
Death rate for homicide among people aged 20–39 years (per 100,000 population)				
Males	1992	3.4	1998	3.7
Females	1992	2.4	1998	1.5
Death rate for homicide among children aged 0–9 years (per 100,000 population)				
Children aged 0–9 years	1992	0.6	1998	1.0
Death rate for injury resulting from fire, burns and scalds among people aged 55 years and over (per 100,000 population)				
Persons aged 55 years and over	1992	2.4	1998	1.4
Hospital separation rate for injury resulting from fire, burns and scalds among children aged 0–4 years (per 100,000 population)				
Boys	1991–92	167	1997–98	106
Girls	1991–92	127	1997–98	79
Hospital separation rate due to poisoning among children aged 0–4 years (per 100,000 population)				
Children aged 0–4 years	1991–92	302	1997–98	288
Death rate for drowning in the total population and among children aged 0–4 years (per 100,000 population)				
Total population	1992	1.7	1998	1.3
Children aged 0–4 years	1992	5.9	1998	3.7
Hospital separation rate for near drowning among children aged 0–4 years (per 100,000 population)				
Children aged 0–4 years	1991–92	29.5	1997–98	23.0
Incidence rate for persistent spinal cord injury from traumatic causes (per 100,000 population)				
Persons	1995–96	1.34	1998–99	1.45

Sources: AIHW National Mortality Database; AIHW National Morbidity Database; AIHW NISU unpublished data; DHFS & AIHW 1998b.

Table S57: Indicators for mental health, focusing on depression

	Baseline		Most recent data	
Descriptor	**Year**	**Value**	**Year**	**Value**
Prevalence rates for depressive disorders (per 100,000 population)				
Males	1997	4.2	n.a.	n.a.
Females	1997	7.4	n.a.	n.a.
Prevalence rates for anxiety disorders (per 100,000 population)				
Males	1997	7.1	n.a.	n.a.
Females	1997	12.1	n.a.	n.a.
Hospital separations for suicide and self-inflicted injury among young adults aged 15–24 years, and older people aged 65 years and over (per 100,000 population)				
Males, aged 15–24 years	1993–94	142.4	1997–98	164.0
Females, aged 15–24 years	1993–94	235.6	1997–98	280.8
Males, aged 65 years and over	1993–94	38.0	1997–98	42.5
Females, aged 65 years and over	1993–94	30.4	1997–98	33.1
Death rates for suicide among young adults aged 15–24 years and older people aged 65 years and over (per 100,000 population)				
Males, aged 15–24 years	1986	21.3	1998	26.6
Females, aged 15–24 years	1986	5.4	1998	6.3
Males, aged 65 years and over	1986	30.7	1998	23.7
Females, aged 65 years and over	1986	7.0	1998	6.2
Death rates for suicide in urban, rural and remote areas among young adults aged 15–24 years (per 100,000 population)				
Males, 15–24 years, capital cities	1986–96	22.7	1988–98	23.2
Males, 15–24 years, other metropolitan	1986–96	24.9	1988–98	26.0
Males, 15–24 years, large rural centres	1986–96	27.9	1988–98	29.8
Males, 15–24 years, small rural centres	1986–96	31.5	1988–98	30.6
Males, 15–24 years, other rural areas	1986–96	34.4	1988–98	37.6
Males, 15–24 years, remote centres	1986–96	31.0	1988–98	35.3
Males, 15–24 years, other remote areas	1986–96	42.5	1988–98	51.3
Females, 15–24 years, capital cities	1986–96	5.2	1988–98	5.2
Females, 15–24 years, other metropolitan	1986–96	4.1	1988–98	4.1
Females, 15–24 years, large rural centres	1986–96	4.0	1988–98	5.1
Females, 15–24 years, small rural centres	1986–96	4.1	1988–98	4.8
Females, 15–24 years, other rural areas	1986–96	4.8	1988–98	5.3
Females, 15–24 years, remote centres	1986–96	5.5	1988–98	6.4
Females, 15–24 years, other remote areas	1986–96	6.1	1988–98	6.3

(continued)

