Diseases and injury

5

Key points

- Among the broad categories of disease, cancer is the leading cause of disease burden (19% of Australia's total), closely followed by cardiovascular disease (18%), then mental disorders (13%).
- Death rates are falling for many of our leading health concerns: cancer, heart disease, strokes, injury and asthma are examples.
- Heart attack rates are falling and survival from the attacks is improving.
- Survival is improving for cancer overall.
- Asthma has become less common among children and young adults.
- Diabetes is becoming more common—prevalence at least doubling in the past two decades.
- There has been a tripling in new cases of treated end-stage kidney disease in the past 25 years.

Diseases and injury are important components of ill health. They cause much suffering, disability and premature mortality. They also impose significant costs on society in terms of health system use (see chapters 7 and 8), days off work because of illness or to care for people who are ill, and reduced quality of life.

Despite diseases and injuries remaining large problems, the situation is improving on many fronts. For example, death rates continue to fall for cancers, cardiovascular disease, asthma, chronic lung disease and injury. This is partly because of fewer of these problems arising in the first place—or at least arising later in people's lives—and partly because of better survival when they do arise. However, the increase in the number of people with certain diseases—notably diabetes and mental health problems—is cause for concern.

This chapter covers Australia's main health problems, namely those that cause the greatest overall disability, premature death or both. The combined extent of disability and premature death —known as 'disease burden'—caused by the conditions covered in this chapter is around 80% of the total burden of disease (see Box 5.1 and Section 2.6).

Box 5.1: Burden of disease for conditions described in this chapter

Almost 80% of the total burden of disease (see Chapter 2) is covered by the conditions described in this chapter. The largest contributions come from cancers, cardiovascular disease (CVD) and mental disorders. These figures do not include chronic kidney disease, which was not identified separately in the burden of disease study, although some of its burden is included with diabetes.

The conditions vary in whether the burden is mainly because of premature death or years lived with disability or illness. Cancers, CVD and injury have over 70% of their burden coming from premature death; and asthma, musculoskeletal disease, mental disorders and oral health problems have more than 90% of their burden coming from the disability/illness component.

Burden of diseases for conditions in this chapter, 2003

Broad cause group	Specific categories	Proportion of burden (per cent)	Fatal component[a] (per cent)
Cancers		19.4	82
Cardiovascular disease		18.0	78
Diabetes		5.5	22
Chronic kidney disease[b]		n.a.	n.a.
Chronic respiratory disease	Chronic obstructive pulmonary disease (COPD)	3.3	54
	Asthma	2.4	6
Musculoskeletal disease		4.0	7
Neurological and sense disorders	Dementia	3.6	26
Mental disorders		13.3	7
Oral health problems		0.9	0
Injury		7.0	76
Infectious diseases		1.7	69
Total in this chapter		*79.1*	
All diseases		**100.0**	

(a) Proportion of burden due to premature death, with the remainder being due to years lived with disability.

(b) Chronic kidney disease is not quantified separately in the Burden of Disease study.

Source: Begg et al. 2007.

5.1 Cancer

Cancer is a diverse group of diseases in which some of the body's cells become defective, begin to multiply out of control, can invade and damage the tissue around them, and can also spread (metastasise) to other parts of the body to cause further damage. Cancer was the leading cause of the total burden of disease and injury in Australia in 2003, with four-fifths of this burden due to premature death. However, over the last decade, improvements in early detection and treatment have resulted in improved survival and a clear decline in mortality for most cancers, despite the overall cancer incidence rate remaining virtually unchanged.

This section describes current cancer incidence and mortality for all cancers and for National Health Priority Area (NHPA) cancers. The eight NHPA cancers are colorectal cancer, lung cancer, melanoma of the skin, non-melanoma skin cancer, breast cancer in females, cancer of the cervix, prostate cancer and non-Hodgkin lymphoma.

Information on new cases of cancer is collected by state and territory cancer registries, and compiled by the AIHW at the National Cancer Statistics Clearing House (see Box 5.2). Information on screening for cancer is included in Chapter 7.

Box 5.2: Cancer surveillance and monitoring in Australia

Cancer registration, excluding non-melanoma skin 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 from hospitals, pathologists, oncologists, cancer treatment centres and nursing homes.

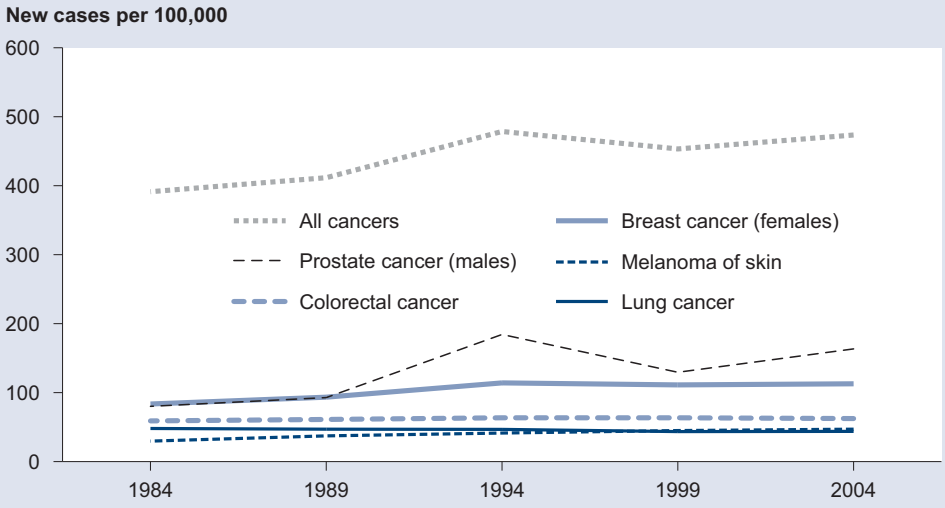
All state and territory cancer registries supply records of all new cases of cancer (since 1982), excluding non-melanoma skin cancer, to the National Cancer Statistics Clearing House (NCSCH). The NCSCH is operated by the AIHW under the supervision of the Australasian Association of Cancer Registries). Both the Australian Institute of Health and Welfare Act and the Australian Government privacy law provide for the protection of confidentiality of records supplied to the NCSCH.

Incidence

The incidence of cancer is the number of new cases in a given period, usually one year. Excluding non-melanoma skin cancer, nearly 100,000 new cases of cancer (54,870 males and 43,466 females) were diagnosed in Australia in 2004. The incidence of 474 cases per 100,000 persons was slightly lower than the rate of 479 a decade earlier, but much higher than the rate of 391 in 1984 (Figure 5.1).

The overall cancer incidence rate was higher among males than females. The imbalance was greatest for mesothelioma, where the male rate was over 6 times as high as the female rate, and for smoking-related cancers such as cancers of the mouth, throat and lung. These excess rates had their origins up to 35 years earlier in the higher exposure of males to asbestos (which causes mesothelioma) and in higher male rates of smoking.

The current situation is that, by the age of 75 years, 1 in 3 Australian males and 1 in 4 females will have been diagnosed with cancer at some stage of their life. The risk by age 85 years increases to 1 in 2 for males and 1 in 3 for females.



Notes

1. Excludes non-melanoma skin cancer.
2. Incidence rates, given as number of new cases per 100,000 persons, were age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Cancer Statistics Clearing House.

Figure 5.1: Trends in incidence, selected cancers, 1984 to 2004 (*NHPC indicator 1.02*)

It is projected that the number of new cases of cancer in 2008 will be around 108,000, a 10% increase on 2004. Most of the projected increase is because of growth in the population aged 60 years and over. In 2004 the average age at diagnosis was 67 years for males and 64 years for females.

Most common cancers

Among males in 2004, prostate cancer was the most common new case of cancer registered, with 15,759 cases diagnosed, a large increase on the 3,886 cases diagnosed in 1984. This increase was largely because of increased use of prostate-specific antigen tests in screening for prostate cancer. Colorectal cancer (7,160 new cases), lung cancer (5,826) and melanoma (5,503) were the next most common cancers diagnosed, apart from non-melanoma skin cancer. Together these four accounted for 62% of all registered cancers in males in 2004.

In 2004, breast cancer (12,126 new cases) was the most commonly registered cancer in females, followed by colorectal cancer (5,817 new cases), melanoma (4,219) and lung cancer (3,270). These four accounted for 59% of all registered cancers in females in 2004.

Non-melanoma skin cancers

Two kinds of non-melanoma skin cancer, namely basal cell carcinoma and squamous cell carcinoma, are not legally notifiable diseases. Therefore national incidence of these cancers must be estimated from periodic national household surveys (NCCI 2003). Based on the most recent survey (in 2002) there are projected to be around 433,000 new cases of non-melanoma skin cancer in 2008, of which 295,000 will be basal cell carcinoma and 138,000 squamous cell carcinoma.

Relative survival

Crude survival from cancer measures the time between diagnosis and death. A more meaningful measure is relative survival, as this adjusts crude survival for expected survival in the general population, taking into account deaths from other causes.

The standard measure for cancer is 5-year relative survival. For cancers as a whole, this improved markedly from 41% for males diagnosed in 1982–1986 to 58% for those diagnosed in 1998–2004 (Table 5.1). There was a similar improvement for females diagnosed in these periods—from 53% to 64%.

These gains have largely been attributed by The Cancer Council Australia to better diagnostic tools, earlier detection and improvements in treatment. But the gains have not been consistent across all types of cancer. For example, brain cancer has poor survival, and its 5-year relative survival has fallen slightly over the 20 years to 2004 from 21% to 19% for males and from 20% to 19% for females. In contrast, early detection through the BreastScreen Australia screening program and improvements in treatment have contributed to 5-year relative survival for breast cancer in females improving from 72% for those diagnosed in 1982–1986 to 88% for those diagnosed in 1998–2004.

There has also been success with the National Cervical Screening Program. It has achieved improvements in early detection and treatment of pre-cancerous abnormalities, thereby considerably reducing both incidence and subsequently mortality since the early 1990s. Despite this preventive success, once cervical cancer has been diagnosed its 5-year relative survival has remained at around 70% for the past two decades.

Table 5.1: Trends in 5-year relative survival for selected cancers, diagnoses from 1982–1986 to 1998–2004 (*NHPC indicator 3.09*) (per cent)

Cancer site	1982–1986	1987–1991	1992–1997	1998–2004
Males				
All cancers	41.3	45.9	54.8	58.4
Stomach	16.2	18.9	20.5	24.4
Colorectal	47.7	52.0	56.8	61.3
Lung	7.9	9.1	9.7	10.7
Melanoma	82.2	86.3	89.3	89.7
Prostate	57.4	63.2	81.7	85.3
Testis	90.8	95.0	95.3	96.8
Kidney	45.2	49.8	58.6	65.6
Brain	20.8	19.7	18.7	18.5
Thyroid	79.1	78.3	85.3	87.7
Hodgkin lymphoma	72.0	76.8	81.5	84.8
Non-Hodgkin lymphoma	46.3	48.2	52.3	61.6
Leukaemia	37.9	42.6	43.0	48.2

(continued)

Table 5.1 (continued): Trends in 5-year relative survival for selected cancers, diagnoses from 1982–1986 to 1998–2004 (*NHPC indicator 3.09*) (per cent)

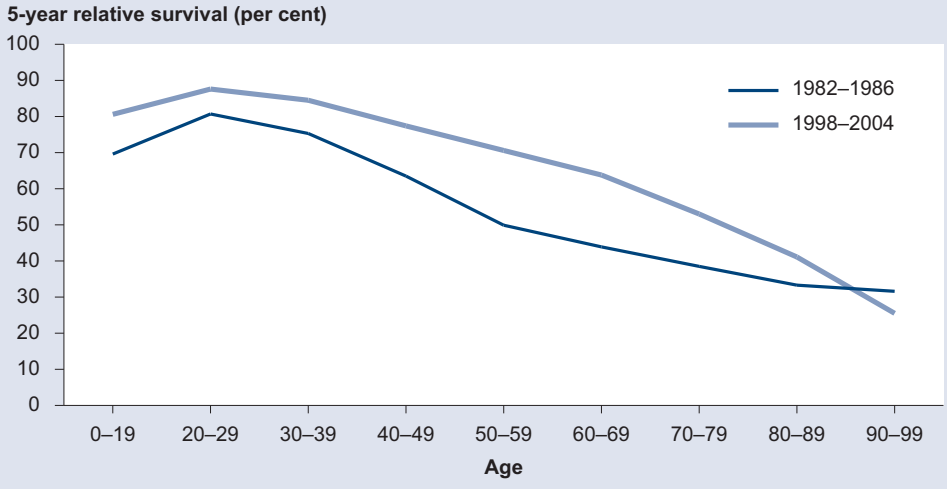
Cancer site	1982–1986	1987–1991	1992–1997	1998–2004
Females				
All cancers	53.2	57.1	60.8	64.1
Stomach	18.2	18.9	22.3	25.3
Colorectal	49.7	53.2	57.4	62.4
Lung	10.5	10.8	12.6	14.0
Melanoma	90.5	92.8	93.9	94.1
Breast	71.8	77.5	83.7	87.8
Body of uterus	75.6	78.0	80.2	82.1
Cervix	68.3	71.2	73.6	71.8
Ovary	32.7	35.7	37.9	39.8
Kidney	48.8	52.5	58.7	66.0
Brain	19.9	20.4	18.3	19.4
Thyroid	85.3	89.9	94.3	95.3
Hodgkin lymphoma	71.3	77.5	83.6	85.8
Non-Hodgkin lymphoma	47.6	52.4	54.0	62.6
Leukaemia	37.2	42.9	42.8	47.3

Note: Relative survival calculated using the methodology of Dickman (2004).

Source: AIHW National Cancer Statistics Clearing House.

Five-year relative survival for persons diagnosed with cancer in 1998–2004 was highest for those aged 20–29 years, at 88%, and next highest for those aged 30–39 years, at 85% (Figure 5.2). It then declined steadily with age to 26% for those aged 90–99 years.

The greatest gains in survival for persons diagnosed in 1998–2004, compared with those diagnosed in 1982–1986, were in the 50–59 year age group, from 50% to 71%, and in the 60–69 year age group, from 44% to 64%.



Source: AIHW National Cancer Statistics Clearing House.

Figure 5.2: Age-specific all-cancer 5-year relative survival for people diagnosed in 1982–1986 and 1998–2004

Mortality

Cancer is a major cause of death, accounting for 30% of all deaths in 2005. From the perspective of total numbers, the falling death rate from cancer is being offset by increased population growth in the 65 years and over age group, as this group has the highest rates of cancer incidence and mortality.

In 2005 there were 38,838 deaths from cancer (Table 5.2). Of these, 21,860 were of males (33% of all male deaths) and 16,978 were of females (27% of all female deaths). The average age at death was 72 years in both males and females. It is projected that there will be around 41,000 deaths from cancer in 2008.

The age-standardised death rate for cancers overall fell from 212 per 100,000 persons in 1984 to 182 in 2005—a 14% fall over two decades. Among the NHPA cancers, the fall in death rates since 1984 has been highest for cervical cancer, where substantial decreases in the number of females developing the disease has been achieved through the use of Pap smears to detect pre-cancerous abnormalities that can then be treated before they develop into cancer. The death rates have also fallen for breast, lung and colorectal cancers.

Table 5.2: Trends in mortality, selected cancers, 1984 to 2005 (*NHPC indicator 1.08*)

	Year					
Type of cancer	**1984**	**1989**	**1994**	**1999**	**2004**	**2005**
			Number of deaths			
All cancers	26,645	30,555	34,134	35,575	38,489	38,838
NHPA cancers						
Lung cancer[a]	5,555	6,308	6,734	6,771	7,259	7,399
Colorectal cancer	3,738	4,127	4,587	4,527	4,068	4,113
Prostate cancer (males)	1,441	2,025	2,613	2,513	2,792	2,946
Breast cancer (females)	2,166	2,449	2,669	2,512	2,664	2,719
Non-Hodgkin lymphoma	803	1,122	1,414	1,503	1,468	1,390
Melanoma of skin	640	782	897	1,005	1,200	1,273
Non-melanoma skin cancer	228	285	358	383	360	405
Cervical cancer (females)	339	369	341	226	210	216
			Death rate[b]			
All cancers	212.3	214.4	212.6	194.2	184.6	181.6
NHPA cancers						
Lung cancer[a]	42.6	42.9	41.2	36.8	34.9	34.7
Colorectal cancer	30.5	29.5	28.7	24.8	19.5	19.2
Prostate cancer (males)	33.3	39.6	43.6	35.2	33.0	33.6
Breast cancer (females)	31.6	31.6	30.8	25.5	23.8	23.7
Non-Hodgkin lymphoma	6.2	7.8	8.8	8.2	7.1	6.5
Melanoma of skin	4.8	5.4	5.5	5.5	5.8	6.0
Non-melanoma skin cancer	2.0	2.1	2.3	2.1	1.7	1.9
Cervical cancer (females)	4.9	4.7	3.9	2.3	1.9	1.9

(a) Includes trachea, bronchus and lung cancer.

(b) Death rates, given as number of deaths per 100,000 persons, were age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

The current risk of dying from a cancer before the age of 75 years is 1 in 8 for males and 1 in 11 for females. The risk of dying from cancer before the age of 85 years is double these proportions: 1 in 4 for males and 1 in 6 for females.

Burden of disease

Cancer was the leading cause of the total burden of disease and injury in Australia in 2003. It accounted for 19% of the total burden, compared with 18% for cardiovascular disease. Four fifths (82%) of the cancer burden was due to premature death and the remainder to the non-fatal burden of years of life lost due to disability (YLD). (See Section 2.6 about the burden of disease generally.)

Males accounted for 53% of the cancer burden and females 47%. Among males in 2003, the cancers with the highest burden, measured by disability-adjusted life years (DALYs), were lung cancer (55,028 DALYs), prostate cancer (36,547), colorectal cancer (34,643) and melanoma (13,734). Among females the highest burden was due to breast cancer (60,520 DALYs), lung cancer (33,876), and colorectal cancer (28,962).

Since the 1990s, cancer has replaced cardiovascular disease as the greatest cause of years of life lost (YLL), or fatal burden. Among males in 2003, the cancers most responsible for fatal burden were lung cancer (51,505 YLL), colorectal cancer (27,997), prostate cancer (23,175), pancreatic cancer (11,136), brain cancer (10,718), lymphoma (10,474), melanoma (10,108) and leukaemia (10,039). Among females the cancers with the highest fatal burden were breast cancer (40,080 YLL), lung cancer (31,551), colorectal cancer (23,735), pancreatic cancer (10,984), ovarian cancer (10,946), lymphoma (8,324), brain cancer (7,809) and leukaemia (7,468).

Cancer has a lower contribution to non-fatal burden than other major diseases and injury. In males the cancer with the highest non-fatal burden in 2003 was prostate cancer with 13,372 YLD, and in females it was breast cancer with 20,440 YLD.

Cancer in Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islander peoples are under-represented in cancer incidence reporting because Indigenous status is not yet included in pathology forms, and the extent to which Aboriginal and Torres Strait Islander cancer patients are identified in hospital statistics varies around Australia.

Nevertheless, just over 3,000 new cases of cancer in Aboriginal and Torres Strait Islander peoples were notified to state and territory cancer registries from 2000 to 2004. In contrast to the non-Indigenous population, more new cases of cancer were reported in females (1,598) than in males (1,485). The most common cancers diagnosed in Indigenous males in 2000–2004 were cancer of the lung, bronchus and trachea (288 cases reported), prostate cancer (145), colorectal cancer (141), cancer of unknown primary site (95), and lymphomas (71). The most common cancers diagnosed in Indigenous females were breast cancer (392 cases reported), cancer of the lung, bronchus and trachea (186), colorectal cancer (142), cancer of the cervix (110) and cancer of unknown primary site (102).

When the age-standardised incidence rate of these cancers among Indigenous Australians was compared with that of their non-Indigenous counterparts, even with the under-reporting it was higher in both males and females for lung cancer and cancer of unknown primary site and more than double the rate for cervical cancer. High lung cancer incidence is caused by high rates of smoking earlier in life, and high cervical cancer incidence is

preventable by early detection in Pap test screening. High incidence of cancer of unknown primary site is likely to be associated with late diagnosis.

The most common causes of cancer death registered in Indigenous males in 2000–2004 were cancer of the lung, bronchus and trachea, cancer of unknown primary site, cancer of the oesophagus, colorectal cancer and liver cancer. For Indigenous females, the most common causes of cancer death were cancer of the lung, bronchus and trachea, breast cancer, cancer of unknown primary site, cancer of the cervix and colorectal cancer.

5.2 Cardiovascular disease

The term 'cardiovascular disease' (CVD) covers all diseases and conditions of the heart and blood vessels (see Box 5.3). Closely behind cancer, CVD is Australia's second leading cause of disease burden, mainly because of the deaths it causes. Over the past few decades, Australia has made impressive gains in fighting CVD, with its death rates falling dramatically to levels below those of 100 years ago. Despite these great advances, among the broad groupings of disease CVD is still Australia's biggest killer, now mostly because of the deaths it causes among older people.