Table S57 (continued): Indicators for mental health, focusing on depression

	Baseline		Most recent data	
Descriptor	**Year**	**Value**	**Year**	**Value**
Death rates for suicide in urban, rural and remote areas among older people aged 65 years and over (per 100,000 population)				
Males, 65+ years, capital cities	1986–96	26.7	1988–98	25.4
Males, 65+ years, other metropolitan	1986–96	30.7	1988–98	30.7
Males, 65+ years, large rural centres	1986–96	29.2	1988–98	27.3
Males, 65+ years, small rural centres	1986–96	31.1	1988–98	28.7
Males, 65+ years, other rural areas	1986–96	34.4	1988–98	33.2
Males, 65+ years, remote centres	1986–96	51.1	1988–98	53.3
Males, 65+ years, other remote areas	1986–96	40.4	1988–98	36.5
Females, 65+ years, capital cities	1986–96	8.2	1988–98	7.8
Females, 65+ years, other metropolitan	1986–96	5.5	1988–98	5.9
Females, 65+ years, large rural centres	1986–96	6.9	1988–98	6.0
Females, 65+ years, small rural centres	1986–96	4.9	1988–98	5.0
Females, 65+ years, other rural areas	1986–96	4.6	1988–98	5.0
Females, 65+ years, remote centres	1986–96	0.0	1988–98	0.0
Females, 65+ years, other remote areas	1986–96	6.8	1988–98	7.5

Sources: AIHW National Mortality Database; AIHW National Morbidity Database; DHAC & AIHW 1999c.

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Methods and conventions

Methods

Details of methods used in particular sections of the report are included in the text and boxes, and in footnotes to figures and tables. Entries in columns of tables may not add to the totals shown, due to rounding.

Age standardisation has been used to facilitate the comparison of populations with differing age compositions, either different populations at one time or the same population at different times. The 1991 Australian population (ABS 1993) has been used as the standard population for all intra-Australia comparisons. The 1988 Australian population was used for these comparisons in editions of *Australia's Health* prior to the 1996 edition; some statistics may thus differ slightly from those in previous editions.

The European and the World Standard Populations have been used for some international comparisons. Details of these standard populations are provided.

Table A1: Age composition of the Australian population at 30 June 1991, and of European and World Standard Populations

Age group (years)	Australia, 30 June 1991	European Std	World Std
0	259,085	1,600	2,400
1–4	1,012,618	6,400	9,600
5–9	1,272,208	7,000	10,000
10–14	1,241,619	7,000	9,000
15–19	1,364,074	7,000	9,000
20–24	1,396,764	7,000	8,000
25–29	1,399,663	7,000	8,000
30–34	1,425,735	7,000	6,000
35–39	1,328,387	7,000	6,000
40–44	1,294,271	7,000	6,000
45–49	1,029,145	7,000	6,000
50–54	846,934	7,000	5,000
55–59	725,950	6,000	4,000
60–64	736,868	5,000	4,000
65–69	671,390	4,000	3,000
70–74	510,755	3,000	2,000
75–79	384,495	2,000	1,000
80–84	229,828	1,000	500
85 and over	154,247	1,000	500
Total	**17,284,036**	**100,000**	**100,000**

Sources: ABS 1993; WHO 1996.

Within Australia, most regional comparisons are among States and Territories. For within-State comparisons, Australian Bureau of Statistics sources use capital city statistical areas and the rest of each State. Definitions for regional comparisons from other sources are not consistent, and are stated at appropriate places in the text.

Average annual rates of change or growth rates have been calculated as geometric rates:

Average rate of change = $((Pn/Po)1/N - 1) \times 100$

where Pn = value in later time period

Po = value in earlier time period

N = number of years between the two time periods.

The classification of deaths follows the Ninth Revision of the International Classification of Diseases (WHO 1977). Diseases treated in hospitals and the procedures performed during a hospital stay are classified using the Australian version of the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM (see Box 5.7, page 274).

Symbols

$	Australian dollars, unless otherwise specified
–	nil or rounded to zero
%	per cent
g	gram
kcal	kilocalorie
kg	kilogram
kJ	kilojoule
km^2	square kilometres
’000	thousands
m	million
mm	millimetre
mm Hg	millimetres of mercury
mmol/L	millimoles per litre
n.a.	not available
. .	not applicable
nec	not elsewhere classified
n.p.	not published by the data source
npr	not previously reported
wk	week

>	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%.

References

ABS 1993. Estimated resident population by sex and age, States and Territories of Australia, June 1991 and preliminary June 1992. ABS Cat. No. 3201.0. Canberra: ABS.

WHO 1977. Manual of the international statistical classification of diseases, injuries and causes of death, 9th Revision, Volumes 1 and 2. Geneva: WHO.

WHO 1996. World health statistics annual, 1995. Geneva: WHO.

Abbreviations

AACR	Australian Association of Cancer Registries
ABS	Australian Bureau of Statistics
ACCHS	Aboriginal Community Controlled Health Services
ACCSIS	Aged and Community Care Strategic Information System
ACCV	Anti-Cancer Council of Victoria
ACHS	Australian Council on Healthcare Standards
ACIR	Australian Childhood Immunisation Register
AGPS	Australian Government Publishing Service
AHMAC	Australian Health Ministers' Advisory Council
AIC	Australian Institute of Criminology
AIDS	Acquired immune deficiency syndrome
AIH	Australian Institute of Health
AIHW	Australian Institute of Health and Welfare
ALOS	Average length of stay
AN-DRG	Australian National Diagnosis Related Group
ANZDATA	Australian and New Zealand Dialysis and Transplant Registry
APA	American Psychiatric Association
APSU	Australian Paediatric Surveillance Unit
AR-DRG	Australian Refined Diagnosis Related Group
ARI	Acute respiratory infections
ASCCSS	Australian Standard Classification of Countries for Social Statistics
ASR	Age-standardised rate
ASVS	Australian Standard Vaccination Schedule
ATSIHWIU	Aboriginal and Torres Strait Islander Health and Welfare Information Unit
BEACH	Bettering the Evaluation And Care of Health
BMI	Body mass index
CABG	Coronary artery bypass grafting
CATI	Computer-assisted telephone interview

CBCS	Commonwealth Bureau of Census and Statistics
CFCs	Chlorofluorocarbons
CGC	Commonwealth Grants Commission
CHD	Coronary heart disease
CNS	Central nervous system
COAG	Council of Australian Governments
COPD	Chronic obstructive pulmonary disease
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CT	Computerised tomographic (scan)
CVD	Cardiovascular disease
DALY	Disability-adjusted life year
DASET	Department of Art, Sport, the Environment and Territories
DBP	Diastolic blood pressure
DDD	Defined daily dose
DEETYA	Department of Employment, Education, Training and Youth Affairs
DHAC	Department of Health and Aged Care
DHCS	Department of Health and Community Services
DHFS	Department of Health and Family Services
DHHST	Department of Health and Human Services, Tasmania
DHSH	Department of Human Services and Health
DMFT	Decayed, missing or filled permanent teeth
dmft	Decayed, missing or filled primary teeth
DNA	Deoxyribonucleic acid
DPIE	Department of Primary Industries and Energy
DRG	Diagnosis related group
DSRU	Dental Statistics and Research Unit
DTP	Diphtheria, tetanus, pertussis (triple antigen vaccine)
FECCA	Federation of Ethnic Communities’ Councils of Australia
FED	Front-end deductible
FORS	Federal Office of Road Safety
FWE	Full-time workload equivalent
GBD	Global Burden of Disease Study
GDM	Gestational diabetes mellitus

GDP	Gross domestic product
GIFT	Gamete intra-fallopian transfer
GP	General practitioner
GPSCU	General Practice Statistics and Classification Unit
HACC	Home and Community Care
HCV	Hepatitis C virus
HFA	Heart Foundation of Australia
HGP	Human Genome Project
Hib	*Haemophilus influenzae* type b
HIC	Health Insurance Commission
HIV	Human immunodeficiency virus
HLA	Human leukocyte antigen
HUS	Haemolytic uraemic syndrome
ICD	International Classification of Diseases
ICD-10	International Classification of Diseases, 10th Revision
ICD-10-AM	International Classification of Diseases, 10th Revision, Australian Modification
ICD-9	International Classification of Diseases, 9th Revision
ICD-9-CM	International Classification of Diseases, 9th Revision, Clinical Modification
ICIDH	International Classification of Impairments, Disabilities and Handicaps
ICPEMC	International Commission for Protection against Environmental Mutagens and Carcinogens
IHD	Ischaemic heart disease
IPD	Implicit price deflator
IRSD	Index of relative socioeconomic disadvantage
IUD	Intra-uterine device
IVF	In-vitro fertilisation
KS	Kaposi's sarcoma
LIPID	Long-term Intervention with Pravastatin in Ischaemic Disease
MBS	Medicare Benefits Schedule
MCC	Measles Control Campaign
MCS	Mental component summary (of the SF-36)
MDBS	Murray–Darling Basin Commission
MDC	Major diagnostic category