Coronary heart disease, stroke, heart failure and peripheral vascular disease are the major contributors to the cardiovascular disease burden in Australia. Congenital heart and vascular diseases constitute one of the leading causes of death in the first year of life. Rheumatic fever and chronic rheumatic heart disease are a significant problem among Aboriginal and Torres Strait Islander peoples.

Box 5.3: Cardiovascular disease definition and estimates

The definition of 'cardiovascular diseases' differs between organisations. In this report, as in other material prepared by the AIHW, the terms 'cardiovascular disease', 'circulatory disease' and 'heart, stroke and vascular diseases' are used interchangeably to convey the same meaning. The ABS has used the term 'heart, stroke and vascular diseases' to represent a subgroup of 'diseases of the circulatory system' (ABS 2006a).

In addition, the figures on prevalence of cardiovascular conditions shown in this section are based on data on long-term conditions collected in the ABS National Health Survey but the method used here to analyse the data is different from that used by the ABS. Hence the data presented in this section differ from those presented by the ABS, and from those in *Australia's health 2006*.

The main underlying causal mechanism in CVD is plaque formation, a process marked by abnormal build-ups of fat, cholesterol and other substances in the inner lining of the arteries. It is most serious when it leads to a reduced or blocked blood supply to the heart (causing angina or heart attack) or to the brain (causing a stroke).

The major preventable risk factors for CVD are tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition and diabetes. Atrial fibrillation, transient ischaemic attack and a high intake of alcohol also increase the risk of stroke.

This section provides a brief statistical profile of CVD, followed by sections on coronary heart disease, stroke, heart failure and rheumatic heart disease. Information is also presented on health services use and CVD in Indigenous Australians.

All cardiovascular disease

CVD accounted for 46,134 deaths (35% of all deaths in Australia) in 2005. It is also one of the leading causes of disability, with around 1.4 million Australians (6.9% of the population) estimated to have disability associated with cardiovascular conditions. In the 2004–05 National Health Survey, about 19% of those surveyed reported one or more long-term diseases of the circulatory system, corresponding to 3.7 million Australians. The prevalence of CVD was significantly higher in females (55%) than in males (45%). Comparing males and females after adjusting for differences in age structure, females were 10% more likely to have CVD (19,449 females per 100,000 versus 17,439 for males).

Combining both the burden from premature death and the extent of its disability, CVD was estimated to account for 18% of the overall disease burden in Australia in 2003, with coronary heart disease and stroke contributing over four-fifths of this burden (Begg et al. 2007). Most of the cardiovascular burden was due to years of life lost (YLL) to premature death and they represented 29% of total YLL for Australia in 2003. Years of 'healthy' life lost due to poor health or disability (YLD) arising from CVD accounted for 8% of Australia's total YLD in 2003. The cardiovascular burden increases markedly with age, particularly from 60 years onwards.

CVD is the most expensive disease group in terms of direct health-care expenditure, at $5.9 billion, which is 11.2% of the health system's expenditure in 2004–05 that can be reliably attributed to various diseases.

Coronary heart disease

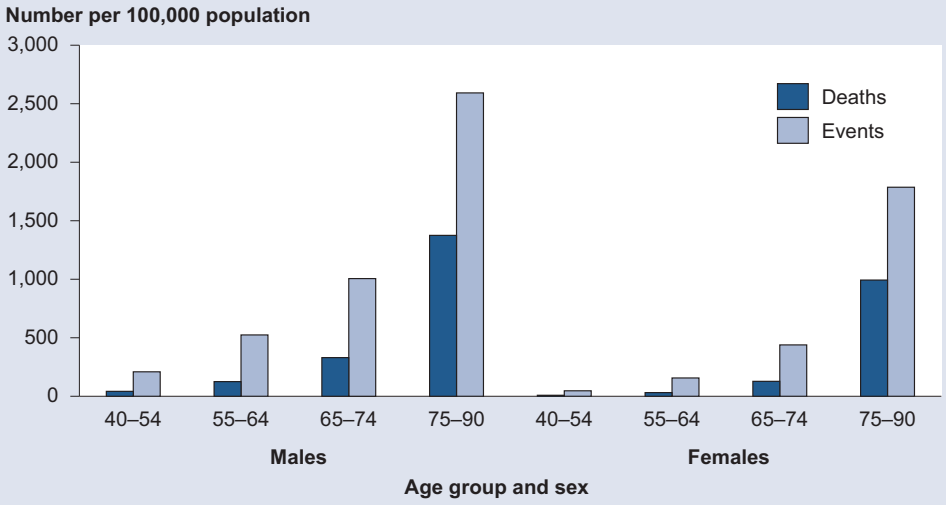
Coronary heart disease (CHD), also known as ischaemic heart disease, is the most common form of heart disease. There are two major clinical forms—heart attack (often known as acute myocardial infarction or AMI) and angina. A heart attack is a life-threatening event that occurs when a blood vessel supplying the heart itself is suddenly blocked completely, threatening to damage the heart and its functions. The blockage is due to a blood clot that forms when a plaque breaks open. Angina is a chronic condition in which short episodes of chest pain can occur periodically when the heart has a temporary deficiency in its blood supply. Episodes occur when one of the heart's arteries is already significantly narrowed by plaque and cannot meet an extra demand for blood flow, such as with exercise or strong emotion.

In 2003, CHD was the leading specific cause of disease burden overall for males (11% of overall burden in males) and the second leading specific cause for females (9% of overall burden in females) (Begg et al. 2007). Over 80% of the CHD burden was due to premature death.

From the 2004–05 National Health Survey, about 3.2% of Australians have CHD, corresponding to around 637,900 people. Among those with CHD, around 359,500 had angina and 354,700 people had had a heart attack (note that a person may report more than one disease). The prevalence of angina was higher among males than females, at 2.2% and 1.4% respectively. For a history of heart attack, the difference between males and females was greater still, with prevalences of 2.6% and 1.0% respectively. These differences remained after adjusting for differences in age structure, with males 1.8 times as likely as females to report angina (2,315 per 100,000 versus 1,319), and 3 times as likely to report heart attack (2,729 per 100,000 versus 905).

The prevalence of CHD increases markedly with age. Based on self-reported information in the NHS, around 7.5% of Australians aged 55–64 years have CHD, increasing to 20.3% among those aged 75 years and over.

The incidence of 'major coronary events' has been estimated from CHD deaths and non-fatal AMI hospitalisations (Jamrozik et al. 2001). Using this method, about 47,730 such events are estimated to have occurred in Australia in 2005 among those aged 40–90 years—about 130 per day. Around 40% of these events (19,430 cases) were fatal. The incidence rate for CHD events was higher among males than females at every age. This difference decreased with age: the ratio of the male to female rate was 4.9 for ages 40–54 compared with 1.4 for those aged 75–90 years. Both male and female incidence rates increased with age (Figure 5.3). The age-standardised incidence of major coronary events fell from 719 per 100,000 in 1996 to 511 in 2005.



Sources: AIHW National Hospital Morbidity Database; AIHW National Mortality Database.

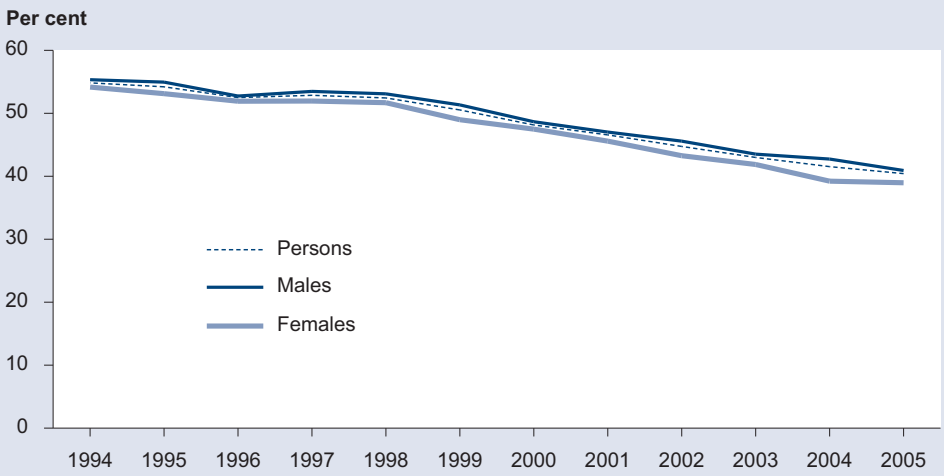
Figure 5.3: Major CHD events and CHD mortality, ages 40–90 years, 2005 (*NHPC indicators 1.01 and 1.08*)

CHD is a major cause of disability in Australia. In the 2003 Survey of Disability, Ageing and Carers, 1.5% of respondents reported one or more disabling conditions associated with CHD, corresponding to about 303,500 Australians. Of these, almost half (49%) needed help or had difficulties with self-care, mobility or communication.

CHD is the largest single cause of death in Australia, accounting for 23,570 deaths (18% of all deaths) in 2005. The number of CHD deaths increases greatly with age: 74% of all CHD deaths occur among those aged 75 years and over, and around 5% occur among those aged under 55 years. The male CHD death rate in 2005 was almost twice as high as the female rate (Figure 5.3). The proportion of people aged 40–90 years dying after a major coronary event (age-standardised case fatality rate) fell from 53% in 1996 to 40% in 2005 (Figure 5.4).

CHD death rates have fallen rapidly since the 1970s (Figure 5.5). In the latest decade alone (1996–2005), the age-standardised CHD death rate declined by 43% in males and 41% in females. These declines are due to both a reduction in heart attacks and better survival.

Australia's CHD death rates compare favourably with those of countries such as Slovakia, Hungary, Czech Republic, Finland, New Zealand and the United States, but they are still 1.5–3 times as high as in Spain, Portugal, France, Korea and Japan (OECD 2007).



Note: Age-standardised to the distribution of fatal and non-fatal events in 2001. This method differs to that used previously in AIHW: Mathur 2002 and NHPC 2004.

Sources: AIHW National Hospital Morbidity Database; AIHW National Mortality Database.

Figure 5.4: Proportion of people aged 40–90 years dying after major CHD events, 1996–2005 (*NHPC indicator 3.08*)

Cerebrovascular disease

Cerebrovascular disease refers to any disorder of the blood vessels supplying the brain and its covering membranes. Most cases of cerebrovascular death are due to stroke. Stroke occurs when a blood vessel to the brain is suddenly blocked or bleeds. This may result in part of the brain dying because of the lack of blood, leading to a loss of brain function or impairment in a range of activities including movement, thinking and communication. Blockage is the most common cause of stroke. There can also be temporary strokes (where symptoms disappear within 24 hours), known as transient ischaemic attacks.

(Note that this section uses the terms 'cerebrovascular disease' (ICD-10 codes I60–I69) and 'stroke' (ICD-10 codes I60–I64) in their strict meanings as explained above. However, sometimes other reports have used 'stroke' to mean 'cerebrovascular disease', as shorthand. Thus, the figures presented here may not be comparable to those shown elsewhere.)

Cerebrovascular disease was the fifth leading specific cause of disease burden overall for males (4% of overall burden in males) and the third leading cause for females (5% of overall burden in females) in 2003 (Begg et al. 2007). More than 70% of the cerebrovascular disease burden was due to premature death.

An estimated 40,000 to 48,000 stroke events occur in Australia every year—about one every 12 minutes. Most of these (70%) are first-ever strokes (AIHW 2004). Based on the 2003 Survey of Disability, Ageing and Carers (SDAC), 346,700 Australians in 2003 had had a stroke at some time in their lives. Of those who reported having had a stroke, 4 out of 5 were aged 60 years or over. More females than males report having had a stroke, but the age-standardised incidence is higher among males as they tend to have the stroke at a younger age.

Stroke is a significant cause of disability. From the SDAC, about 282,600 persons had a disability in 2003 along with a history of stroke, representing 7% of all people with disability. In about half of these cases, the disability was mainly attributed to the stroke.

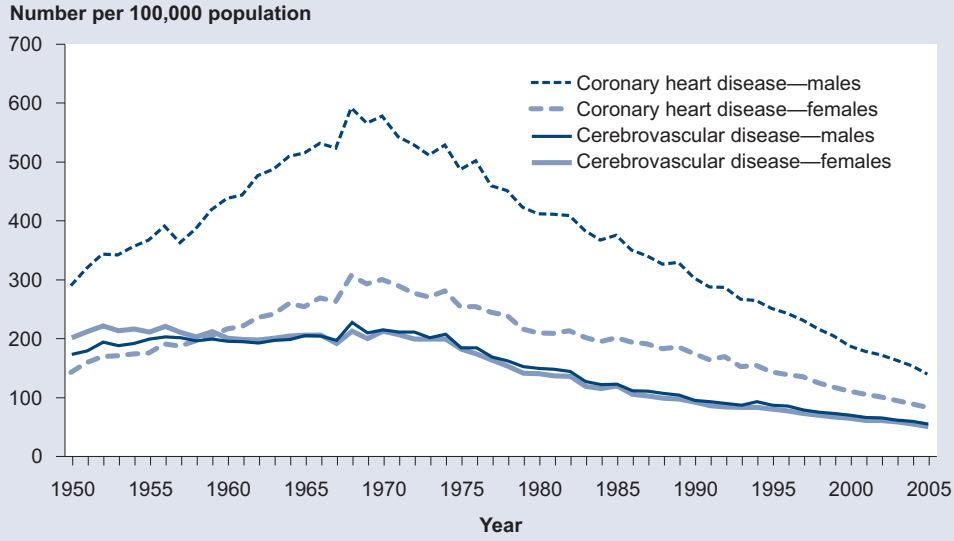
Stroke survivors with disability were much more likely to have a profound core activity limitation than the average person with disability. This means that the person is unable to achieve, or always needs help with, communication, mobility or self–care.

Most stroke survivors live at home, including those with disability. About half of this latter group needed assistance with health care, household chores, home maintenance, mobility and transport; and around one-quarter needed help with self-care, cognitive and emotional tasks, meal preparation and paperwork. The vast majority of people with stroke had a carer and informal carers provided most of the assistance with activities for those not in institutions (AIHW: Senes 2006).

Cerebrovascular disease accounted for 11,513 deaths (9% of all deaths) in 2005. Most of these deaths (83%) occurred among those aged 75 years or over. More females than males (6,845 compared with 4,668) died of cerebrovascular disease. However, the age-standardised death rate was slightly higher among males, reflecting the higher death rates for males in most age groups except the very oldest.

Australia's mortality from cerebrovascular disease has been declining in recent decades. There was no downward trend in the death rates between 1950 and 1975. However, since the mid-1970s, consistent declines have been noted for both males and females. Age-standardised death rates for cerebrovascular disease fell by 37% (males) and 35% (females) over the period 1996–2005 (Figure 5.5).

Stroke death rates in Australia are low compared with other OECD countries such as Hungary, Portugal, Czech Republic and Korea; but they are 1.4 times as high as in Switzerland, which had the lowest rates overall (OECD 2007).



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 5.5: Death rates for coronary heart disease and cerebrovascular disease, 1950 to 2005 (*NHPC indicator 1.08*)

Heart failure

Heart failure occurs when the heart functions less effectively in pumping blood around the body. It can result from a variety of diseases and conditions that impair or overload the heart, notably heart attack, high blood pressure or a damaged heart valve. People with mild heart failure may have few symptoms, but in more severe cases it can result in chronic tiredness, reduced capacity for physical activity, and shortness of breath.

Based on 2004–05 National Health Survey self-reports, 263,000 Australians (1.3% of the population) had heart failure or oedema (swelling, which can be a sign of heart failure when it occurs in the lower legs). More than two-thirds of these were females. The prevalence of heart failure or oedema increases with age from 2.5% in people aged 55–64 to 8.2% in those aged 75 years and over.

There are no national data on the incidence of heart failure in Australia. However, applying overseas findings to the Australian population, it has been estimated that around 30,000 new cases are diagnosed each year in Australia (AIHW: Field 2003).

Heart failure accounted for 2,225 deaths in 2005, with 91% of these occurring among people aged 75 years and over. Because females live longer, more females than males (1,390 compared with 835) died of heart failure. The condition is more likely to be listed as an associated cause of death than as the underlying cause—it was mentioned as an associated cause of death in 14,466 cases in 2005. (See Section 2.5 for more information about underlying and associated causes of death.) Heart failure occurs frequently as an associated cause when the underlying cause of death is kidney failure, CHD, diabetes or chronic lower respiratory disease.

In recent years there has been a major decline in mortality from heart failure in Australia. Age-standardised death rates for heart failure as an underlying or associated cause of death fell by 29% for both males and females between 1997 and 2003 (Najafi et al. 2006). It is not clear whether this trend reflects a fall in the incidence of heart failure as a result of reduced incidence of CHD or improved care of people with CHD, or better management of people with heart failure and reduced case fatality.

Acute rheumatic fever and chronic rheumatic heart disease

Both acute rheumatic fever and rheumatic heart disease are preventable causes of ill health and death. They are a major problem in the Indigenous Australian population of northern and central Australia. In contrast, they are very rare in other Australians. Acute rheumatic fever is a delayed complication of untreated throat infection with Group A streptococcus bacteria, but may also follow streptococcal skin sores. The infection and illness occur mainly in children and young adults. Rheumatic heart disease is caused by the long-term damage done to the heart muscle or heart valves by acute rheumatic fever (AIHW: Field 2004).

Acute rheumatic fever is believed to be under-reported, partly because it is difficult to diagnose. Therefore the reported incidence of the disease is likely to underestimate the true incidence (AIHW: Field 2004). Between 2002 and 2006 there were 350 new registrations of people with acute rheumatic fever in the Top End of the Northern Territory and in Central Australia—all registrations in Central Australia and 98% in the Top End were of Indigenous Australians. The incidence of acute rheumatic fever among Indigenous Australians was 1.1 per 1,000 in the Top End and 1.4 per 1,000 in Central Australia. The peak age of incidence is 5–14 years and 55% of cases occurred in this age group in 2002–2006 (AIHW: Penm 2008).

By the end of 2006, there were 1,053 people with chronic rheumatic heart disease registered in the Top End of the Northern Territory and 349 in Central Australia. Almost all of these (91% and 94%, respectively) were Indigenous Australians. Overall, about 65% of Indigenous cases were females and around 60% were aged 15–44 years. After adjusting for differences in age structure of both populations, the prevalence rate of rheumatic heart disease among Indigenous Australians was 35 and 30 times that of other Australians in the Top End of the Northern Territory and in Central Australia, respectively.

In 2005, there were 284 deaths with acute rheumatic fever and rheumatic heart disease recorded as the main cause of death. They were mentioned as an associated cause of death in another 418 death certificates. As would be expected, the death rates for Indigenous Australian males and females because of rheumatic heart disease are far higher than for other Australians—15 and 23 times as high, respectively, over the period 2002–2005 (AIHW: Penm 2008).

Health service use

The treatment and care of people with cardiovascular disease (CVD) covers a variety of settings and phases of care. This section presents data on care provided by general practitioners (GPs), on hospitalisations and on use of medicines.

GP visits

According to the BEACH survey of general practice, cardiovascular conditions are one of the problems most commonly treated by GPs, accounting for 12% of all problems they managed in 2005–06 (Britt et al. 2007). Overall, GPs managed cardiovascular problems at a rate of 16.9 per 100 encounters with their patients.

High blood pressure was the most commonly treated cardiovascular problem, at a rate of 9.4 per 100 encounters, accounting for over half of all cardiovascular problems managed. Lipid disorders (abnormal blood levels of cholesterol or related substances) were managed at a rate of 3.4 per 100 encounters. The management rates of high blood pressure and lipid disorders increased significantly between 1999–00 and 2005–06. Other relatively common cardiovascular problems managed by GPs in 2005–06 were CHD, heart check-ups and the heart rhythm problems of atrial fibrillation or flutter.

For problems that are chronic in nature, these were among the 20 most frequently managed in general practice overall—high blood pressure (18.5% of all chronic problems), lipid disorders (6.7%), CHD (2.5%), atrial fibrillation or flutter (1.8%) and heart failure (1.2%).

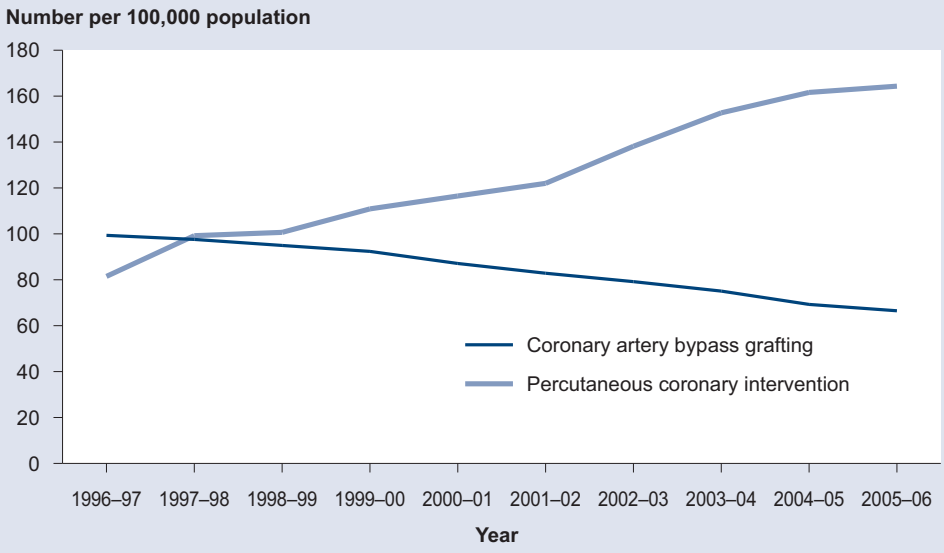
Hospitalisations

CVD was the principal diagnosis for 458,615 hospitalisations (6% of all hospitalisations) in 2005–06. Of these, 35% were due to CHD, 9% to heart failure, 9% to cerebrovascular disease, 6% to peripheral vascular disease and 0.5% to acute rheumatic fever and chronic rheumatic heart disease.

Among those aged 45 years and over, CVD hospitalisation rates for males in 2005–06 were almost twice as high as those for females. The number of hospitalisations for CVD increases rapidly with age, with those aged 55 years and over accounting for 78% of CVD hospitalisations.

The number of hospital procedures to diagnose and treat people with CVD has continued to increase. Prominent among these are coronary angiography, percutaneous coronary interventions (PCI) and coronary artery bypass grafting (CABG). Over the period 1996–97

to 2005–06, there was a doubling in the use of PCI, the term which describes coronary angioplasty and coronary stenting. In contrast, the rate of CABG procedures declined by 33% (Figure 5.6). However, both PCI and CABG are used to remove artery blockages and their combined rate continued to increase over the period.



Note: Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Hospital Morbidity Database.

Figure 5.6: Trends in cardiovascular procedures, 1996–97 to 2005–06

Use of medicines

Most people need medicines to treat their cardiovascular conditions—65% of people who reported a cardiovascular condition in 2004–05 also reported using medicines for it (ABS 2006a). The rate of GP prescriptions for cholesterol-lowering agents, certain blood-pressure-lowering medicines and clot-preventing medicines increased between 2000 and 2006 (AIHW: Senes & Penm 2007). In 2005–06 there were 67 million government-subsidised prescriptions dispensed for medicines used to prevent or treat CVD (37% of all subsidised prescriptions). Seven cardiovascular medicines were in the ten most commonly used medicines in Australia overall in 2005–06.

These figures reflect both the large numbers of Australians at risk of or with CVD and the chronic nature of the disease: once people start on these medicines, they usually need to use them for life to gain the benefits. However, many people stop taking medicines—10–25% had discontinued their medicines at 6 months from the start of therapy, rising to 21–47% at 24 months (AIHW: Senes & Penm 2007). Reasons for this may include cost, medicine side effects, treating conditions with no symptoms, patients not understanding their condition or the benefits of treatment, and complexity of therapy.

People living in metropolitan areas were dispensed cardiovascular medicines at twice the rate of those in rural areas, and 29–58 times the rate of those in remote areas. This is despite higher death rates from CVD in rural and remote areas compared with Major Cities. These great disparities in supply may relate to problems accessing medical services and medicines in rural and remote areas.

Cardiovascular disease in Indigenous Australians

Aboriginal and Torres Strait Islander peoples develop CVD and die from it at much higher rates than non-Indigenous Australians (AIHW: Penm 2008). The high prevalence of tobacco smoking, overweight and obesity, poor nutrition and diabetes among Indigenous Australians increases their risk of CVD. The presence of multiple cardiovascular risk factors is also very common in adult Indigenous Australians, with 53% of those surveyed in the 2004–05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) reporting three or four risk factors (AIHW: Penm 2008). Indigenous Australians are also likely to experience other factors recognised as important contributors to the development of CVD. These include environmental and socioeconomic risk factors, such as poor housing, low income and poverty; and psychosocial stressors, such as the death of a family member or close friend, serious illness or disability and inability to get a job (ABS & AIHW 2005; Bunker et al. 2003; Marmot 2005; van Holst Pellekaan & Clague 2005).

Based on NATSIHS self-reports, 12% of Indigenous Australians had a long-term circulatory condition. Comparing the Indigenous and non-Indigenous populations after adjusting for differences in their age structure, Indigenous Australians were twice as likely to have CHD and 1.6–1.7 times as likely to have cerebrovascular disease, heart failure or hypertension (Table 5.3). Furthermore, the pattern of CVD prevalence among Indigenous Australians was equivalent to that of non-Indigenous Australians who were 10 years older (AIHW: Penm 2008).

Table 5.3: Prevalence of major cardiovascular diseases as long-term conditions in Aboriginal and Torres Strait Islander peoples, 2004–05

Disease	Per cent of Indigenous population	Number of people affected	Indigenous to non-Indigenous rate ratio[(a)]
Coronary heart disease	1.2	5,800	2.1
Cerebrovascular disease	0.3	1,300	1.7
Heart failure	1.0	4,500	1.7
Hypertension	7.0	33,600	1.6
Rheumatic fever and rheumatic heart disease	0.7	3,500	. .
Total cardiovascular disease	**12.0**	**55,900**	**1.3**

(a) Standardised prevalence ratio; that is, the ratio of the observed number of cases to the number of cases expected if Indigenous Australians had the same age- and sex-specific prevalence rates as non-Indigenous Australians.

Note: Based on self-reported information collected in the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Source: AIHW: Penm 2008.

Compared with other Australians, in 2002–2003 Indigenous Australians were 3.0 times as likely to suffer a coronary event such as a heart attack, 1.4 times as likely to die from it without being admitted to hospital, and 2.3 times as likely to die from it if admitted to hospital (AIHW: Mathur et al. 2006). In hospital they were less likely to be investigated by angiography and receive coronary angioplasty, stenting or coronary bypass surgery.

CVD is the leading cause of death for Indigenous Australians, accounting for 27% of all deaths in 2002–2005. After adjusting for age differences, Indigenous males were twice as likely to die from CVD as females.

In 2002–2005, Indigenous Australians were three times as likely to die from CVD as their non-Indigenous counterparts. This disparity was evident for CHD, cerebrovascular disease and heart failure but was most marked for rheumatic fever and rheumatic heart disease (Table 5.4). Indigenous Australians were also more likely to die from CVD at younger ages than non-Indigenous Australians.

Table 5.4: Average annual deaths from cardiovascular diseases for Aboriginal and Torres Strait Islander peoples[a], 2002–2005[b]

	Indigenous Australian males		Indigenous Australian females	
	Number of deaths[c]	SMR[d]	Number of deaths[c]	SMR[d]
Coronary heart disease	140	3.3	83	2.8
Cerebrovascular disease	28	2.1	33	1.8
Heart failure	4	2.1	7	2.4
Rheumatic fever and rheumatic heart disease	5	15.0	13	23.0
Total cardiovascular diseases	**217**	**3.1**	**170**	**2.7**

(a) Data are for Indigenous deaths for usual residents of Queensland, Western Australia, South Australia and Northern Territory.

(b) Deaths are based on year of occurrence of death for 2002–2004 and year of registration of death for 2005.

(c) The number of deaths has been averaged over the period 2002–2005.

(d) SMR (standardised mortality ratio) is the ratio of the observed number of deaths to the number of expected deaths if Indigenous Australians had experienced the same age- and sex-specific death rates as non-Indigenous Australians.

Note: All ratios are significantly different from those for non-Indigenous Australians.

Source: AIHW: Penm 2008.

5.3 Diabetes

Diabetes mellitus (diabetes) is a chronic metabolic disease marked by high levels of glucose in the blood, which is a result of too little insulin (a hormone produced by the pancreas to control blood glucose), insulin becoming ineffective, or both. Diabetes is on the rise in Australia and across the world, and according to estimates from the Australian Diabetes, Obesity and Lifestyle Study (AusDiab study), in 1999–2000 it affected nearly 900,000 Australians aged 25 years and over. Recent increases in the number of people with diabetes have led to claims that it has now risen to 'epidemic' proportions (Colagiuri et al. 2005).

If left undiagnosed or poorly controlled, diabetes can lead to a range of complications including coronary heart disease, peripheral vascular disease, stroke, diabetic neuropathy, renal failure, amputations and blindness. Together with these complications, diabetes places a large burden on the affected individuals, their families and the community.

Diabetes accounted for the second and fourth highest disease burden for males and females respectively in 2003 and as a cause of death was ranked fifth for males and seventh for females in 2005.

There are several types of diabetes with different causes and clinical histories. The three main types are Type 1, Type 2 and gestational diabetes (Box 5.4).

Box 5.4: Main types of diabetes

Type 1 diabetes mostly arises in children or young adults, although it can occur at any age. It is marked by the inability to produce insulin. People with Type 1 diabetes need insulin replacement for survival. Type 1 accounts for around 10–15% of all diabetes cases.

Type 2 diabetes is the most common form of diabetes, occurring mostly in people aged 50 years and over. Although uncommon in childhood, it is becoming increasingly recognised in that group. People with Type 2 diabetes produce insulin but may not produce enough or cannot use it effectively. Type 2 diabetes may be managed with changes to diet and exercise, oral glucose-lowering drugs, insulin injections, or a combination of these.

Gestational diabetes is a form of diabetes that develops during pregnancy in some females. It involves high blood sugar levels appearing for the first time during pregnancy among females who have not previously been diagnosed with other forms of diabetes. It usually disappears after the baby is born, but it can recur in later pregnancies. It is also a marker of increased risk of developing Type 2 diabetes later in life. Some cases of gestational diabetes are managed with changes to diet and exercise alone and some require insulin treatment.

Risk factors for diabetes

Risk factors for diabetes differ by type of diabetes. Type 1 diabetes is believed to be caused by particular biological interactions and exposure to environmental agents among genetically predisposed people (Atkinson & Eisenbarth 2001). Age is a risk factor for Type 2 diabetes and another strong factor is a genetic predisposition shown by family history and ethnic background. Several modifiable risk factors also play a role in Type 2 diabetes—notably obesity, physical inactivity and an unhealthy diet (Shaw & Chisholm 2003). The metabolic syndrome—the clustering of a number of risk factors including abdominal obesity, impaired fasting blood glucose levels, raised blood pressure, raised blood triglycerides and reduced blood HDL cholesterol—substantially increases the risk of Type 2 diabetes (Chew et al. 2006). The risk factors for gestational diabetes are mostly similar to those for Type 2 diabetes, with females being at higher risk if they are in an older age group or obese when they are pregnant (Virjee et al. 2001).

Incidence

Good information on the incidence of Type 1 diabetes in Australia is available from the National Diabetes Register (NDR). The register also provides information on other types of diabetes for the subset of cases where insulin is used to treat the disease (see Box 5.5).

In 2005, 901 new cases of Type 1 diabetes in children aged under 15 years were recorded. This equates to an annual incidence of 22.6 cases per 100,000 population (around 1 in 4,000) in this age group and represents a 20% increase in the rate of new cases compared with that in 2000 (19.2 per 100,000 population). This increase in the incidence of Type 1 diabetes in Australian children is consistent with international trends (DIAMOND Project Group 2006) as well as with the findings of previous Australian studies.

The NDR also records new cases of Type 1 diabetes among adults. In 2005, there were 788 new cases of Type 1 diabetes in people aged 15–39 years, equating to an incidence rate of 10.9 cases per 100,000 population.

Box 5.5: National Diabetes Register

The National Diabetes Register (NDR) is a confidential database established in 1999 to collect information about new cases of insulin-treated diabetes—that is, all new Type 1 diabetes cases and all other new cases of individuals needing insulin treatment, whether Type 2, gestational or other types. The register is operated by the AIHW, using data from the National Diabetes Services Scheme and the Australasian Paediatric Endocrine Group.

The NDR holds diabetes-related information on all cases for which the insulin treatment began on or after 1 January 1999. This means that the register should cover all new cases of Type 1 diabetes since 1999 because they all require insulin treatment. However, not all Type 2 and gestational diabetes cases require insulin treatment so those that do not are excluded.

For children aged 0–14 years, the NDR receives information about new cases of insulin-treated diabetes from two sources, providing reliable estimates of Type 1 diabetes incidence in this age group, with an estimated coverage rate of more than 96%. With ethics approval, researchers are now able to use the register as an important source of information for clinical and population studies of the causes, complications and patterns of diabetes.

Of the 76,000 people who were registered on the NDR in 2005, around 69% were found to have Type 2 diabetes and 18% Type 1. At diagnosis, 56% of registrants were aged 45 years or over and 8% were aged under 15 years (AIHW: Catanzariti et al. 2007).

Between 1999 and 2005, an estimated 100,400 persons began using insulin to treat their Type 2 diabetes. The NDR registers only those requiring insulin, so this estimate does not include people with Type 2 diabetes who are not using insulin to manage their diabetes.

Gestational diabetes is estimated to occur in about 5% of pregnancies in Australia each year (ADIPS 2007). Estimates of gestational diabetes incidence can also be obtained from data on hospitalisations. During 2005–06, about 12,400 (4.6%) of those females who gave birth in hospital had diagnosed gestational diabetes, with 33.7% of cases occurring in females aged 35 years and over.

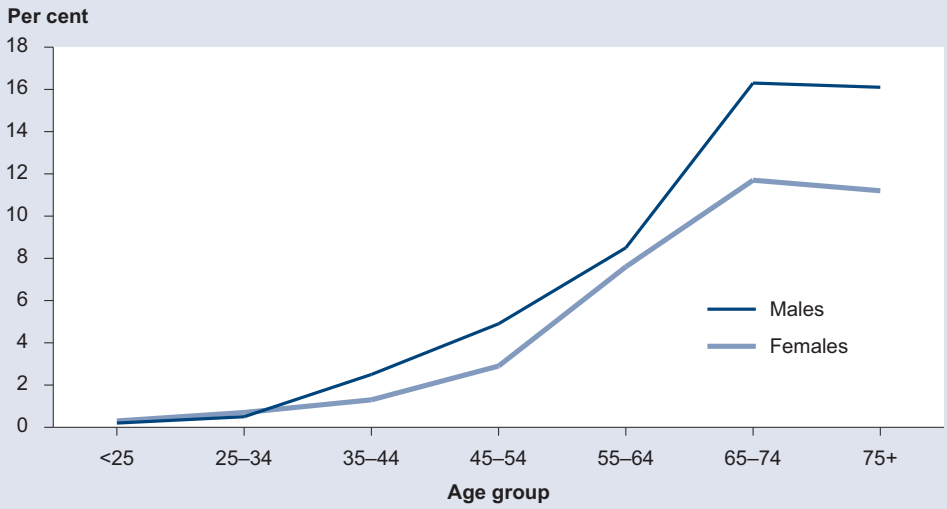
Prevalence

There are two main sources of national diabetes prevalence data in Australia. The first is the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab study), in which diabetes prevalence was estimated on the basis of measured blood glucose levels. The second is the ABS National Health Survey (NHS), in which prevalence estimates are based on self-reported information.

Measured data such as those collected in the AusDiab study provide more accurate assessment of diabetes status in an individual. In addition, measured data can be used to estimate prevalence according to whether cases had already been diagnosed or not. The accuracy of self-reported data, such as those collected in the NHS, relies on respondents being aware of and accurately reporting their health status, and therefore previously undiagnosed cases of diabetes will not be counted. However, the NHS is conducted regularly so it provides relatively recent information and should be useful for producing trends on the prevalence of diabetes. The accuracy of prevalence estimates from surveys will depend on both the collection method—such as blood measurements or self-reported information—and other factors including the response rate achieved in a survey.

Based on measured data from the AusDiab study, it has been estimated that 880,000 Australian adults aged 25 and over had diabetes in 1999–2000, or 7.4% of adults (more than 1 in 14). About half these people were not aware that they had diabetes.

From self-reported data in the 2004–05 NHS, over 700,600 Australians of all ages (3.6% of the population) had been diagnosed with diabetes. Among people with diabetes, 13% reported having Type 1 diabetes and 83% reported having Type 2; a further 3.6% did not know which type they had. The proportion of people with diagnosed diabetes increased with age, and the highest prevalence rate was for those aged 65–74 years (Figure 5.7). Males had a higher rate of diabetes than females (4% and 3% respectively).



Note: Based on self-reported data.

Source: AIHW analysis of the ABS 2004–05 National Health Survey.

Figure 5.7: Age-specific prevalence of diagnosed diabetes by sex, 2004–05

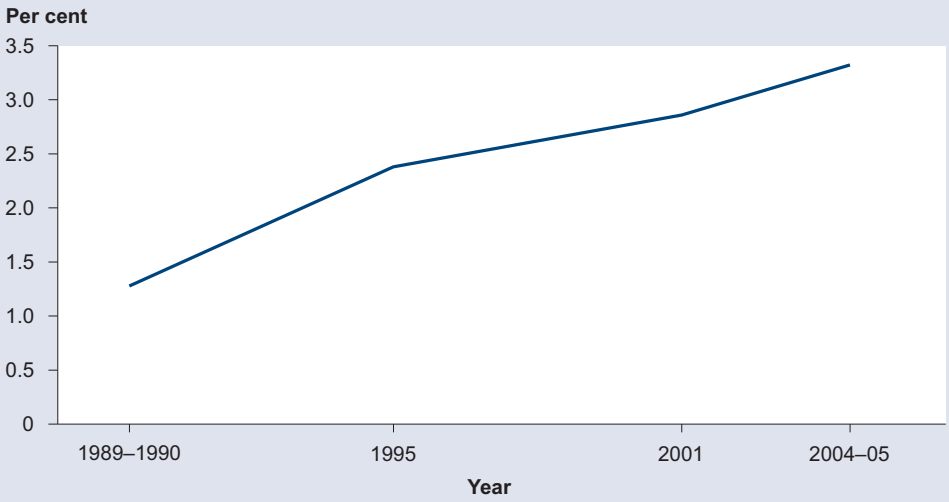
Population groups

Aboriginal and Torres Strait Islander peoples have markedly higher rates of diabetes (specifically Type 2) compared with other Australians. According to the 2004–05 National Aboriginal and Torres Strait Islander Health Survey, an estimated 29,900 Indigenous people had diabetes/high-sugar level—around 6% of the total Indigenous population. The age-standardised prevalence of diabetes among Indigenous people was almost 3 times as high as that of non-Indigenous Australians (11% and 4% respectively) (ABS 2006b).

Data from the 2004–05 NHS show that there are also higher rates of diabetes among other sections of the Australian community, namely those living in more remote areas, those with lower socioeconomic status, and those born overseas (AIHW 2008).

Trends

The prevalence of diagnosed diabetes in Australia based on self-reported information has more than doubled since 1989–90 (Figure 5.8). Although an increase in the incidence of diabetes may play a major role in trends in diabetes prevalence, rising awareness in the community, better detection and better survival may also help explain them.



Notes

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

Sources: AIHW analysis of the 1989–90, 1995, 2001 and 2004–05 ABS National Health Surveys.

Figure 5.8: Trends in the prevalence of diabetes, 1989–90 to 2004–05

Estimates of diabetes prevalence from measured data show a similar trend; the prevalence of diabetes in the 1999–2000 AusDiab study was more than double that estimated from the 1981 Busselton survey (Dunstan et al. 2002).

Complications of diabetes

Diabetes complications can arise quickly or develop over a number of years. Short-term complications are considered a medical emergency and may lead to coma and death in a short time. These include a condition known as diabetic ketoacidosis that can occur from a severe lack of insulin in those with Type 1 diabetes and another condition called hypoglycaemia (low blood glucose) that is a complication of insulin treatment. There is limited statistical information about short-term complications, although it has been found that 4.6% of people with diabetes who attended specialist diabetes services in 2004 had suffered at least one episode of severe hypoglycaemia in the previous 12 months (Flack & Colagiuri 2005).

Long-term complications include disease of large blood vessels (macrovascular disease) that leads to conditions such as coronary heart disease, stroke and peripheral vascular disease; and disease of small blood vessels (microvascular disease) that can cause chronic kidney disease, nerve damage and retinopathy (loss of vision). From the 2004–05 NHS, the prevalence rates of stroke and heart attack among people with diabetes were twice as high as the rate among those without diabetes and the rate of angina was 2.6 times as high. Specific eye health problems such as glaucoma, cataract and blindness were also more commonly reported by people with diabetes than by those without it (2.4, 1.5 and 1.3 times respectively).

Type 2 diabetes is also the most common cause of severe kidney disease. In 2005, 697 Australians began kidney replacement therapy (dialysis or kidney transplant) due to diabetic nephropathy, accounting for 32% of all new cases registered in the Australia and New Zealand dialysis and kidney transplant registry for that year (McDonald et al. 2006).

This represents an increase in the proportion of new cases of end-stage kidney disease caused by diabetes, from 25% in 2001. Of all people beginning kidney replacement therapy in 2005, 41% had diabetes, the majority Type 2.