MEAC	Measles Elimination Advisory Committee
MMR	Measles, mumps and rubella (vaccine)
MRI	Magnetic resonance imaging
MS	Multiple sclerosis
NADC	National Association of Diabetes Centres
NCATSIS	National Centre for Aboriginal and Torres Strait Islander Statistics
NCC	National Coding Centre
NCCH	National Centre for Classification in Health
NCEPH	National Centre for Epidemiology and Population Health
NCHECR	National Centre in HIV Epidemiology and Clinical Research
NDR	National Diabetes Register
NHDC	National Health Data Committee
NHDD	National Health Data Dictionary
NHF	National Heart Foundation
NHIA	National Health Information Agreement
NHIMAC	National Health Information Management Advisory Committee
NHIMG	National Health Information Management Group
NHL	Non-Hodgkin's lymphoma
NHLBI	National Heart, Lung and Blood Institute
NHMBWG	National Health Ministers' Benchmarking Working Group
NHMRC	National Health and Medical Research Council
NHPA	National Health Priority Area
NHPC	National Health Performance Committee
NHS	National Health Survey
NISAD	Neuroscience Institute of Schizophrenia and Allied Disorders
NISU	National Injury Surveillance Unit
NMDS	National minimum data set
NMSC	Non-melanocytic skin cancer
NNDSS	National Notifiable Diseases Surveillance System
NPHP	National Public Health Partnership
NPSU	National Perinatal Statistics Unit
NTD	Neural tube defect
OATSIH	Office for Aboriginal and Torres Strait Islander Health

OECD	Organisation for Economic Co-operation and Development
OGIT	Oral glucose tolerance test
Pap	Papanicolaou
PBAC	Pharmaceutical Benefits Advisory Committee
PBS	Pharmaceutical Benefits Scheme
PCP	*Pneumocystis carinii* pneumonia
PCS	Physical component score (of the SF-36)
PEI	Patient episode initiation
PHIAC	Private Health Insurance Advisory Council
PHIIS	Private Health Insurance Incentives Scheme
PSA	Prostate-specific antigen
PSD	Post-traumatic stress disorder
PYLL	Potential years of life lost
RDI	Recommended Dietary Intake
RFE	Reason for encounter
RNA	Ribonucleic acid
RPBS	Repatriation Pharmaceutical Benefits Scheme
RRMA	Rural, Remote and Metropolitan Areas classification
RRV	Ross River virus
SAAP	Supported Accommodation Assistance Program
SBP	Systolic blood pressure
SCRCSSP	Steering Committee for the Review of Commonwealth/State Service Provision
SEIFA	Socio-Economic Indexes for Areas
SF-12	Medical Outcomes Study Short-Form 12
SF-36	Medical Outcomes Study Short-Form 36
SIDS	Sudden infant death syndrome
SIGNAL	Strategic Intergovernmental Nutrition Alliance
SLA	Statistical local area
SMR	Standardised mortality ratio
SSPE	Subacute sclerosing panencephalitis
STD	Sexually transmitted disease
TFR	Total fertility rate

UN	United Nations
UNEP	United Nations Environment Program
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WHR	Waist-to-hip-ratio
YLD	Years lost due to disability
YLL	Years of life lost (due to mortality)

Abbreviations of places

ACT	Australian Capital Territory
Aust	Australia
Can	Canada
Fra	France
Ger	Germany
Jpn	Japan
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
USSR	Former Union of Soviet Socialist Republics
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.

accommodation (of eye): How the eye automatically adjusts so it can focus at various distances, mainly by changing the shape of its lens.

acute: Coming on sharply to a crisis and often brief, intense and severe.

acute hospitals: Public, Department of Veterans' Affairs (repatriation) and private hospitals which provide services primarily to admitted patients with acute or temporary ailments. The average length of stay is relatively short.

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. See Box 5.6, page 271.

affective disorders: Mood disorders such as depression, mania and bipolar affective disorder. (Do not include anxiety disorders, which are classified as a separate group.)

age-specific death rate: See Box 2.6, page 39.

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.

age-standardised death rate: See Box 2.6, page 39.

agoraphobia: Fear of being in public places from which it may be difficult to escape.