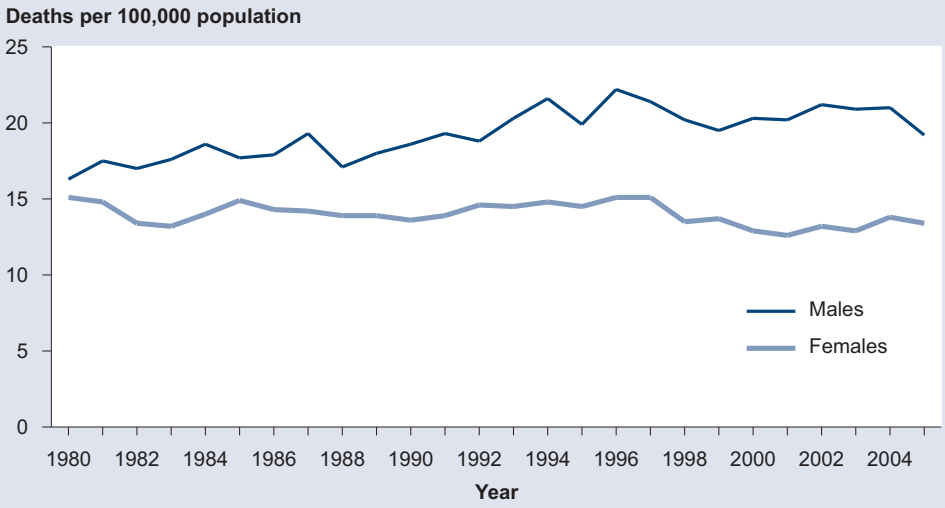
Among people attending specialist diabetes services in 2004, 9.0% gave a history of at least one episode of heart attack, 5.1% had had a stroke and 12.4% had peripheral vascular disease (reduced blood flow to the legs). In addition, 1.1% had been diagnosed with end-stage kidney disease, 1.1% were blind and 1.1% had had a lower limb amputation (Flack & Colagiuri 2005). It is important to note that specialist diabetes clinics are likely to see more patients with complications than would be seen among people with diabetes generally.

Mortality

A total of 11,864 deaths in Australia in 2005 were caused to some degree by diabetes. It was listed as the underlying cause of 3,529 deaths (2.7% of all deaths) and as an associated (contributory) cause in 8,335 deaths (6.4% of all deaths).

Where diabetes was the underlying cause of death, common conditions listed as associated causes included coronary heart diseases (in 67% of cases), kidney-related diseases (30%), stroke (20%) and heart failure (20%). When diabetes was listed as an associated cause, coronary heart disease was listed as the underlying cause of death in 28% of cases, cancer in 25% and stroke in 8%.

There have not been major changes in the death rate from diabetes (as an underlying cause) over the last 25 years (Figure 5.9), although there have been some differences for males and females. For males, the death rate rose by an average of 0.7% per year. In contrast, the rate for females fell by an average of 0.5% per year.



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. For 1980 to 1996 the disease grouping is classified according to the ICD-9 code: 250 for diabetes.
3. For 1997 to 2005 the disease grouping is classified according to the ICD-10 codes: E10–E14 for diabetes.

Source: AIHW National Mortality Database.

Figure 5.9: Deaths with diabetes as the underlying cause of death, 1980 to 2005 (*NHPC indicator 1.08*)

The death rate for diabetes increases progressively with age; about 87% of people who died with diabetes in 2005 were aged 65 years and over. Males were more likely to die from diabetes than females, with age-standardised death rates of 68 and 43 per 100,000 people respectively.

Disability and functioning

Based on the 2003 Survey of Disability Ageing and Carers, an estimated 56% of people with diabetes also had a disability. Of them, 42% had a profound or severe core activity limitation, indicating that they were unable to do, or always/sometimes needed help with, a task such as self-care, mobility and communication. Disability among people with diabetes was higher at older ages: 67% of such people aged 65 years and over reported a disability compared with 46% of those aged less than 65 years. Twenty four per cent of people with diabetes and a disability reported diabetes as the main condition causing their disability in 2003.

Burden of disease

Using a conservative estimate, diabetes was held responsible for nearly 6% of the total disease burden in 2003, making it the eighth leading cause of burden of disease and injury in Australia. However, diabetes increases the risk of coronary heart disease and stroke, and when this contribution is added, the burden attributable to diabetes increases to 8.3%, ranking it fourth out of all diseases (Begg et al. 2007).

In 2003, Type 2 diabetes accounted for 92% of the diabetes burden. It was ranked sixth among the 20 leading causes of burden for both males and females in 1993 and by 2003 it was ranked second for males and fourth for females. Type 2 diabetes is projected to be the leading specific cause of disease burden for males and second for females by 2023.

Health service use

The first aim of diabetes management is to prevent complications, mainly by maintaining normal blood glucose levels. The second is to detect and treat any complications early. This requires frequent attention and monitoring by patients, their doctors and other health professionals.

People with diabetes are therefore more likely than others to consult health professionals or use hospital services. Recent data suggest that health service use by people with diabetes is increasing. This may reflect the increasing prevalence of diabetes, but may also be because of greater compliance with guidelines for diabetes management and rising awareness of diabetes and its complications.

GP visits

According to the 2005–06 BEACH survey, diabetes was the third most frequently managed chronic condition and represented 2.4% of all problems managed by GPs, at a rate of 3.5 per 100 encounters (Britt et al. 2007). There has been a gradual increase in this proportion since 1999–00, when the corresponding figure was 1.8% (a rate of 2.7 per 100 encounters).

Diabetes was the problem most frequently referred by GPs to specialists and other health professionals in 2004–05: 6.9% of all diabetes encounters resulted in a referral to a specialist and 4.9% in a referral to an allied health professional (Britt et al. 2007).

Hospitalisations

Diabetes was the principal diagnosis for 80,380 hospitalisations in 2005–06 and an additional diagnosis for 506,355 hospitalisations. These almost 600,000 events can be termed diabetes-associated hospitalisations and they accounted for 8% of all hospitalisations in that year. The rates increased with age, with 53% of hospitalisations occurring among people aged 65 years and over.

As well as diabetes accounting for a large proportion of hospitalisations, the average length of stay for such cases was longer than the overall average—4.8 days for diabetes as the principal diagnosis and 5.7 days as the additional diagnosis, compared with 3.3 days for all hospitalisations.

The reasons for hospitalisations for people with diabetes are diverse. Diseases of the circulatory system were the most common principal diagnoses for those with diabetes (16% of all diabetes-associated hospitalisations). When diabetes was the principal diagnosis, about 32% of hospitalisations were for eye complications (ophthalmic), 13% for multiple complications, just over 9% for diabetes in pregnancy and 9% for poor control. When diabetes was listed as an additional diagnosis, multiple complications were more common (43%).

Hospitalisation rates involving any diagnosis of diabetes increased by 42% between 2000–01 and 2005–06, from 1,932 to 2,744 hospitalisations per 100,000 people. This increase is also represented in the proportion of hospitalisations involving diabetes: in 2000–01, diabetes contributed to 6% of the total hospitalisations and by 2005–06 this had risen to 8%.

International comparisons

Australia has a relatively low prevalence of overall diabetes compared with other OECD countries, ranking the third lowest in 2006, with an estimated 5% of the population aged 20–79 years having diabetes (IDF 2006).

However, Australia's incidence of Type 1 diabetes among 0–14 year olds in the late 1990s to early 2000s was the fourth highest in the range of estimates for OECD countries, with around 23 per 100,000 (IDF 2006).

5.4 Chronic kidney disease

Chronic kidney disease (CKD) is the occurrence of kidney damage and/or reduced kidney function, lasting for 3 months or more. In severe cases, kidney function may deteriorate to the extent that it is no longer sufficient to sustain life and, if untreated, will cause death within a few weeks. This is called 'end-stage kidney disease' (ESKD). People with ESKD require kidney replacement therapy (KRT)—either dialysis or kidney transplant—to survive.

Risk factors and causes

A variety of factors may contribute to the development of CKD. The major risk factors include diabetes, high blood pressure, glomerulonephritis, urinary tract infections and drug toxicity. Other factors, such as tobacco smoking, ageing, genetic makeup, physical inactivity, and low socioeconomic status may also contribute (AIHW 2005a). The most common reasons for people starting KRT in 2005 were diabetes (32%), glomerulonephritis (23%) and high blood pressure (15%) (McDonald et al. 2007).

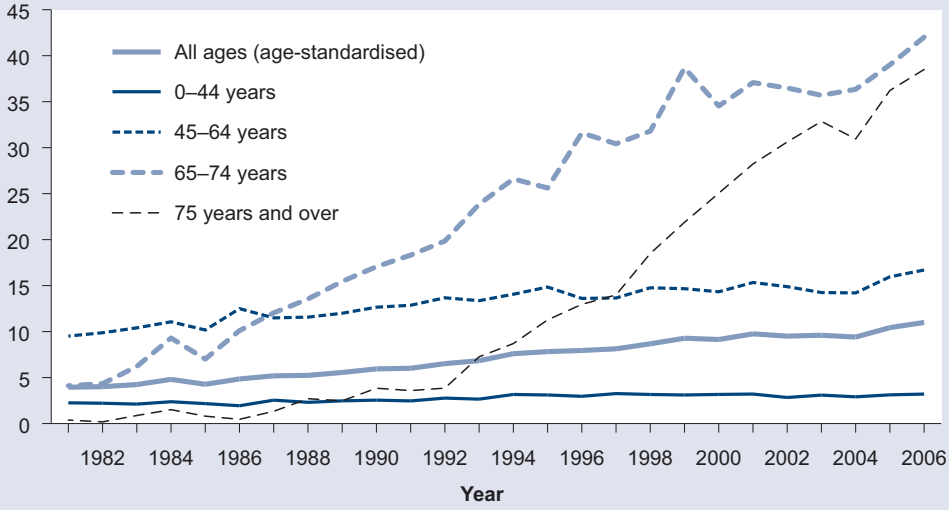
Incidence and prevalence

It is not clear how many Australians have CKD. As it has few specific symptoms, it often remains undetected until the late stages, and many people may not know that they have it. Any self-reported information, therefore, will underestimate its prevalence. The 1999–2000 AusDiab study found that about 7.5% to 11.2% of Australians aged 25 years and over had evidence of reduced kidney function, and a further 5.1% had evidence of protein and/or blood in their urine, indicating possible kidney damage (Chadban et al. 2003, Australasian Creatinine Consensus Working Group 2005).

Treated end-stage kidney disease

Information on people receiving KRT for ESKD in Australia is compiled by the Australia and New Zealand Dialysis and Transplant (ANZDATA) Registry. According to this, 2,378 persons (1,441 males and 937 females) began KRT in Australia in 2006. The rate of new patients increased with age, being highest among 65–74 year olds (39 per 100,000 population). The average age of patients beginning treatment in 2006 was 60.7 years (McDonald et al. 2007), well above the average of 42.3 years in 1981.

The number of new KRT patients has been increasing over the last 25 years. However, this increase has not been seen across all age groups. Under the age of 45 years, incidence rates of treated ESKD are relatively stable, but rapid increases have occurred among the older age groups (Figure 5.10). Major contributors to this increase are the increasing prevalence of diabetes, reduced cardiovascular mortality and a greater readiness to offer this treatment to older people.



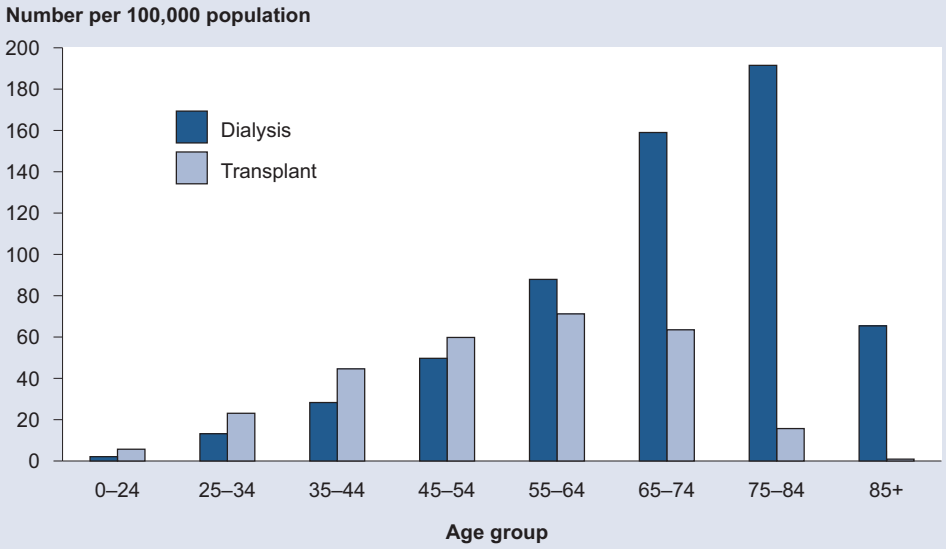
Note: Age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of ANZDATA Registry data.

Figure 5.10: Trends in new cases of kidney replacement therapy for treating end-stage kidney disease, 1981 to 2006

At the end of 2006, 9,182 Australians were having dialysis and a further 6,845 were living with a kidney transplant (McDonald et al. 2007). The rate of functioning transplants was greatest among those aged 55–64 years (71 per 100,000 population), whereas dialysis was most common among those aged 75–84 years (192 per 100,000) (Figure 5.11).

As with the incidence, the prevalence of treated ESKD has greatly increased over the past 25 years, more than tripling from 22 per 100,000 population in 1981 to 74 in 2006. Although some of this increase may be attributed to a greater incidence of ESKD and increased numbers of patients beginning treatment, improved management of other illnesses and new technologies have also contributed to these numbers by increasing patient survival.



Source: McDonald et al. 2006.

Figure 5.11: Prevalence of kidney replacement therapy, by age and treatment type, 2006

Complications and comorbidities

Loss of kidney function can have serious effects on the body, causing damage to other organs and disruption of bodily processes. This can lead to various complications including heart disease, infections and problems with the bones and muscles. The impairments of other organ systems can be detected at the early stages, and the risk of such impairments increase progressively with worsening kidney function (Johnson 2004). As well as diseases that are complications of CKD, people with CKD may have diseases that have arisen independently, or through a common risk factor such as high blood pressure. The overall burden of the comorbidity and the various complications of CKD has not yet been well studied. However, records of hospitalisations and deaths among Australian adults show that CVD and diabetes often coexist with CKD (Table 5.5).

Table 5.5: Comorbidity of CKD with CVD and diabetes: hospitalisations and deaths

Type of record	With CVD (without diabetes)	With diabetes (without CVD)	With CVD and diabetes
		Per cent	
Hospitalisations with a diagnosis of CKD in 2004–05[(a)]	32.8	6.1	36.9
Deaths with CKD as a cause of death in 2004	59.7	2.7	16.3

(a) Hospitalisations for regular dialysis were excluded from this analysis.

Note: Only people aged 18 years and over are included.

Source: AIHW: Tong & Stevenson 2007.

Mortality

CKD contributes significantly to mortality. People with CKD have an increased risk of death in the early stages compared with people without the disease, and this risk increases progressively with worsening kidney function. At the end stage of the disease, people without kidney replacement therapy will die in a few weeks because of uraemia—the damaging build-up in the blood of urea and related waste products, which the kidneys would normally eliminate through the urine. CKD also contributes to death by increasing the risk of death from other diseases, such as CVD and infection.

In 2005, CKD was recorded as contributing to 11,954 deaths (6,367 males and 5,587 females), which represents over 9% of total deaths in Australia. Among these deaths, CKD was recorded as the underlying cause in 2,426 cases (a fifth of the total) and as an associated cause in 9,528 cases.

From 1997 to 2005, the mortality rate for CKD as the underlying cause of death fell from 13 to 11 deaths per 100,000 population. In the same period, the death rates where CKD was recorded as an associated cause of death remained at about 43 deaths per 100,000 population.

Health service use

Management of chronic kidney disease aims to slow or halt further deterioration of function and to prevent complications. This may involve lifestyle modifications, regular check-ups, use of medications and kidney replacement therapy. As with most chronic conditions, day-to-day management is generally provided by a GP or specialist, whereas acute illness and treatment of end-stage disease may require hospital services.

GP visits

The BEACH survey found that chronic kidney disease was managed at a rate of around 2 per 1,000 GP encounters in 2005–06. This equates to around 177,401 Medicare-reimbursed GP consultations in that year. The kidney problem most commonly managed by GPs was described as 'chronic kidney failure'.

Hospitalisations

People with CKD, particularly those at the later stages, require a large number of hospital services. The most frequent reason for hospitalisation among these people is day-admission for dialysis. In 2005–06, day-admission for dialysis was the leading cause

of hospitalisation in Australia, with a total of 883,593 hospitalisations (12.1% of all hospitalisations). These high numbers reflect the need for those having dialysis to receive it three to four times per week.

Besides day-admission for dialysis, people with CKD are also hospitalised for other treatment. In 2005–06, there were 28,955 such episodes of care (0.4% of total hospitalisations), where CKD was recorded as the principal diagnosis. The average length of stay was 4.6 days, well above the average length of stay for all hospitalisations (3.3 days).

In addition, many hospitalisations were attributed to the clinical management of comorbidities of CKD and complications of KRT. These hospitalisations were more likely to record CKD as an additional diagnosis. In 2005–06, there were 145,746 of these (2.0% of all hospitalisations). The common principal diagnoses recorded included CVD (32,359), respiratory diseases (12,083) and diabetes (8,206).

Kidney replacement therapy

Despite increases in the number of older patients and patients with comorbidities, better management and advances in technology have led to increases in the proportion of people receiving dialysis (AIHW 2005a; McDonald et al. 2007).

In addition, people with ESKD also survive longer after kidney transplant. For patients who received a kidney from a deceased donor in 1999–2000, 95% of them survived more than 1 year and 90% survived more than 5 years. This is higher than the 93% and 84% respectively in 1991–1992. For patients who received a kidney from a live donor, besides the nearly 100% survival rate after 1 year of transplantation, the 5-year survival rate also improved from 86% in 1991–1992 to 95% in 2000–2001 (McDonald et al. 2007).

However, choices of treatment and access to kidney transplant were reduced in around 23% of patients because they were referred to kidney physicians too late. There is also a long waiting list for kidney transplant. At the end of 2006, 1,344 people were waiting for a kidney transplant, and 92% of them were aged under 65 years (McDonald et al. 2007).

Chronic kidney disease in Indigenous Australians

Data on the prevalence of CKD among Aboriginal and Torres Strait Islander peoples are limited to self-reported information, with no large-scale Indigenous biomedical surveys having been done. From the 2004–05 ABS National Aboriginal and Torres Strait Islander Health Survey, an estimated 7,500 (3%) Indigenous Australians aged 18 years and over had kidney disease as a long-term condition (AIHW: Penm 2008). Note that some kidney diseases may not cause permanent damage to kidney function or kidney structure despite being long-term, and that the 2004–05 survey did not collect information from health-care facilities. For these reasons, the survey estimates are unlikely to fully reflect the prevalence of chronic kidney disease in the Indigenous population.

End-stage kidney disease is much more common among Indigenous Australians than among other Australians. According to the ANZDATA Registry, 207 (8.7%) patients beginning kidney replacement therapy in 2005 were Indigenous, compared with Indigenous representation of 2.5% among the total Australian population. At the end of 2005, 1,041 Indigenous Australians relied on this therapy to survive. Overall there were nearly five times as many Indigenous cases of treated ESKD as would be expected from Australia's national prevalence rate.

CKD also contributed greatly to hospital use and mortality in this population. Based on data from Queensland, Western Australia, South Australia and the Northern Territory, CKD was recorded as the principal diagnosis in 46% of hospitalisations of Indigenous Australians in 2005–06, and was recorded as a cause of death (as either the underlying or an associated cause of death) in 14% of Indigenous deaths in 2005. These hospitalisation and mortality rates for CKD among Indigenous Australians were much higher than among other Australians in these jurisdictions.

5.5 Chronic respiratory diseases

Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) is a serious, progressive and disabling disease in which destruction of lung tissue and narrowing of the air passages obstructs oxygen intake, causing chronic shortness of breath. The person is also prone to episodes where shortness of breath is more severe and he or she has fits of coughing with mucus. The lung damage is mainly due to the long-term inhalation of irritant gases and particles, and by far the main cause of this is cigarette smoking.

The main pattern of COPD is known as emphysema but if the person's cough is a fairly constant feature the condition is often labelled as chronic bronchitis.

Risk factors

Tobacco smoking is by far the most important risk factor for COPD. It is estimated that 82% of global deaths due to COPD are attributable to smoking (Zaher et al. 2004). Based on estimates from the Australian Burden of Disease and Injury Study (Begg et al. 2007), about 73.4% of COPD deaths in Australia in 2003 could be attributed to tobacco smoke.

Other risk factors for COPD may worsen respiratory symptoms or may contribute to the risk of developing the disease, either independently or in conjunction with tobacco smoking. These include respiratory infections (see Box 5.6) and exposure to environmental (passive) tobacco smoke, indoor and outdoor air pollution, and occupational dusts and chemicals (Chapman et al. 2006; Rennard 1998).

Prevalence

The prevalence of COPD in Australia is difficult to determine. Definitions of the disease can vary and the term COPD is not commonly used in health surveys (Mannino et al. 2002). Instead, prevalence calculations are often based on combining separate estimates for emphysema and bronchitis (sometimes with no distinction between chronic and acute bronchitis).

From self-reports in the 2004–05 National Health Survey (NHS), about 591,000 persons (3% of the Australian population) were estimated to have emphysema and/or bronchitis—down from 665,000 persons in 2001. The self-reported prevalence of emphysema/bronchitis among those aged 65 years and over is about 8%. For people aged 65 years and over, emphysema/bronchitis is more common in males than in females.

It is possible that the NHS overestimates the prevalence of COPD in younger people. The approach taken by the ABS for the survey is to include bronchitis as a 'long-term condition' rather than to specify and define 'chronic bronchitis'. Long-term bronchitis may be interpreted as recurring episodes of acute bronchitis (Mannino 2001). On the

other hand, the NHS probably underestimates the prevalence in older people. This is because the symptoms of COPD overlap with those of other conditions (such as asthma) and COPD is usually not diagnosed until it is moderately advanced and begins to restrict a person's daily activities.

Direct comparisons with the prevalence of COPD in other countries are difficult to make because of differences in how the disease is defined and how data are collected. An international survey of people aged 20–44 years ranked Australia third out of 16 high-income countries in the prevalence of mild COPD, with 4.3%, and fourth in the prevalence of moderate to severe COPD, with 1.4% (de Marco et al. 2004). However, Australia had the lowest prevalence of those considered 'at risk' (some chronic symptoms but no airflow obstruction), with 7.2%.

Box 5.6: Influenza and pneumococcal vaccination for people with COPD

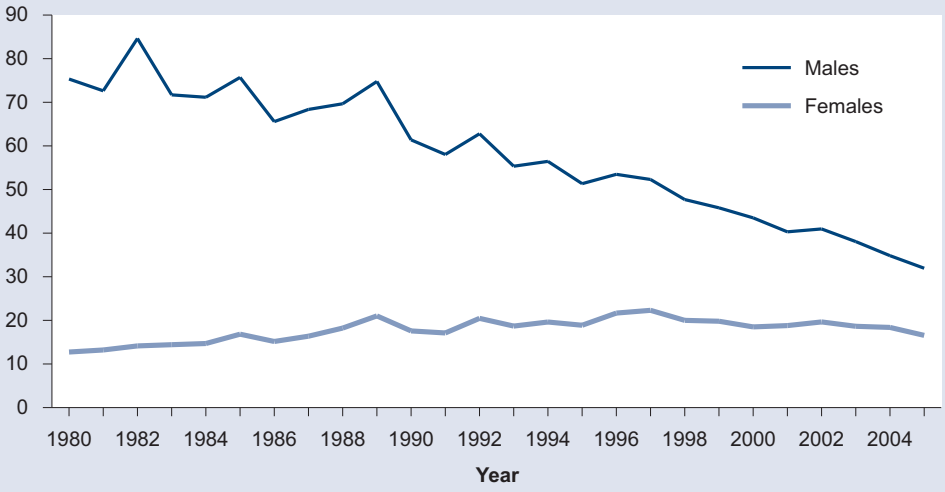
Influenza and pneumonia can worsen the symptoms of COPD, decrease lung function, and lead to hospitalisation or, in severe cases, death. These risks can be reduced significantly by vaccination (see Chapter 4 for more information).

Estimates from the National Health Survey (NHS) suggest that people with COPD are more likely than others to receive influenza and pneumococcal vaccination. From self-reports in the 2004–05 NHS among people aged 65 years and over, 88% of those with emphysema/bronchitis had been vaccinated against influenza in the previous 12 months, compared with 72% of others. This proportion had remained stable since 2001. However, only 61% of respondents with emphysema/bronchitis reported being vaccinated against pneumococcal infection in the previous 5 years, compared with 41% of those without emphysema/bronchitis.

Mortality

COPD is a major cause of death in Australia, reflecting the progressive decline in lung function associated with the disease. In 2005, COPD was the underlying cause of 4,886 deaths (45.2% of deaths due to respiratory diseases and 3.7% of all deaths). It was also listed more than 7,000 times as an associated cause of death, most often when coronary heart disease or lung cancer was the underlying cause. The death rate among males was almost double the female rate (age-standardised rate of 31.2 deaths per 100,000 population for males and 16.3 for females).

Overall, the death rate for COPD fell over the 25 years to 2005 (Figure 5.12). In males, the age-standardised death rate fell every year for the latest 10 years, except in 2002 (during which there was a small rise). In females, the rate appeared to level off after peaking in 1997, until a small fall in 2005.



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. COPD classified according to ICD-9 codes 491, 492, 496 (1980–1996) and ICD-10 codes J41 to J44 (1997–2005).
3. Rates for 1980–1996 have been adjusted by a factor of 0.93 to be comparable with 1997–2005 rates.

Source: AIHW National Mortality Database.

Figure 5.12: Trends in COPD mortality, by sex, 1980 to 2005

Burden of disease

COPD was estimated to account for 3.3% (3.6% among males and 3.0% among females) of the total burden of disease and injury in Australia in 2003 (Begg et al. 2007). The proportion of the total burden of disease and injury associated with COPD increases with age among males, but peaks at 65–74 years among females. Due mainly to declining smoking rates, especially among males, the proportion of the total burden of disease and injury associated with COPD is projected to fall to 2.2% for males and 2.8% for females by 2023 (Begg et al. 2007).

Health service use

COPD may require regular hospital care when symptoms worsen, lead to increased disability or become life-threatening. There were 53,726 hospitalisations in 2005–06 with COPD as the principal diagnosis. The average length of stay in the hospital for COPD in 2005–06 was 7.1 days compared with 4.2 days for all respiratory diseases. A large proportion (87%) of COPD hospitalisations followed an emergency admission. Hospitalisations for COPD occur mainly among the elderly, with those aged 65 years and over accounting for 77% of them. Males are more likely than females to be hospitalised for COPD; however, the age-standardised hospitalisation rate in males has fallen in recent years (Table 5.6). Between 2001–02 and 2005–06, the average length of stay in hospital fell by about half a day for females and slightly less for males.

Chronic respiratory diseases are often aggravated by acute respiratory infections. It is not surprising, therefore, that hospitalisations for COPD are most common during the winter months, with about one-third occurring between June and August.

COPD is not managed very often in general practice: less than once every 100 encounters (Britt et al. 2007). However, in terms of both the number of hospitalisations and the average length of time spent in hospital, COPD accounts for considerable health-care resources. Each year COPD incurs health-care expenditure of several hundred million dollars in Australia, about two-thirds of which is attributed to hospital use (AIHW 2005b).

Table 5.6: Trends in hospitalisation rates and average length of stay for COPD, 2001–02 to 2005–06

	Hospitalisation rate[(a)] (per 100,000 population)		Average length of stay (days)	
Year	Males	Females	Males	Females
2001–02	344	206	7.3	7.8
2002–03	346	211	7.3	7.7
2003–04	340	211	7.2	7.7
2004–05	325	202	7.1	7.5
2005–06	313	204	7.0	7.3

(a) Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Hospital Morbidity Database.

Asthma

Asthma is a common chronic inflammatory condition of the airways which presents as episodes of wheezing, breathlessness and chest tightness because of widespread narrowing of the airways. The symptoms are usually reversible, either spontaneously or with treatment.

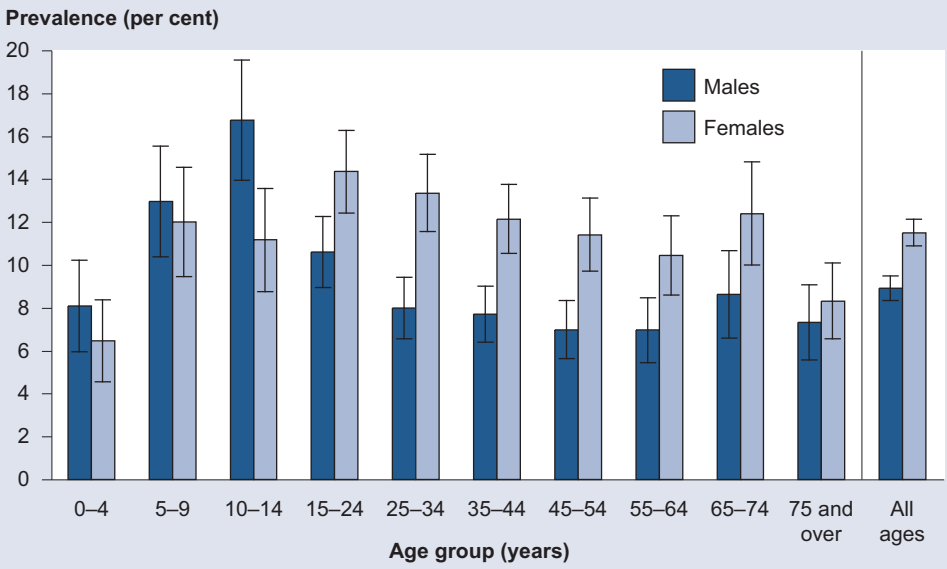
The underlying causes of asthma are still not well understood, but environmental and lifestyle factors, as well as constitutional factors such as an allergic tendency, may increase the risk of developing asthma. Among those with the condition, airway narrowing and symptoms can be triggered by a wide range of exposures and other factors. These include specific allergens, such as house dust mites, pollens, mould spores, animal danders and occupational allergens; viral infections; irritants such as tobacco smoke and other air pollutants; exercise; and some food preservatives.

Prevalence

During the 1980s and early 1990s there was a substantial worldwide increase in the prevalence of asthma. However, in recent years this trend appears to have plateaued (Asher et al. 2006; Eder et al. 2006) and may even have reversed in children. Although the prevalence of asthma in Australia remains high by international standards (ACAM 2005), national data show a recent decrease in prevalence among children and young adults in Australia, consistent with worldwide trends.

An estimated 10.3% of the Australian population had asthma in 2004–05, down from 11.6% in 2001 (ACAM 2007). The prevalence of asthma among children and adults aged under 35 years fell significantly during this period (11.7% in 2004–05 versus 14.0% in 2001). However, in the same period, there was no change in its prevalence among people aged 35 years and over.

Based on the 2004–05 NHS, among those aged under 15 years the prevalence is higher among boys than girls, but after the teenage years asthma is more prevalent in females than males (Figure 5.13). Overall, females had a significantly higher prevalence of asthma than males (11.5% compared with 8.9%).



Notes

1. Age-standardised to the Australian population as at June 2001.
2. Error bars represent 95% confidence intervals; that is, a range (interval) of values within which we can be '95% confident' that the true value lies.

Source: ABS National Health Survey 2004–05.

Figure 5.13: Prevalence of current asthma, by age group and sex, all ages, 2004–05

According to the 2004–05 National Aboriginal and Torres Strait Islander Survey and National Health Survey, the prevalence of asthma is also higher among Aboriginal and Torres Strait Islander Australians than other Australians (16.5% versus 10.2% in 2004–05, age-standardised). Although this difference exists across all age groups, it is more prominent in older adults, particularly females aged 35 years and over and males aged 55 years and over.

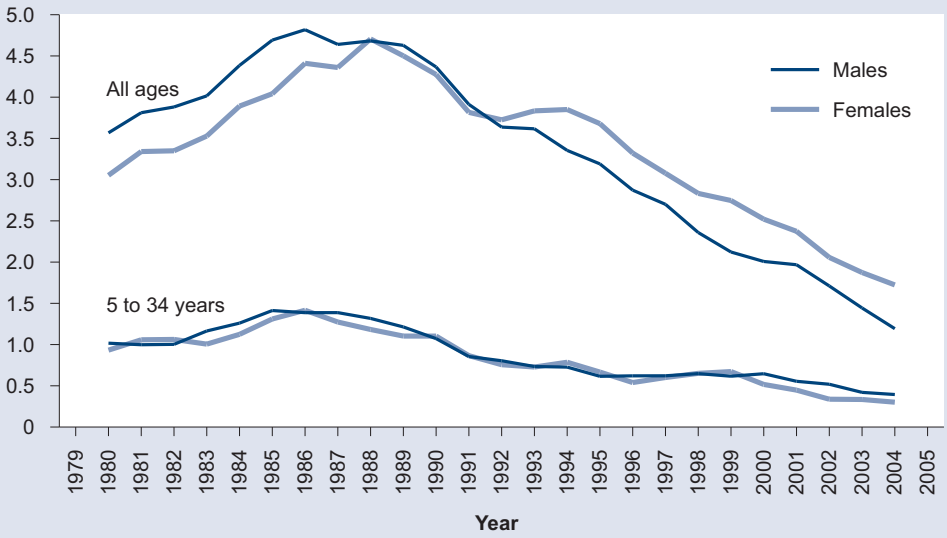
People from non-English-speaking backgrounds have a lower prevalence of asthma than those from English-speaking backgrounds, especially among those aged under 65 years. People with lower socioeconomic status have a higher prevalence of asthma than those with higher socioeconomic status. In 2004–05, the difference in the prevalence of asthma between the lowest and the highest fifth of the population based on socioeconomic status was 2.2 percentage points. This gap had widened since 2001, when the difference was 0.9 percentage points.

Mortality

Death rates due to asthma in Australia are high by international standards, although asthma is not a leading cause of mortality. Asthma was attributed as the underlying cause of 318 deaths in 2005, representing 0.24% of all deaths in that year. Although deaths caused by asthma occur in all age groups, the risk of dying from asthma increases with age.

The mortality rate attributed to asthma has been falling since the late 1980s and has fallen by more than 50% since 1989 (Figure 5.14). Until the late 1980s, the rate was higher in males but since the early 1990s it has been higher in females.

In older people, there are problems in attributing deaths to asthma because misclassification can occur between asthma and other diseases, in particular COPD. So a more reliable guide to trends may come from deaths among those aged 5–34 years, where classification is more accurate. Deaths attributed to asthma in this age group have also declined substantially since the mid to late 1980s but, in contrast to the trend observed for the population as a whole, there has been little difference in the asthma death rate between the sexes.



Notes

1. Age-standardised to the Australian population as at June 2001.
2. Asthma classified according to ICD-0 code 493 and ICD-10 codes J45 and J46.
3. Deaths coded to ICD-9 (1979–1997) were converted to ICD-10 using the following conversion: ages 0–34 years, no conversion; 35–64 years, converted by a factor of 0.84; 65+ years, converted by a factor of 0.68.

Source: AIHW National Mortality Database.

Figure 5.14: Trends in asthma mortality, 3 year moving average, 1979 to 2005 (*NHPC indicator 1.08*)

Disability and functioning

People with asthma compare poorly in a range of health-related quality-of-life measures. Across all age groups and for both sexes, they rate their general health worse than people without the disease (ACAM 2007). In addition, a higher proportion of people with asthma report taking days off work or school or having other days of reduced activity. Furthermore, they report worse psychological or 'mental' health. This is particularly true among females, for whom those with asthma are 2.2 times as likely to have high or very high psychological distress as others.

However, there appear to have been some recent improvements in quality of life for those with asthma. Compared with 2001, Australians with asthma in 2004–05 rated their general health as better and reported less asthma-related days off work or study (ACAM 2007).

Burden of disease

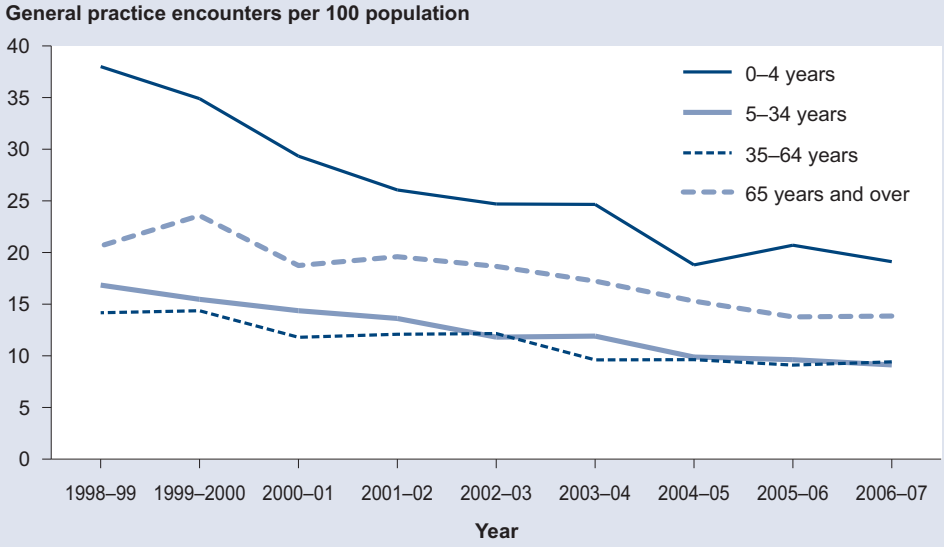
Asthma was estimated to account for 2.4% of the total disease burden in 2003, as measured by disability-adjusted life years (DALYs) (Begg et al. 2007), with the distribution of asthma burden in the population mirroring its prevalence. Among children aged under 15 years, asthma was the leading specific cause of disease burden, accounting for 17.6% of the total DALYs among boys and 17.0% among girls. Asthma was also the fourth leading cause of DALYs among 15–44 year old females.

Health service use

GP visits

General practitioners (GPs) play a central role in the management of asthma in the community. This includes assessment, prescription of regular medications, education and review, as well as managing acute episodes. Data from BEACH surveys show that the rate of GP encounters for asthma has decreased since 1998–99 (Figure 5.15). The largest reduction has been among young children aged under 5 years. Although this group had the highest rate of GP encounters for asthma compared with other ages between 1998–99 and 2006–07, the rate fell by around 50% during this time.

Among children, boys are more likely than girls to have an asthma-related GP encounter. However, after the age of 15 years this trend reverses and continues into older age groups, with more females having GP encounters for asthma than males.



Notes

1. Asthma classified according to ICPC-2 PLUS codes R96001–R96005, R96007, R96008.
2. BEACH data year is April to March.

Source: BEACH survey of general practice.

Figure 5.15: General practice encounters for asthma per 100 population, by age group, 1998–2007

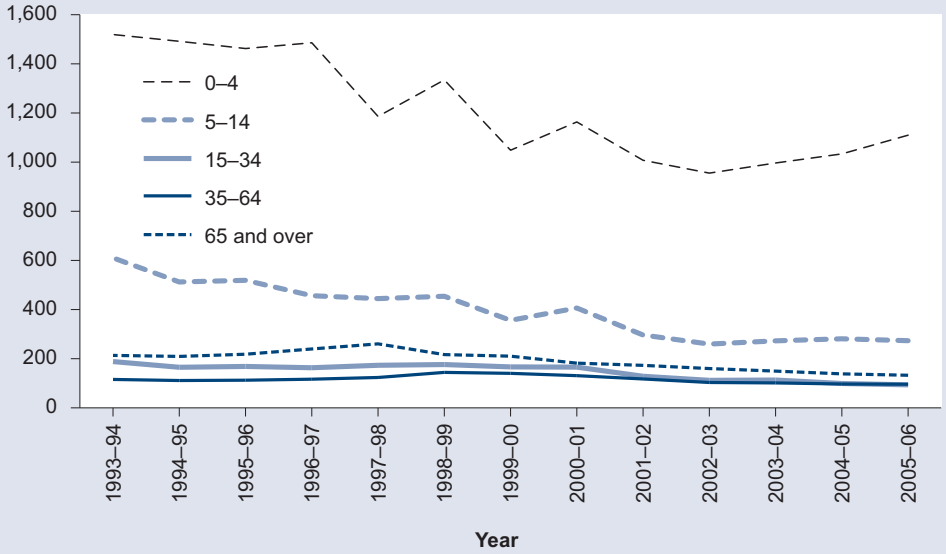
Hospitalisations

Hospitalisation for asthma is required when flare-ups or 'attacks' are life-threatening or when they cannot be managed at home. Preventing such attacks is a major goal of primary care. However, in 2004–05 there were 37,461 hospitalisations for asthma in Australia, representing 0.53% of all hospitalisations during that year.

Since 1993–94 there has been a marked reduction in the rate of hospitalisations for asthma among children aged under 15 years (Figure 5.16). Between 1993–94 and 2005–06, hospitalisations decreased by 55% among those aged 5–14 years and by 36% among those aged 15 years and over. However, children still have high rates of hospitalisation for asthma compared with adults.

Among adults, hospitalisation rates for asthma are highest in the winter months, which probably reflects the impact of the winter rise in respiratory tract infections. Among children, the peaks for hospitalisations occur in late summer and autumn. The reason for this seasonal peak is not known, though it is likely to be related to a high prevalence of respiratory viral infections, particularly the common cold, around this time. Boys aged under 15 years are more likely to be admitted to hospital for asthma than girls, but after the age of 15 years females have a higher rate than males. This pattern is consistent with prevalence rates as well as the rate of asthma-related GP consultations.