Alzheimer's disease: A disease (named after a German physician) in which there is progressive loss of brainpower shown by worsening short-term memory, confusion and disorientation.

ambulatory care: Care provided to hospital patients who are not admitted to the hospital, such as patients of emergency departments and outpatients clinics. The term is also used to refer to care provided to patients of community-based (non-hospital) health care services.

AN-DRGs: See DRGs.

angina: Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs, as in exercise. See also *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.

anxiety disorders: A group of mental disorders marked by excessive feelings of apprehension, worry, nervousness and stress. Includes panic disorder, various phobias, generalised anxiety disorder, obsessive–compulsive disorder and post-traumatic stress disorder.

arrhythmia: A disturbed rhythm of the heart beat—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.

asthma: An inflammatory disease of the air passages that makes them prone to narrow too easily and too much in response to 'triggers', causing episodes of shortness of breath and wheezing or coughing. The triggers include exercise, pollens, the house dust mite, cold weather, throat and chest infections, tobacco smoke and other factors.

atherosclerosis: A process that gradually clogs arteries, through fatty and fibre-like deposits that build up on the inner walls of the arteries.

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.

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.

body mass index (BMI): The most commonly used method of assessing whether a person is normal weight, underweight, overweight or obese. Calculated by dividing the person's weight (in kilograms) by their height (in metres) squared, i.e. $kg \div m^2$. Also known as Quetelet's Index. 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 but less than 30, and obese is 30 and over.

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 food-borne.

cancer: A range of diseases where some of the body's cells 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.

cardiovascular disease: Any disease of the heart or blood vessels, including heart attack, angina, stroke and peripheral vascular disease. Also known as circulatory disease.

capital expenditure: Expenditure on large-scale fixed assets (for example, new buildings and equipment with a useful life extending over a number of years).

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 healthcare resources, so that the activity and cost-efficiency of different hospitals can be compared.

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 9th revision of the International Classification of Diseases. The underlying cause is defined as the disease which initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the violence which produced the fatal injury, rather than to the nature of the injury.

cerebrovascular disease: See *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 conditions.

chronic: Persisting over a long period.

chronic bronchitis: Long-term lung condition with inflammation of the main air passages causing frequent coughing attacks and coughing up of mucus.

chronic obstructive pulmonary disease: A combination of emphysema and chronic bronchitis-related conditions, where damage to the lungs tends to obstruct their oxygen intake.

cohort: A group of individuals being studied who have experienced the same event at a specified period in time, e.g. ‘birth cohort’ refers to people born in the same year.

colonoscopy: A procedure whereby the inside of the large bowel (colon) is viewed using a long flexible tube inserted through the anus.

colorectal cancer: Cancer of the colon (the lower 1.5 to 2 metres of the intestine) or of the rectum (the final 15 cm at the end of the colon, ending with the anus).

co-morbidity: When a person has two or more health problems at the same time.

confidence interval: 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 which are inherited or caused by environmental factors.

coronary heart disease: See *ischaemic heart disease*.

crude death rate: See Box 2.6, page 39.

cryptosporidiosis: A disease usually marked by diarrhoea with cramping abdominal pain and other symptoms, caused by *Cryptosporidiosis parvum*, a protozoan parasite and transmitted directly from person to person, or food-borne.

dementia: A general and worsening loss of 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.

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. Preventable by vaccine.

direct bill: The process by which a medical practitioner or optometrist sends the bill for services direct to Medicare, often referred to as bulk billing.

disability: The presence of one or more of seventeen limitations, restrictions or impairments (see Box 2.7, page 49).

disability-adjusted life year (DALY): Years of healthy life lost through premature death or living with disability due to illness or injury.

DRGs (diagnosis related groups): A widely used type of casemix classification system. In the case of Australian acute hospitals, AN-DRGs (Australian National 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 Box 5.7, page 274. See also *casemix*.

dysthymia: A disorder characterised by constant or constantly recurring chronic depression of mood, lasting at least 2 years.

emphysema: A long-term 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.

encephalitis: Inflammation of the brain.

enterohaemorrhagic* E. coli *infection: A disease marked by diarrhoea that can be mild or severe and bloody, and sometimes also the haemolytic-uraemic syndrome (sudden kidney failure and anaemia in children) and other symptoms. It is caused by some types of *E. coli* bacteria and is usually food-borne.

epidemiology: The study of the patterns and causes of health and disease in populations, and the application of this study to improve health.

expectation of life: See *life expectancy.*

external cause: Environmental event, circumstance and/or condition as the cause of injury, poisoning and/or other adverse effect. Used in disease classification.

foetal death: Birth of a foetus 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.

foetal death rate: Number of foetal deaths per 1,000 total births (foetal deaths plus live births).

freestanding day hospital facility: A private hospital where only minor operations and other procedures not requiring overnight stay are performed, not forming part of any private hospital providing overnight care.

gastroscopy: A procedure whereby the inside of the stomach is viewed using a flexible tube passed down into it via 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.