People living in remote areas (particularly older adults), Indigenous Australians and people with lower socioeconomic status have higher rates of hospitalisation for asthma than other Australians.



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. Asthma classified according to ICD-9-CM code 493 and ICD-10-AM codes J45 and J46.
3. Hospitalisations coded to ICD-9-CM (1993 to 1997) were converted to ICD-10-AM using the following conversion: ages 0–34 years, no conversion; 35–64 years, converted by a factor of 0.64; 65 years and over, converted by a factor of 0.53.

Source: AIHW National Hospital Morbidity Database.

Figure 5.16: Trends in hospitalisations for asthma, by age, 1993–94 to 2005–06

5.6 Arthritis and other musculoskeletal conditions

Arthritis is marked by inflammation of the joints, causing pain, stiffness, deformity and disability. Other musculoskeletal conditions such as osteoporosis and back pain affect the bones, muscles and their attachments to each other. There are more than 150 forms of arthritis and musculoskeletal conditions, and their causes include overuse of joints, congenital anomalies, metabolic or biochemical abnormalities, infections, inflammatory conditions, trauma and cancer. These conditions result in few deaths but can cause significant pain and disability, severely limiting a person's ability to perform everyday tasks at home and work.

Arthritis and musculoskeletal conditions were declared a National Health Priority Area (NHPA) in 2002. The initial NHPA focus was on osteoarthritis, rheumatoid arthritis and osteoporosis, with juvenile arthritis added in 2006. The four focus areas are briefly described below.

Osteoarthritis: a degenerative joint condition that mostly affects the hands, spine and weight-bearing joints such as hips, knees and ankles. Its main feature is the breakdown of the cartilage that overlies the ends of the bones in the joint. The disease disrupts the normal function of the joint and can lead to pain, stiffness, activity limitations at home or work, and psychological distress.

Rheumatoid arthritis: a chronic auto-immune disease marked by inflammation of the joints, most often affecting the hand joints in a symmetrical fashion. The immune system attacks the tissues lining the joints, causing pain, swelling and stiffness. Over time there is progressive and irreversible joint damage, resulting in deformities and severe disability. The systemic nature of the condition can also lead to problems with the heart, lungs, nerves and eyes.

Juvenile arthritis: a common term used for arthritis occurring in children under the age of 16 years. The condition typically has an unpredictable pattern of disease activity, with periods of disease remission followed by a resurgence of signs and symptoms. The main symptoms are swelling, pain and stiffness in the affected joints. Juvenile arthritis may affect children's growth and skeletal maturity, causing long-term disability and affecting their participation in activities such as sport.

Osteoporosis: the thinning and weakening of bones that often occurs with age, increasing the risk of fracture in both males and females. Bone loss occurs when the bone remodelling process begins to favour bone breakdown. Fractures after minimal trauma, such as minor bumps or falls from a standing height, are a hallmark of osteoporosis. They can cause both acute and chronic pain and can significantly affect daily life.

Prevalence

Data from the 2004–05 National Health Survey (NHS) reveal that long-term arthritis and musculoskeletal conditions affect 31% of the population—more than 6 million Australians (Table 5.7). Arthritis affects about 3 million people, with osteoarthritis accounting for about half the cases (1.6 million). From self-reports in the NHS, rheumatoid arthritis affects about 491,000 Australians and osteoporosis affects about 586,000. However, because of the 'silent' nature of osteoporosis, its true prevalence is significantly underestimated. The highest prevalence of musculoskeletal conditions is among older people, though the conditions also affect many younger Australians. About 1 in every 36 of those aged under 18 years are estimated to have arthritis or a musculoskeletal condition—an estimated 131,000 Australian children and young people. Of these, about 4,600 children reportedly had juvenile arthritis.

Table 5.7: Prevalence and health impact of selected arthritis and musculoskeletal conditions, various years (includes *NHPC indicator 1.08*)

	Prevalence[a] (2004–05)		Disability[b] (2003)		Deaths[c] (2005)		Disability-adjusted life years (DALYs) (2003)	
Disease/ condition	Number ('000)	Percentage of population[d]	Number ('000)	Percentage of population	Number ('000)	Percentage of all deaths	DALYs ('000)	Percentage of total DALYs
Osteoarthritis	1,548	7.9	n.a.	n.a.	0.1	0.1	34.6	1.3
Rheumatoid arthritis	491	2.5	n.a.	n.a.	0.2	0.1	16.8	0.6
Juvenile arthritis	5	0.1	n.a.	n.a.	—	—	n.a.	n.a.
All arthritis	*3,020*	*15.3*	*558*	*2.8*	*0.4*	*0.3*	*n.a.*	*n.a.*
Osteoporosis	586	3.0	51	0.3	0.2	0.1	n.a.	n.a.
All arthritis and musculoskeletal conditions	**6,092**	**31.0**	**1,245**	**6.3**	**1.0**	**0.8**	**105.5**	**4.0**

(a) Based on self-reported, current and long-term disease from the 2004–05 National Health Survey.

(b) Based on AIHW analysis of the 2003 Survey of Disability, Aging and Carers for persons aged 15 years and over.

(c) Deaths registered in 2005.

(d) For juvenile arthritis, population refers to all children aged under 16 years.

Sources: ABS 2006a; Begg et al. 2007; AIHW National Mortality Database.

Disability and functioning

Arthritis and musculoskeletal conditions are common causes of long-term disability. The nature of these limitations and disability for the main conditions is described in Box 5.7.

Based on data from the 2003 Survey of Disability, Ageing and Carers, over 6% of the Australian population have a disability related to diseases of the musculoskeletal system or connective tissue (Table 5.7). The range of disability and functional limitations differs between the various conditions, affecting not only a person's physical wellbeing but also their mental wellbeing. Arthritis and osteoporosis were the main disabling condition for about 560,000 and 51,000 Australians respectively. More than 30% of people with arthritis-associated disability and almost half with osteoporosis-associated disability are estimated to have profound or severe limitations in performing core activities such as those related to self-care and mobility (AIHW: Rahman & Bhatia 2007). Although a large proportion of people with arthritis-associated disability are aged 75 years and over (about one-quarter), just under half (266,000 persons) are of working age (15–64 years). The functional limitations imposed by the condition can cause restrictions in the types of jobs they can do, difficulty in changing jobs or in obtaining a preferred job.

Box 5.7: Disability and musculoskeletal conditions

Osteoarthritis: The type of activity a person with osteoarthritis finds difficult is greatly determined by which joints are affected. Hand and arm problems may lead to a need for help with self-care tasks involving personal hygiene, dressing or other household chores. When hip or knee function is affected, mobility can be restricted, making tasks such as going up and down stairs, rising from a chair or bed, and walking very painful and difficult.

Rheumatoid arthritis: Deterioration in physical functioning can occur rapidly in the first couple of years after diagnosis. Being unable to perform tasks can lead to high levels of anxiety and depression. A loss of positive body image due to joint deformities can also reduce a person's wellbeing. Early diagnosis and treatment can do much to reduce the impact of rheumatoid arthritis.

Juvenile arthritis: The physical symptoms of juvenile arthritis can interrupt a child's daily activities, such as attending school and participating in play or exercise. Children might find it difficult to sit on the floor, hold pens and pencils, carry books and open their lunch box. Pain and functional limitations can prevent them from participating in sport, and the physical appearance of swollen and deformed joints can affect their psychosocial function. This can in some cases lead to social isolation and poor social development, which may lead to problems with employment, social interaction and personal relationships in adulthood.

Osteoporosis: The site and severity of a fracture will determine how a person's functioning may be limited. Wrist and forearm fractures may affect the ability to write or type, prepare meals, perform personal care tasks and manage household chores. Fractures of the spine and hip usually affect mobility, making activities involving walking, bending, lifting, pulling or pushing difficult. The loss of independence from the need for assistance may also reduce wellbeing.

Burden of disease

Arthritis and musculoskeletal conditions do not account for many deaths (a total of about 1,000 each year), representing only 0.5% of life lost due to premature mortality (YLL). However, they are responsible for 7.3% of 'healthy' life lost due to poor health or disability (YLD). Including both deaths and disability, they accounted for 4% of the overall disease burden in 2003, measured in terms of DALYs (Table 5.7; Begg et al. 2007).

Health service use

The treatment and management of arthritis and other musculoskeletal conditions results in the frequent use of primary care, hospital and allied health services. These conditions are the fourth leading cause of health expenditure, accounting for $4.0 billion in 2004–05 or 7.5% of health system expenditure that can be reliably allocated to various diseases.

Most of these conditions can be effectively managed by general practitioners, who provide primary care and advice on self-management strategies. Hospital services are used when certain musculoskeletal conditions require surgical intervention or more specialised treatment. Allied health-care professionals, such as physiotherapists and occupational therapists, help to manage pain and maximise physical functioning. Information about services provided by GPs and hospitals is presented below. Unfortunately, although allied health care is an integral component of management for musculoskeletal conditions, very little information about the use of these services is currently available.

GP visits

Musculoskeletal conditions were the second most commonly managed problem by GPs in 2005–06, accounting for 11.8% of total problems managed (Britt et al. 2007). Osteoarthritis made up 1.8% of all problems managed by GPs, being managed in 27 out of every 1,000 encounters (more than one problem can be managed at each encounter). This equates to more than 2.5 million Medicare-paid GP consultations between 1 April 2005 and 31 March 2006. Rheumatoid arthritis (0.4% of problems managed in 2005–06) and osteoporosis (0.6%) are less commonly managed by GPs than osteoarthritis. This is most likely because of their lower prevalence, but it may also be related to differing levels of self-management for osteoporosis and the greater role of specialists in rheumatoid arthritis management. The most common action taken by GPs to manage osteoarthritis, rheumatoid arthritis and osteoporosis was to prescribe, advise on or supply medication.

Hospitalisations

Significant advancements in surgical treatment have provided effective options to reduce the pain and disability associated with certain musculoskeletal conditions. Joint replacement surgery (knee and hip replacement) is considered the most cost-effective intervention for severe osteoarthritis, reducing pain and disability and restoring some patients to near normal function (Bachmeier et al. 2001). The fractures resulting from osteoporosis can require hospital care and treatment. Procedures such as partial joint replacements and the use of pins, screws and plates can help to strengthen and realign broken bones. These procedures can restore some degree of function, ultimately improving quality of life.

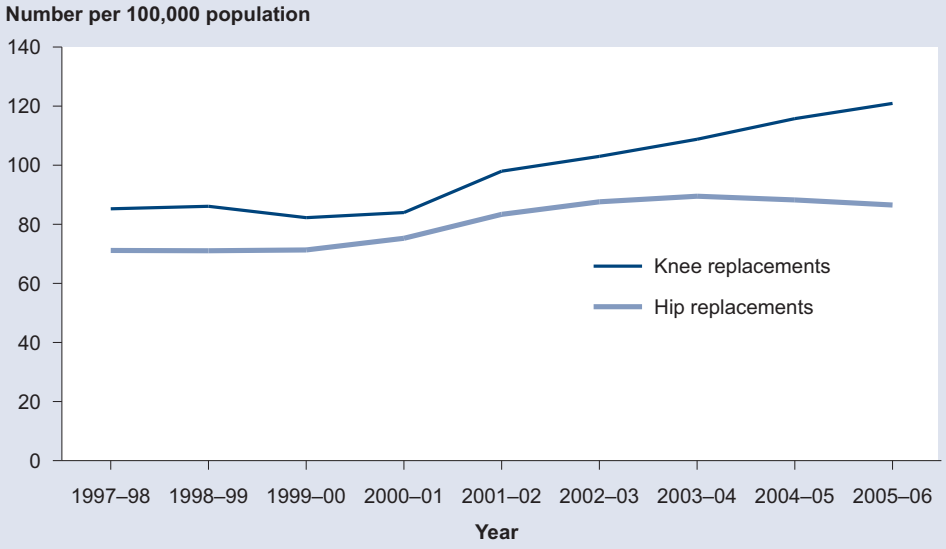
Joint replacements

In 2005–06, 44,446 total knee and hip joint replacements were performed in Australia for people with the principal diagnosis of a disease of the musculoskeletal system. About 95% of these procedures were for osteoarthritis, with the remaining 5% undertaken for osteoporosis, rheumatoid arthritis, and other musculoskeletal conditions. Knee replacements (25,897 procedures) were performed more commonly than hip replacements (18,549). Both procedures were more common in females than males.

The rate of joint replacements increased between 2000–01 and 2003–04, and this trend is expected to continue based on Australia's ageing population. However, data between 2003–04 and 2005–06 indicate that while knee replacement rates continued to rise, the rate of hip replacements declined (Figure 5.17).

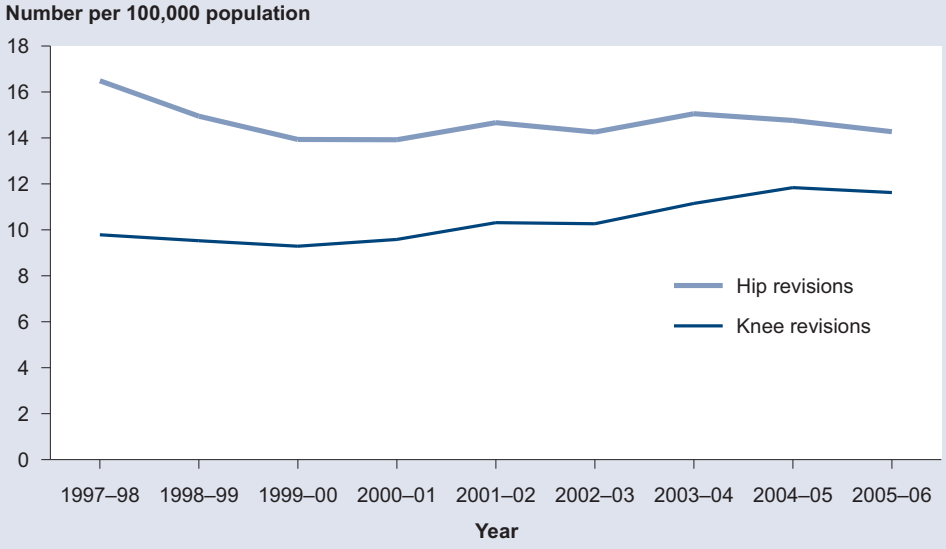
Primary hip and knee replacements may need to be revised if the artificial joint can no longer provide suitable function. The need for revision can be caused by loosening or dislocation of the artificial joint (accounts for about 63% of revisions), osteolysis (degeneration of bone), fracture or infection (Australian Orthopaedic Association National Joint Replacement Registry 2006). The quality and performance of artificial joints are major factors affecting the revision rate of total hip and knee replacements. In 2005–06, total knee revisions (11.62 per 100,000 population) were less common than total hip revisions (14.27 per 100,000) (Figure 5.18).

Hospital services account for the largest proportion of total direct health expenditure for arthritis and musculoskeletal conditions (AIHW: Penm et al. 2006). Osteoarthritis is the greatest contributor to this, reflecting the use of joint replacement in its management. The average cost of a primary hip or knee replacement in a public hospital was estimated to be $14,000–$17,000 in 2004–05, and a revision hip procedure cost $17,000–$30,000 on average (DoHA 2006).



Source: AIHW National Hospital Morbidity Database.

Figure 5.17: Trends in total primary hip and knee replacements, 1997–98 to 2005–06



Source: AIHW National Hospital Morbidity Database.

Figure 5.18: Trends in revisions of total primary hip and knee replacements, 1997–98 to 2005–06

Treatment for minimal trauma fractures

In 2005–06 there were 48,409 hospitalisations (excluding patient transfers) for minimal trauma (osteoporosis-related) fractures in persons aged 40 years and over. Almost four-fifths of these (78%) involved fractures at one of the major body sites listed in Table 5.8, with hip fractures accounting for about a third of all hospitalisations for minimal trauma fractures.

Table 5.8: Hospitalisations for minimal trauma fractures, persons aged 40 years or over, 2005–06

Fracture site[(a)]	Males	Females	Persons	Per cent
Hip	4,410	11,824	16, 234	33.5
Wrist	922	5,917	6,839	14.1
Shoulder	861	3,046	3,907	8.1
Pelvis	661	3,037	3,698	7.6
Ankle	848	2,303	3,151	6.5
Spine	861	1,756	2,617	5.4
Forearm	328	1,026	1,354	2.8
Other	3,832	6,777	10,609	21.9
Total	**12,723**	**35,686**	**48,409**	**100**

(a) Based on principal diagnosis. More than one fracture may have been recorded.

Notes

1. A hospitalisation for minimal trauma fracture was defined as any hospitalisation of a person aged 40 years and over with the principal diagnosis of a fracture and an external cause code indicating minor trauma (ICD-10-AM codes W00–W08, W18, W19, W22, W50, W51 and W548).
2. Hospitalisations where the patient was transferred from another hospital were excluded (6,891 cases, or approximately 12.5% of all minimal trauma fracture hospitalisations). This provides a more accurate estimate of the number of fractures that required hospital treatment as an admitted patient.

Source: AIHW National Hospital Morbidity Database.

5.7 Dementia

Dementia is a major health problem among older people. It can be described as a general and increasing deterioration of higher brain functions such as memory, understanding and reasoning. It is not a specific disease but a syndrome associated with a range of diseases. Dementia is highly disabling, restricts daily activities and can result in high care needs in the long term. Many diseases can cause dementia, the most common being Alzheimer's disease. Other common forms include vascular dementia, dementia with Lewy bodies, frontotemporal dementia (including Pick's disease) and mixed forms of dementia. Although dementia is not an inevitable part of ageing, its prevalence is greater in older age groups and it is very prevalent in the very old.

Disability

Even though dementia is not often fatal in itself, it causes so much disability that it was ranked fifth as a specific cause of the burden of disease among females in 2003 (Begg et al. 2007). It is the greatest single contributor to the burden of disability at older ages and the second greatest single contributor to the cost of care in residential aged care (AIHW 2007a).

In older people dementia is more likely than other health conditions to be associated with severe or profound limitations in self-care, mobility and communication, and is very likely to be associated with multiple health conditions (AIHW 2007a: Table 5.25; AIHW 2002). Other long-term problems include gait disturbance, slowed movement, fractures, arthritis, osteoporosis and urinary tract infections. The oral health of older people with dementia is also significantly worse than that of their counterparts (AIHW Dental Statistics and Research Unit 2005).

Dementia is a progressive condition whose impact on the individual's functioning increases with the growing severity of the underlying disease. It is classified as 'mild' in about 55%, 'moderate' in 30% and 'severe' in 15% of those affected, based on the severity definitions of the Clinical Dementia Rating scale (AIHW 2007a). However, the naming system of this scale does not adequately describe dementia's impact. For example, those with 'moderate' dementia are described as having such severe memory loss that only information that has long been deeply ingrained is retained. They are also severely impaired in making judgements or solving problems, they often cannot function independently outside the home, and they require help with personal care.

Because of the severity of the condition, people with dementia are heavy users of health and aged care services including GP consultations, pharmaceuticals, aged care assessments, community care programs, hospitals and residential aged care. They also require much time and help from their carers and their behavioural and psychological symptoms are also distressing to many of their carers.

Prevalence

Based on findings from major European studies, about 6.5% of Australians aged 65 years and over had dementia in 2006, including 22% of people aged 85 years and over (Table 5.9). The condition is rare in people under the age of 65 years. Almost two-thirds (64%) of older people with dementia were female, mostly because of the higher proportion of females living to older ages. Rates increase markedly with age and dementia is common in very elderly people, and almost 40% of those with dementia are aged 85 years and over. The age profile of males with dementia is different from that of females. For example, 29% of males with dementia are aged under 75 years compared with 13% of females.

Table 5.9: Prevalence of dementia by age and sex, 2006

	Rate (per cent)			Number		
Age	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
0–64	0.1	0.0	0.1	5,900	2,900	8,800
65–74	2.0	1.8	1.9	13,900	12,600	26,500
75–84	7.3	9.3	8.4	30,500	50,300	80,700
85+	17.1	24.9	22.4	18,300	55,300	73,500
Total 65+	*5.0*	*7.8*	*6.5*	*62,700*	*118,200*	*180,700*
Total	**0.7**	**1.2**	**0.9**	**68,600**	**121,100**	**189,500**

Note: Derived from aggregated age- and sex-specific rates from a meta-analysis of data from European studies (Lobo et al. 2000). Percentages are of the estimated Australian resident population of that age and sex at 30 June 2006.

Source: AIHW 2007a based on data from Lobo et al. 2000 and Harvey et al. 2003.

Use of cared accommodation

Because dementia is one of the most disabling health conditions, most (91%) who are moderately or severely affected require full-time care and live in cared accommodation. Conversely, nearly all (96%) with mild dementia live in households. Considering the 166,600 older people with dementia in 2003, 44% (74,100) were in cared accommodation and the remainder lived in households (Table 5.10). The proportion of people with dementia who lived in households decreased with age from 79% at ages 65–74 to 36% at ages 85 and over. Accordingly, the majority of the estimated $1.4 billion health and aged-care system expenditure for dementia in 2003 is in the residential aged-care sector, where $993 million was attributed to dementia.

Although the 2003 Survey of Disability, Ageing and Carers is currently the best source of data about dementia in cared accommodation, there is evidence that it underestimates the number of cases of mild and moderate dementia in households, and to a lesser extent in cared accommodation.

Table 5.10: Prevalence of those with dementia living in households or cared accommodation, 2003

Age	Cared accommodation[a]	Households	Total prevalence	Per cent living in households
0–64	1,200	6,900	8,100	85
65–74	5,300	20,100	25,400	79
75–84	27,300	49,000	76,300	64
85+	41,500	23,400	64,900	36
Total 65+	*74,100*	*92,500*	*166,600*	*56*
Total	**75,300**	**99,400**	**174,700**	**57**

(a) Cared accommodation includes Accommodation for the retired or aged, Home for the aged, Home—other, Hospital—general and Hospital—other. It is broader in scope than 'Residential aged care'.

Sources: AIHW 2007a based on data from Lobo et al. 2000 and Harvey et al. 2003 and AIHW analysis of ABS 2003 SDAC confidentialised unit record file.

The future prevalence of dementia

The number of older Australians with dementia is projected to increase from 180,700 in 2006 to 452,600 in 2031, an increase of 150% or 271,900 persons (Table 5.11). For the 6 years from 2006 to 2011, the number of older people with dementia is projected to increase by 17% (31,300 persons) to around 212,000 persons. These estimates are based on the projected increase in the number of older people over this period and assumes that prevalence rates for dementia remain stable. However, prevalence rates may change as a result of changes in prevention, detection, management and treatment of the disease.

Table 5.11: Projected number of people with dementia, 2006 to 2031

	2006			2011			2031		
Age	**Male**	**Female**	**Persons**	**Male**	**Female**	**Persons**	**Male**	**Female**	**Persons**
0–64	5,900	2,900	8,800	6,700	3,300	10,000	8,000	4,000	12,000
65–74	13,900	12,600	26,500	16,700	14,900	31,600	28,400	26,000	54,500
75–84	30,500	50,300	80,700	33,000	51,500	84,500	71,800	104,100	175,900
85+	18,300	55,300	73,500	25,700	70,300	96,000	74,200	148,100	222,200
Total 65+	*62,700*	*118,200*	*180,700*	*75,400*	*136,700*	*212,100*	*174,400*	*278,200*	*452,600*
Total	**68,600**	**121,100**	**189,500**	**82,100**	**140,000**	**222,100**	**182,400**	**282,200**	**464,600**

Source: AIHW 2007a, based on data from Lobo et al. 2000 and Harvey et al. 2003.

Incidence

Based on the best data about dementia prevalence, duration of illness and mortality, it has been estimated that there were 37,000 incident (new) cases of dementia among Australians in 2003, with most occurring in people over the age of 65 years (Table 5.12). The majority (63% or 23,300) of these were female and 13,900 were male. Not all incident cases of dementia will be initially visible because onset usually occurs with mild symptoms. However, as dementia is not reversible, these people will in time become part of the visible prevalent population unless they die from other causes first.

Table 5.12: Estimated incidence of dementia, by age and sex, 2003

Age	Males	Females	Persons
0–64	1,100	600	1,600
65–74	2,800	2,700	5,400
75–84	6,300	10,100	16,400
85+	3,700	9,900	13,500
Total 65+	*12,800*	*22,700*	*35,400*
Total	**13,800**	**23,200**	**37,000**

Note: Figures may not sum to totals due to rounding.

Source: AIHW and University of Queensland estimates based on meta-analysis of overseas studies (see AIHW 2007a: Box 4.3).

5.8 Mental health problems and illnesses

Mental health problems and illnesses affect the perceptions, emotions, behaviour and resulting social wellbeing of individuals. There are numerous types of mental illnesses with varying degrees of severity. Examples include anxiety, depression, bipolar disorders and schizophrenia. Mental illness is widely recognised as a major health concern in Australia. Although fewer deaths are attributed to it than to other leading health problems, it causes so much distress and disability that it was third among the broad disease groups in the burden of disease rankings for 2003 (Begg et al. 2007).

Mental illness is also associated with stigma in Australian society, which often leads to isolation and discrimination for those affected. In February 2006 the Council of Australian Governments committed to reform of Australia's mental health services nationally, with a 5-year action plan developed for Commonwealth and state/territory collaboration. The plan focuses on the removal of stigma attached to mental illness through increasing community awareness of mental illness as a disease, preventing mental ill health, intervening early, and improving access to services for those in need.

Prevalence

Based on the latest information available—collected in the 1997 National Survey of Mental Health and Wellbeing (see Box 5.8)—almost one in five Australian adults will experience a mental disorder at some time in their life. Overall, an estimated 18% of Australian adults had experienced a mental disorder in the preceding 12 months (ABS 1998).

Box 5.8 Measuring the prevalence of mental health problems

The prevalence of mental health problems used in this section comes from three main sources:

- The National Survey of Mental Health and Wellbeing was conducted by the ABS in 1997. This survey used the Composite International Diagnostic Interview to identify adults with mental illness. The survey also collected information on psychological distress using the Kessler Psychological Distress Scale-10 items (K10). K10 is a scale of non-specific psychological distress based on 10 questions about negative emotional states in the reference period (the 4 weeks before interview). Another survey was run in 2007, with results not available in time for this publication.
- The ABS National Health Survey (NHS) of 2004–05 included two measures of the prevalence of mental health problems. The first was self-reported information about long-term conditions. The second was the K10 (also collected in the previous two NHS surveys).
- The 2004 National Drug Strategy Household Survey also collected information using the K10.

The 2004–05 National Health Survey (NHS) provides the latest estimates of the prevalence of mental health problems in Australia based on self-reports (see Box 5.8). The proportion of people estimated to have a long-term mental or behavioural problem increased progressively over the last three NHS surveys—from 5.9% in 1995, to 9.6% in 2001, to 11.0% in 2004–05 (age-standardised). This may reflect a real increase, or simply a growing willingness to report mental disorders, or both. The most commonly reported problems were anxiety-related problems and mood (affective) problems, each found in about 4% of males and 6% of females. Females were more likely than males to report a long-term mental or behavioural problem (11.4% of females compared with 10% of males).

Psychological distress

Based on information in the 2004–05 NHS, an estimated 3.8% of Australians aged 18 years and over had very high levels of psychological distress (Table 5.13). Earlier estimates covering the period between 1997 and 2004 varied between 2.2% and 3.6%. In 1997 and 2001, the highest rates occurred in the 45–54 years age group, for both males and females. This remained unchanged for females in 2004–05 but for males the group with the highest rate was now those aged 55–64 years.

Table 5.14 shows that high and very high levels of psychological distress were more common in females (15%) than in males (11%) in the 2004–05 NHS, and males (67%) were more likely to have low levels of psychological distress than females (59%). Adults reporting a long-term mental or behavioural problem were much more likely to have high or very high levels of psychological distress than the total adult population (48% compared with 13%) (ABS 2006a).

Table 5.13: Prevalence of very high psychological distress[a] in adults, 1997, 2001, 2004, 2004–05 (per cent) (*NHPC indicator 1.05*)

Year	Age group						
	18–24	25–34	35–44	45–54	55–64	65 or over	Total
	Males						
1997	0.6[b]	1.3[b]	2.2	3.0	2.7	1.9[b]	1.9
2001	2.7	2.1	2.5	3.7	3.6	1.9	2.7
2004	2.5	2.9	1.5	2.0	1.9	1.0	2.0
2004–05	3.3	2.3	3.4	4.0	4.6	2.9	3.3
	Females						
1997	2.1[b]	2.8	2.4	3.8	1.5[b]	1.3[b]	2.4
2001	5.4	4.6	4.2	5.5	3.6	3.2	4.4
2004	4.5	3.2	2.9	2.0	1.7	1.4	2.6
2004–05	3.5	3.5	5.1	5.5	4.3	3.5	4.3
	Persons						
1997	1.3	2.1	2.3	3.4	2.1	1.6	2.2
2001	4.0	3.4	3.4	4.6	3.6	2.6	3.6
2004	3.5	3.0	2.2	2.0	1.8	1.2	2.3
2004–05	3.4	2.9	4.3	4.8	4.4	3.2	3.8

(a) Measured using the Kessler Psychological Distress Scale-10 items (K10).

(b) Estimate has a relative standard error of between 25% and 50% and should be used with caution.

Notes

1. Persons with scores of 30 to 50 are rated as having a very high level of psychological distress on the K10 scale of psychological distress.
2. Age-standardised to the Australian population as at 30 June 2001.

Sources: ABS 1998, 2002, 2006a; AIHW 2005d.

Table 5.14: Prevalence of psychological distress in adults, 2004–05 (per cent)

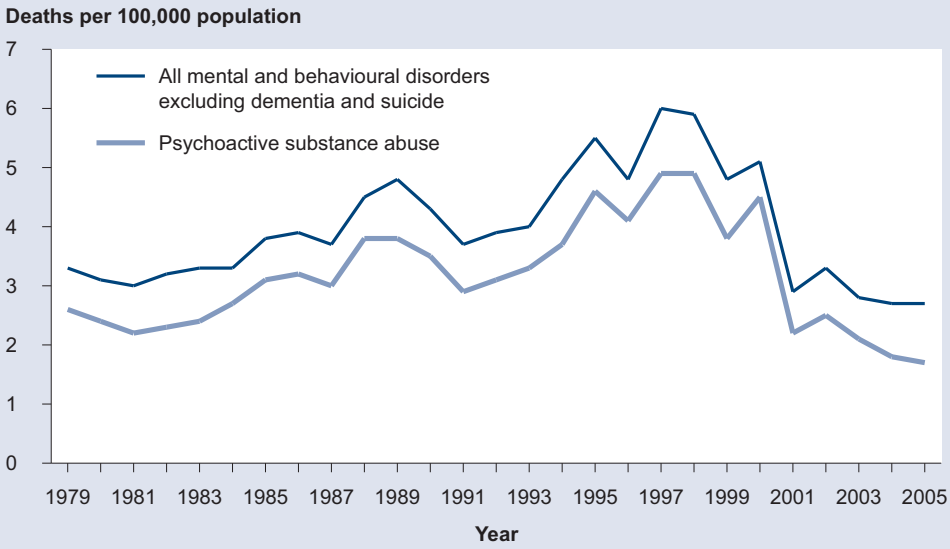
Age group	Level of psychological distress (K10 scale[a])			
	Low	Moderate	High	Very high
	Males			
18–24	60.4	27.1	9.1	3.3
25–34	64.3	26.4	7.0	2.3
35–44	64.7	23.8	7.9	3.4
45–54	67.8	21.0	7.0	4.0
55–64	70.4	18.0	6.7	4.6
65 or over	72.4	17.2	7.3	2.9
Total	**66.6**	**22.4**	**7.5**	**3.3**
	Females			
18–24	49.4	31.8	15.2	3.5
25–34	55.3	30.2	10.9	3.5
35–44	57.2	26.1	11.5	5.1
45–54	59.4	24.1	10.7	5.5
55–64	69.1	17.8	8.8	4.3
65 or over	65.4	22.8	8.1	3.5
Total	**59.1**	**25.7**	**10.8**	**4.3**

(a) Based on the Kessler 10 scale of psychological distress.

Source: ABS 2006a.

Mortality

A mental or behavioural disorder was recorded as the underlying cause for 579 deaths in 2005 (excluding dementia and suicide), an age-standardised rate of 2.7 per 100,000 persons. (Suicides are reported in Section 5.10 and dementia in Section 5.7.) The rate dropped substantially from the peak years of the mid to late 1990s, and now appears to be plateauing (Figure 5.19). Most cases with a mental or behavioural disorder as the underlying cause of death were due to abuse of psychoactive substances such as alcohol and heroin.



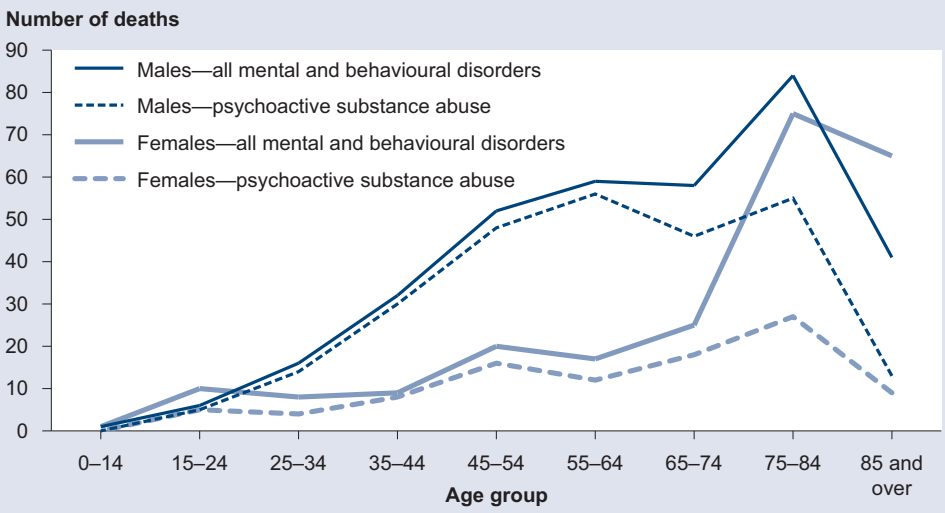
Notes

1. ICD-10 codes: all mental and behavioural disorders, F04–F99; psychoactive substance abuse, F10–F19.
2. A comparability factor was applied to enable comparison between ICD-9 (baseline) and ICD-10 (most recent) coded data.
3. Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 5.19: Death rates for mental and behavioural disorders, 1979 to 2005 (*NHPC indicator 1.08*)

Deaths due to psychoactive substance abuse were more common among males than females (Figure 5.20). Deaths with another mental or behavioural disorder as the underlying cause (that is, not psychoactive substance abuse) were mainly recorded for persons over the age of 65 years.



Note: ICD-10 codes: all mental and behavioural disorders, F04–F99; psychoactive substance abuse, F10–F19.

Source: AIHW National Mortality Database.

Figure 5.20: Deaths from mental and behavioural disorders, by sex and age group, 2005

Psychiatric disability

Based on the ABS Survey of Disability, Ageing and Carers (ABS 2005), around 1 in 20 (5.2%, about 1.0 million) Australians were estimated to have a psychiatric disabling condition in 2003. Almost half of these had severe or profound core activity limitation—that is, they sometimes or always needed help with self-care, mobility or communication (Table 5.15). The proportion of females with a psychiatric disability who had a severe or profound activity limitation was higher than for males (3.0% and 2.0% respectively).

Psychiatric disability is also associated with other disabling conditions. For those with a psychiatric problem as a disabling condition, 36.7% also had a sensory/speech disability and 36.2% reported physical and/or diverse disabilities. In those aged under 15 years, 83.9% also reported an intellectual disability.

Table 5.15: Prevalence of psychiatric disability[a] by core activity limitation, 2003

	Males		Females		Persons	
Core activity limitation	**Number ('000)**	**Per cent**	**Number ('000)**	**Per cent**	**Number ('000)**	**Per cent**
Profound core activity limitation	109.6	1.1	187.4	1.9	297.0	1.5
Severe core activity limitation	89.6	0.9	106.2	1.1	195.8	1.0
Moderate core activity limitation	65.6	0.7	91.1	0.9	156.6	0.8
Mild core activity limitation	87.9	0.9	96.9	1.0	184.8	0.9
Total with a psychiatric disability[b]	**447.4**	**4.6**	**570.5**	**5.8**	**1,017.9**	**5.2**

(a) Persons with a psychiatric disability as the main or other disabling condition.

(b) Includes persons with no core activity limitation but who are restricted in schooling or employment only, and persons without specific limitations or restrictions.

Note: Percentages are of the respective component of the Australian population.

Source: AIHW 2005c.

As at June 2005, 26.2% of the 706,782 recipients of the Australian Government's Disability Support Pension had a psychiatric/psychological condition, second only to musculoskeletal and connective tissue conditions (33.9%) (DEWR 2006).

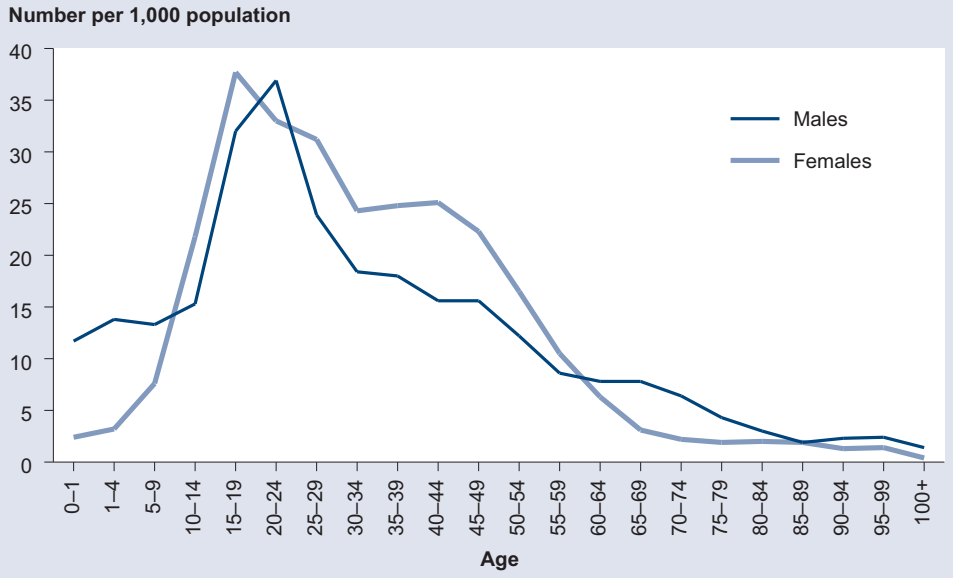
Burden of disease

Mental illness was estimated to be responsible for 13% of the total burden of disease in Australia in 2003, placing it third as a broad disease group after cancers and cardiovascular disease (Begg et al. 2007; see Section 2.6). Almost all (93%) of the mental illness burden was due to disability rather than premature mortality. In fact, mental illnesses accounted for almost one-quarter (24%) of the total disability burden for all diseases.

The burden attributed to mental illness was spread across both sexes and all ages, with females accounting for 53% of the burden. In females, anxiety and depression were the foremost causes, accounting for 10% of the overall female burden of disease, and together they ranked third (at almost 5%) in the overall male burden.

The burden from mental illnesses for both sexes was greater in early to mid adulthood than at other ages (Figure 5.21).

Mental illnesses accounted for a relatively large proportion of overall disease burden for age groups up to middle age. Twenty-three per cent of the overall burden for children aged 0–14 years was due to mental illnesses and the proportion was 36% for the 15–44 years age group.



Note: Disease burden is measured using Disability-Adjusted Life Years. See Section 2.6 for more information.

Source: Begg et al. 2007.

Figure 5.21: Mental illnesses burden by age and sex, 2003

Comorbidity

Comorbidity, involving more than one mental illness, or at least one mental illness and one or more physical illnesses, is common among those with mental illness. Based on information from the National Survey of Mental Health and Wellbeing, of people who had a mental disorder (including anxiety, affective, substance use and personality disorders), 40% reported at least one other disorder. People with multiple disorders were more disabled, more distressed, had more consultations for mental health problems, and had higher measured levels of neuroticism than those with only one disorder (Andrews et al. 2002).

From the 2004–05 NHS, the prevalence of other National Health Priority Area diseases and conditions was higher among those with a long-term mental or behavioural problem than among the total population (Table 5.16).

Table 5.16: Prevalence of NHPA diseases, 2004–05 (per cent)

NHPA disease/condition	Among persons with a long-term mental or behavioural problem	Among the total population
Arthritis	23.4	15.3
Asthma	16.0	10.2
Heart, stroke and vascular disease	6.3	3.8
Diabetes	3.7	3.6
Malignant neoplasms (cancers)	3.2	1.7

Source: ABS 2006a.

The causal link between mental illnesses and physical ill health is also now widely recognised. A recent World Health Organization report contends that there is strong evidence establishing depression as a risk factor for heart disease (Raphael et al. 2005). Australian research has also supported a causal association between depression, social isolation and lack of quality social support and the onset and prognosis of coronary heart disease (Bunker et al. 2003).

Health service use

GP visits

According to estimates from the 2005–06 BEACH survey of general practice activity, 11.1% of GP encounters involved the management of a psychological problem (Britt et al. 2007). Depression was the fourth most commonly managed problem in general practice (3.6 per 100 encounters) and the second most frequently managed chronic problem, accounting for 7.1% of total chronic problems. Over 80% of GP contacts involving a diagnosis of depression were repeat attendances. Medications relating to the nervous system were the most commonly prescribed drug type, accounting for an estimated 21.7% of prescriptions written by GPs. Medications in this group included antidepressants, anti-anxiety drugs and antipsychotics.