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.

haemodyalisis/dialysis: Process used to treat kidney failure with a machine that is connected to the patient's bloodstream so it can take on the role of the kidneys by removing excess substances from the blood.

handicap: A disadvantage resulting from impairment or disability that limits or prevents the fulfilment of a role that is normal (see Box 2.7, page 49).

health indicator: See *indicator.*

health outcome: A change in the health of an individual or population due to a preventive or clinical intervention.

health promotion: Activities to improve health and prevent disease.

health status: An individual's or population's overall level of health, taking account of various aspects such as life expectancy, amount of disability, levels of disease risk factors and so forth.

heart attack: Emergency illness 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 cannot pump strongly enough to keep the blood circulating around the body at adequate rate.

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): A bacterial infection of infants and children that can cause meningitis, pneumonia and other serious effects. Preventable by vaccine.

Hodgkin's disease (Hodgkin's lymphoma): A cancer marked by progressive painless enlargement of lymph nodes throughout the body. A form of *lymphoma*. Named after the English physician who described it.

hostels: Establishments providing board, lodging or accommodation for the aged, distressed, or disabled who cannot live independently but who do not need nursing care in a hospital or nursing home. Residents are generally responsible for their own provisions, but may be provided with domestic assistance (meals, laundry, personal care).

hypertensive disease: Occurs when blood pressure is high long term, especially when this leads to damage of the heart, brain or kidneys.

hypomania: A lesser degree of mania characterised by a persistent mild abnormal elevation of mood and increased activity lasting at least 4 days.

immunisation: Inducing immunity against infection by the use of antigen to stimulate the body to produce its own antibodies. See *vaccination*.

impairment: Any loss or abnormality of psychological, physiological or anatomical structure or function.

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

indicator (health indicator): A key statistic that indicates an aspect of population health status, health determinants, interventions, services or outcomes. Indicators are designed to help assess progress and performance, as a guide to decision making. They 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.

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.

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 the auto-immune disorders.

International Classification of Diseases: The World Health Organization's internationally accepted classification of death and disease. The 9th Revision (ICD-9) is currently in use. In this report, causes of death classified before 1979 under previous revisions have been reclassified to ICD-9 by the AIHW.

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.

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. Technically it is the number of years of life remaining to a person at a particular age if death rates do not change.

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 food-borne. It can cause more severe symptoms in newborns, the elderly, people with poor immunity and pregnant women (in whom it can also cause abortion).

low birthweight: Birth of a baby weighing less than 2,500 grams.

lymphoma: A cancer of the lymphatic system, which includes the lymph nodes and the channels linking them. Lymphomas are divided into two broad types, *Hodgkin's disease/ lymphoma* and *non-Hodgkin's lymphoma (NHL)*.

major diagnostic categories (MDCs): A high level of groupings of patients used in the AN-DRG classification.

malignancy: See *cancer.*

mammogram: X-ray of the breast. 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. Preventable by vaccine.

median: The midpoint of a list of observations ranked from the smallest to the largest.

Medicare: A national, government-funded scheme that subsidises the cost of personal medical services, and that covers all Australians to help them afford medical care.

melanoma: A cancer of the body's cells that contain pigment (melanin), mainly affecting the skin.

meningitis: Inflammation of the brain's covering (the meninges), as can occur with some viral or bacterial infections.

mental disorder: A disturbance of mood or thought that can affect behaviour and distress the person or those around them, so the person cannot function normally. Includes anxiety disorders, depression and schizophrenia.

metastasis: The spread of a cancer from its original site to other parts of the body.

morbidity: Refers to ill health in an individual and to levels of ill health in a population or group.

motor neurone disease: A disease of the nervous system with progressive wasting of muscles, weakness and paralysis.

multiple sclerosis: One of the most common nervous system disorders, with varied symptoms such as 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.

myocardial infarction: Term still commonly used to mean a heart attack, but more correctly refers only to those heart attacks which have caused some death of heart muscle.

neonatal death: Death of an infant within 28 days of birth.

neonatal mortality rate: Number of neonatal deaths per 1,000 live births.

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. Includes anxiety disorders, obsessive–compulsive disorder, stress reactions and other problems.

non-Hodgkin's lymphoma: A range of cancers of the lymphatic system (lymph glands and the channels they are linked to) which are not of the Hodgkin's variety.

non-admitted patient: A patient who receives care from a recognised non-admitted patient service/clinic of a hospital.

nursing homes: Establishments which provide long-term care involving regular basic nursing care to chronically ill, frail, disabled or convalescent people or senile inpatients.

obesity: Marked degree of overweight defined as *body mass index* 30 and 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 the hospital, but is not admitted.

ophthalmology: A medical specialty dealing with eye diseases.

Organisation for Economic Co-operation and Development (OECD): An organisation of 24 developed countries, including Australia.

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.)

overweight: Defined as a *body mass index* 25 and over but less than 30. See also *obesity*.

panic disorder: Marked by panic attacks (episodes of intense fear or discomfort) that occur suddenly and unpredictably.

Pap smear: 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 not resulting 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 1 patient-day.

performance indicators: Measures of the efficiency and effectiveness of health services (hospitals, health centres, etc.) in providing health care.

perinatal: Pertaining to or occurring in the period shortly before or (usually 28 days) after birth.

perinatal death: Foetal or neonatal death.

perinatal mortality rate: Number of perinatal deaths per 1,000 total births (foetal deaths plus live births).

peripheral vascular disease: Pain in the legs due to an inadequate blood supply to them.

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. Preventable by vaccine.

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. Different phobias include fear of heights, flying, open spaces, social gatherings, animals such as spiders and snakes, etc.

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. Preventable by vaccine.

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.

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, etc.) present in a population at a given time. Compare with *incidence*.

prevention (of disease): Action to reduce or eliminate the onset, causes, complications or recurrence of disease.

principal diagnosis: The diagnosis describing the problem that was chiefly responsible for the patient's episode of care in hospital.

principal procedure: The most significant procedure that was performed for treatment of the principal diagnosis.

private health insurance: See Box 5.5, page 252.

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 paramedical practitioners. Includes private freestanding day hospital facilities.

private patients: Persons admitted to a private hospital; or persons admitted to a public hospital who decide to choose the doctor(s) who will treat them and to have private ward accommodation. This means they will be charged for medical services, food and accommodation.

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 primarily to the treatment and care of inpatients with psychiatric disorders.

public health: Health activities which aim to benefit a population. Prevention, protection and promotion of health are emphasised, as distinct from treatment tailored to individuals with symptoms. Examples include provision of a clean water supply and good sewerage, conduct of anti-smoking education campaigns and screening for diseases such as cancer of the breast and cervix.

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 who need it.

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 the patient is not charged.

quintile: A group derived by ranking the population according to specified criteria and dividing it into five equal parts.

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.

recurrent expenditure: Expenditure on goods and services which are used up during the year, for example, salaries. It may be contrasted with capital expenditure, such as expenditure on hospital buildings and large-scale diagnostic equipment, the useful life of which extends over a number of years.

refraction: The eye's ability to bend light rays that enter it, to form an image at the back of the eye.

renal dialysis: A treatment for kidney failure where the patient is connected to a machine which does the kidneys' work by filtering the blood to control its contents.

rheumatic heart disease: Disease from damaged heart valves caused by childhood attack of rheumatic fever.

risk factor: Any factor which represents a greater risk of a health disorder or other unwanted condition. Some risk factors are regarded as causes of disease, others are not necessarily so.

rubella (German measles): A contagious viral 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. Preventable by vaccine.

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 food-borne.

same-day patients: Admitted patients who are admitted 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.

separation: The formal process by which a hospital records the completion of treatment and/or care for an admitted patient. See Box 5.6, page 271.

SF-36: Short Form 36—widely used questionnaire to measure general health and wellbeing.

shigellosis: A 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.

sign (clinical): An indication of a disorder that is apparent to a clinician or other observer and not necessarily to the person affected. Compare with *symptom*.

social phobia: A persistent, irrational fear of being the focus of attention, or fear of behaving in a way that will be embarrassing or humiliating.

statistical significance: An indication from a statistical test that the result of a comparison, suggesting a difference or change, may be significant or meaningful 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 twenty times or less.

stillbirth: See *foetal death.*

stroke: When an artery supplying blood to the brain suddenly becomes blocked or bleeds, often causing paralysis of parts of the body or speech problems.

substance use disorders: Result from harmful use and/or dependence on illicit or licit drugs, including alcohol, tobacco and prescription drugs.

suicide: Deliberately ending one's own life.

symptom: Any indication of a disorder that is apparent to the person affected. Compare with *sign*.

tetanus: A serious infection with a bacterial nerve poison causing spasm of the jaw muscles (lockjaw) and body muscles generally, from a bacterium entering through a wound. The disease is preventable by vaccine.

thrombolysis: Emergency 'clot-busting' drug treatment for a heart attack.

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.

tuberculosis: 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.

underweight: Defined as a *body mass index* less than 18.5.

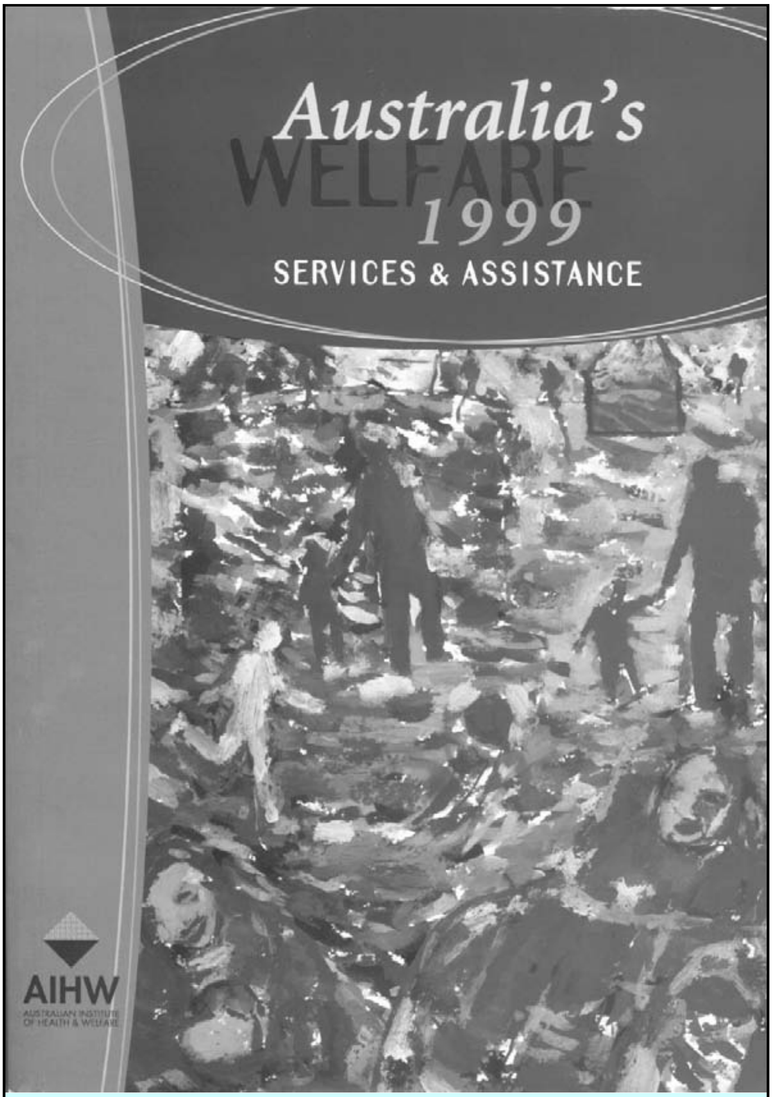
vaccination: The process of administering a vaccine to a person to produce immunity against infection. See *immunisation*.

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 food-borne.

Index

Australia's Health 1999



Australia's Welfare is the most comprehensive and authoritative source of national information on welfare services in Australia.

Topics include welfare services expenditure, children's and family services, child protection, housing assistance, crisis accommodation and support services, aged care services and disability services.

Australia's Welfare 1999 features a special chapter on the interactions between changing work patterns and demand for, and supply of, welfare services. Both formal and informal care services are explored, as well as changes in the nature of the welfare labour force.