Hospitalisations

There were 322,110 hospitalisations with either a mental health-related principal diagnosis or a record of specialised psychiatric care in the financial year 2005–06 (1,567 hospitalisations per 100,000 people). These accounted for 2,960,201 patient days, which equates to an average stay of 9.2 days (Table 5.17).

Although constituting 4.4% of all hospitalisations, mental health-related hospitalisations accounted for 12.2% of total patient days. Principal diagnoses of depressive disorders (25.8%), neurotic and stress-related disorders (15.5%), mental and behavioural disorders due to alcohol (11.8%), and schizophrenia (9.6%) accounted for large proportions of mental health-related hospitalisations. Schizophrenia accounted for the largest proportion of such patient days (22.2%).

Table 5.17: Mental health-related hospitalisations[a], 2005–06 (number)

Principal diagnosis	Hospitalisations	Patient days
Dementia	5,973	143,103
Other organic mental disorders	5,166	71,717
Mental and behavioural disorders due to use of alcohol	38,122	147,964
Mental and behavioural disorders due to other psychoactive substance use	15,145	85,454
Schizophrenia	30,834	657,775
Other schizophrenic, schizotypal, delusional disorders	20,523	259,994
Manic episode	986	11,034
Bipolar affective disorder	20,854	232,111
Depressive disorders	83,189	497,523
Other mood (affective) disorders	3,527	18,881
Neurotic, stress-related and somatoform disorders	49,933	213,493
Eating disorders	4,971	56,821
Other behavioural syndromes associated with physiological disturbances and physical factors	2,123	11,115
Disorders of adult personality and behaviour	9,885	50,409
Mental retardation	409	43,834
Disorders of psychological development	887	11,586
Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	4,237	13,740
Mental disorder not otherwise specified	576	6,083
Other mental health-related diagnosis[b]	14,636	115,825
Other[c]	10,134	311,739
Total	**322,110**	**2,960,201**

(a) Includes hospitalisations which reported either specialised psychiatric care days and/or a mental health-related principal diagnosis.

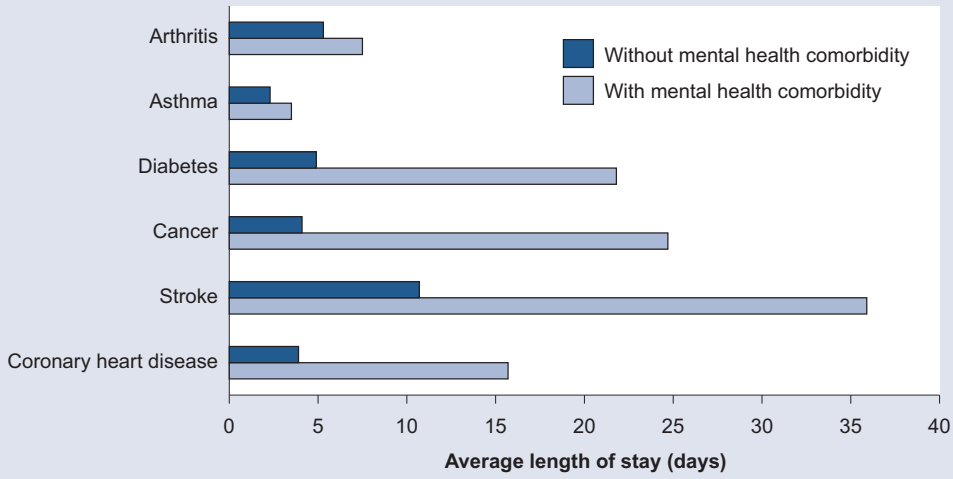
(b) Includes mental health-related diagnoses other than those in the Mental and Behavioural Disorders chapter of ICD-10-AM, as detailed in AIHW 2007b: Appendix 4.

(c) Includes hospitalisations for which specialised psychiatric care was provided without a mental health-related principal diagnosis being recorded.

Source: AIHW National Hospital Morbidity Database.

In 2005–06, there were a further 282,876 hospitalisations with a mental health-related additional diagnosis and a non-mental health-related principal diagnosis. These accounted for around 2.8 million patient days.

The average length of stay in hospital for patients with various NHPA-related principal diagnoses was higher when the patient also had a mental health diagnosis reported (Figure 5.22).



Source: AIHW National Hospital Morbidity Database.

Figure 5.22: Length of stay when mental health problems are a comorbidity in hospitalisations, 2005–06

5.9 Oral health problems

The picture for oral health problems is improving in Australia, indicated by the number of people with dental decay decreasing over the last two decades. Australia also compares well internationally, with a low number of children with decayed teeth compared with other OECD countries. However, oral health problems are still common, and since they are highly preventable there is considerable scope to improve.

The oral diseases that most frequently contribute to poor oral health in the Australian population are dental decay and periodontal (gum) disease. Both conditions can express themselves as toothache, unsightly teeth with cavities, red and sore gums, or pain with eating and drinking. Even today, it is common for a tooth to be extracted when it is affected severely by decay, gum disease, or both (see Box 5.9).

Information for this section has come from two national oral health surveys, one conducted in 2004–06, and one in 1987–88. See Box 5.10 for more information on these surveys. Information on dental services is included in Chapter 8.

Box 5.9 Dental health problems and tooth loss

Individuals who experience repeated episodes of oral disease in different teeth can lose several or all of their natural teeth. Dentures are worn by virtually all people who lose all of their natural teeth and by some people who have lost several. However, decisions to extract teeth or to wear dentures are not dictated solely by the degree of oral disease or tooth loss. Alternative treatments for severe disease or extensive tooth loss tend to be expensive, which can influence patients' and dentists' treatment preferences. There is historical evidence that when dentists had few alternative methods to treat oral disease, they were more likely to recommend extractions of all teeth, even when severe disease affected only a few such teeth (Davis 1980).

Box 5.10 National oral health surveys

New information about oral health in the Australian adult population was obtained in Australia's second National Oral Health Survey conducted in 2004–06 (Slade et al. 2007). Population estimates of oral disease and functioning were generated through interviews with 14,123 people aged 15 years or over. Additionally, dentists examined 5,505 survey participants who had one or more of their own natural teeth and recorded their levels of dental decay and gum disease.

The 2004–06 survey was Australia's second national oral examination survey, occurring 17 years after the 1987–88 National Oral Health Survey of Australia (Barnard 1993). Dental decay was measured in a way that permitted comparisons between surveys to evaluate trends.

By convention, dental decay experience is measured as the sum of three components: decayed (D), missing (M) and filled (F) teeth (T).

Prevalence

Based on the National Survey of Adult Oral Health, nearly one-fifth (19.0%) of Australians had gum disease in 2004–06 and one-quarter had untreated dental decay, with only a moderate amount of variation among age groups (Table 5.18). However, most people had a history of tooth decay, as shown by having one or more filled teeth (83.9% of people) or one or more teeth extracted because of tooth decay (61%). Both these signs of tooth decay were strongly associated with age, and were almost universal among people aged 75 years and over. Only 6.4% of Australian adults had lost all of their teeth, although this varied markedly from negligible among 15–34 year olds to over one-third of those aged 75 years and over. On average, Australians aged 15 year and over had 12.6 decayed, missing or filled teeth (DMFT).

Between 1987–88 and 2004–06, the dental health of people aged 15 years and over improved, indicated by the average number of decayed, missing or filled teeth falling from 14.9 to 12.6 (Figure 5.23). Two other distinctive trends are apparent (see Box 5.10 for information about the surveys). First, the total number of decayed, missing or filled teeth reduced markedly over the period for the three age groups below 45 years. Those younger adults were dominated by a 'fluoride generation' of people born between 1967 and 1983, who received more dental prevention than any previous generation. For example, from birth, the fluoride generation grew up in an era when virtually all toothpaste that could be purchased contained fluoride, and two-thirds of them lived in cities and towns where the water supply contained fluoride. Fluoride has been found to be effective in preventing dental decay in children, and the trends found through the surveys suggest that Australians exposed to fluoride since childhood have major oral health benefits as adults.

The second noteworthy trend, shown in Figure 5.23, is visible when considering the missing and filled components of dental decay experience among people aged 55 years and over. In each of those age groups, there were fewer missing teeth in 2004–06 compared with 1987–88, but a corresponding increase in the number of filled teeth. These findings illustrate a changing pattern of dental treatment, with a preference for fillings to treat decayed teeth, rather than extractions.

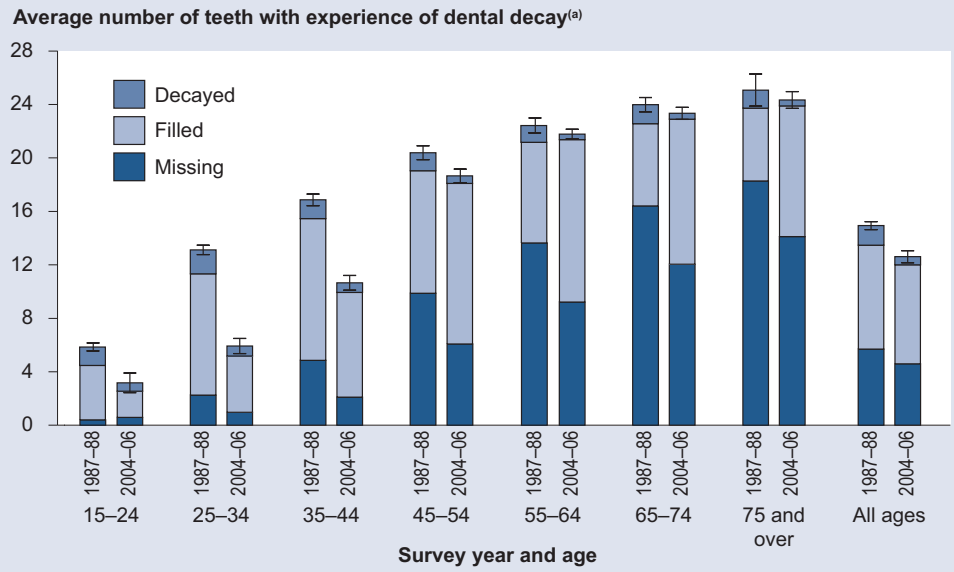
Table 5.18: Oral disease and function among adults 2004–06

Oral health indicator		Age				
		All ages	15–34	35–54	55–74	≥ 75
Population: all adults						
Loss of all natural teeth	% of people	6.4	0.0	1.7	13.9	35.7
	95% CI	6.0–6.9	0.0–0.1	1.3–2.2	12.7–15.2	32.6–38.9
Avoidance of foods due to dental problems	% of people	17.4	14.7	17.7	19.8	21.1
	95% CI	16.5–18.2	13.1–16.4	16.4–19.1	18.2–21.4	18.7–23.7
Population: adults with one or more natural teeth						
Periodontal (gum) disease[a]	% of people	19.0	12.0	23.2	23.5	25.9
	95% CI	17.2–21.0	9.2–15.6	20.5–26.1	20.8–26.4	18.4–35.0
One or more teeth with untreated decay	% of people	25.5	25.8	27.1	22.6	22.0
	95% CI	23.7–27.3	22.4–29.5	24.6–29.8	20.1–25.4	17.4–27.4
One or more teeth filled because of decay	% of people	83.9	65.4	94.8	96.2	89.5
	95% CI	81.9–85.6	61.2–69.4	93.1–96.0	94.6–97.3	84.8–92.9
One or more teeth extracted because of decay	% of people	61.0	25.8	70.7	97.8	99.2
	95% CI	58.5–63.5	21.9–30.2	67.7–73.5	96.3–98.7	94.9–99.4
Experience of toothache during the preceding year	% of people	15.1	18.7	15.3	10.6	6.4
	95% CI	14.2–16.1	16.9–20.6	14.1–16.6	9.4–11.9	4.7–8.6
Fair or poor self-rating of oral health	% of people	16.4	13.4	18.2	18.1	18.0
	95% CI	15.5–17.4	11.9–15.1	16.8–19.7	16.4–20.0	15.1–21.3

(a) Presence of at least one periodontal pocket with both probing depth of 4 mm or more and loss of gum attachment to the tooth for 3 mm or more.

Note: 95% CI = 95% confidence interval for estimated percentage.

Source: Slade et al. 2007.



(a) Black error bars are 95% confidence interval for estimated average number of decayed, missing and filled teeth (DMFT).

Source: Slade et al. 2007.

Figure 5.23: Age group trends in dental decay experience among dentate Australians, 1987–88 to 2004–06

Disability and functioning

Based on information reported in the 2004–06 National Survey of Adult Oral Health, more than one in six (17.4%) Australians were estimated to have difficulty eating foods because of dental problems, and the percentage increased slightly with age (Table 5.18).

Among adults with at least one natural tooth, two consequences of oral disease were toothache, affecting 15.1% of Australian adults, and a perception (in 16.4% of adults) that their oral health was 'fair' or 'poor' (Table 5.18). Over the preceding years, toothache was more likely among younger adults than older adults, probably because older adults had fewer teeth. However, there was little age variation in perceived fair/poor oral health.

5.10 Injury

Injury has a major, but often preventable, impact on Australia's health. It affects Australians of all ages, is the greatest cause of death in the first half of life and leaves many with serious disability or long-term conditions. In 2003, it accounted for 7% of the burden of disease (Begg et al. 2007). For these reasons, injury prevention and control was declared a National Health Priority Area and is the subject of three national prevention plans: the National Injury Prevention and Safety Promotion Plan: 2004–2014 (NPHP 2005a), National Falls Prevention for Older People Plan: 2004 Onwards (NPHP 2005b) and the National Aboriginal and Torres Strait Islander Safety Promotion Strategy (NPHP 2005c).

This section describes fatal and serious non-fatal (hospitalised) injury in Australia.

Hospitalised injury

Hospitalisation data provide an indication of the incidence of more severe injuries (excluding those cases where the person dies before they can be admitted to hospital). Injury accounted for over 1 in 20 of all hospitalisations in Australia in the financial year 2005–06, with 400,000 admitted patient episodes that year (Table 5.19; see also AIHW 2007c). Table 5.19 also provides estimates of the number of people hospitalised (a lower number, because some injuries result in more than one episode in hospital) along with several other summary measures.

Incidence rates of serious injury are higher for males than females, both overall and for most types of injury. However, the average length of stay is longer for females than males, reflecting the large number of older females hospitalised for hip fractures (see 'Fall-related injury' later in this section).

Table 5.19: Hospitalisations due to injury and poisoning[a], 2005–06

Measure	Males	Females	Persons[b]
Hospitalisations			
Hospitalisations due to injury and poisoning[a]	232,666	167,347	400,019
Hospitalisations due to all causes	3,438,248	3,873,645	7,311,983
Injury hospitalisations as proportion of all hospitalisations (%)	6.8	4.3	5.5
Cases			
Estimated number of hospitalised injury cases[c]	216,158	155,133	371,297
Crude rate (per 100,000 population)	2,124.8	1,509.2	1,815.4
Adjusted rate (per 100,000 population)[d]	2,145.6	1,402.9	1,791.3
Number of patient days	728,853	769,995	1,498,862
Average patient days/case	3.4	5.0	4.0
Number of high threat-to-life cases[e]	31,357	29,579	60,938

(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

(b) Includes cases where sex is missing or indeterminate.

(c) Omits inward transfers from acute hospitals.

(d) Age-standardised to the Australian population as at 30 June 2001.

(e) ICD-based Injury Severity Score < 0.941 (weights from Stephenson et al. 2003).

Source: AIHW National Hospital Morbidity Database.

High threat-to-life cases are defined here as those with injury diagnoses having about a 6% or higher chance of fatal outcome in hospital (Stephenson et al. 2003). Injury of this severity is likely to have a large impact on the patient, often with persisting problems and ongoing need for health-care services. One in 6 cases of hospitalised injury fell into this group (15% of the male cases, 19% of female) and they accounted for 43% of injury patient days in 2005–06.

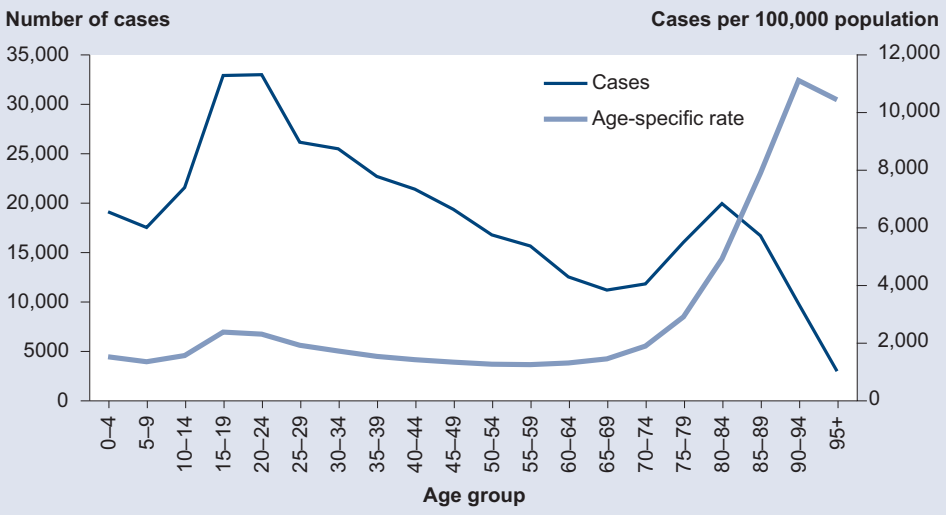
The incidence of hospitalised injury varies with age (Figure 5.24), and the number of cases is greatest among teenagers and young adults. There is also a peak in rates at this age, but by far the highest rates are in the oldest age groups.

The rate of hospitalised injury at ages 90 years and over was high in 2005–06, at more than one hospitalisation for every 10 people in that age group. This rate is almost entirely due to injury from unintentional falls (see 'Fall-related injury' later in this section).

The excess of male over female rates of hospitalised injury was largest for young adults, mainly because of transport injury (mainly road crashes) and interpersonal violence. At 60 years and over, however, the female rate exceeded the male rate, again mainly because of injury from unintentional falls.

Injuries result from exposures and events that are technically called 'external causes'. Table 5.20 summarises the types of external causes among injury cases admitted to hospital. Nearly 7 out of 8 injury cases hospitalised in 2005–06 were recorded as unintentional—that is, the injuries were not caused deliberately.

Falls and transport accidents were common external causes of injury in 2005–06 (50% of all hospitalised injury cases), and accounted for three-quarters of high threat-to-life cases (78%).



Note: Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

Source: AIHW National Hospital Morbidity Database.

Figure 5.24: Hospitalisations due to injury and poisoning, 2005–06: number of cases and rates, by age

Table 5.20: Hospitalisation due to injury and poisoning[a], by external cause groups, 2005–06

	All cases			High threat-to-life[b]			
External cause of injury[c]	Number	Per cent of total	Rate[d]	Number	Per cent of total	Rate[d]	Per cent within type
Unintentional							
Transportation	52,254	14	256.7	14,082	23	68.6	27
Drowning & submersion	494	0	2.5	440	1	2.2	89
Poisoning, pharmaceuticals	6,358	2	31.3	108	0	0.5	2
Poisoning, other substances	2,398	1	11.8	135	0	0.7	6
Falls	132,566	36	618.5	33,444	55	148.5	25
Fires/burns/scalds	5,457	1	27.1	1,405	2	6.9	26
Other unintentional	119,487	32	585.6	5,073	8	24.2	4
Intentional							
Self-inflicted	23,778	6	117.1	1,051	2	5.2	4
Inflicted by another person	22,080	6	109.4	4,753	8	23.5	22
Undetermined intent	4,430	1	21.8	186	0	0.9	4
Other & missing	1,995	1	9.4	261	0	1.2	13
Total	**371,297**	**100**	**1,791.3**	**60,938**	**100**	**282.5**	**16**

(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

(b) ICD-based Injury Severity Score < 0.941 (weights from Stephenson et al. 2003).

(c) ICD-10-AM External Cause codes aggregated as in Berry & Harrison 2007.

(d) The number of cases per 100,000 persons, age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Hospital Morbidity Database.

Mortality

Almost 7.5% of all deaths occurring in Australia in 2004–05 were injury deaths, about 27 per day (Table 5.21) (see Box 5.11 for information on counting injury deaths). The overall injury death rate for males was almost 1.7 times that of females. During the first year of life, congenital and perinatal conditions were the most common cause of death, but injury was the most common cause of death from early childhood through to middle age. In 2004–05, half of all deaths of persons aged 1–44 years were due to injury.

Table 5.21: Injury deaths—numbers, proportions and rates, 2004–05

Measure	Males	Females	Persons
Number of deaths[a]	6,090	3,678	9,768
Proportion of all deaths (per cent)	9.0	5.8	7.5
Crude rate (per 100,000 population)	60.6	36.2	48.3
Adjusted rate (per 100,000 population)[b]	58.8	34.6	46.7

(a) Deaths occurring during 2004–05 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any associated cause of death coded to ICD-10 S00–T75, T79. Method follows Henley et al. 2007.

(b) Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Of the nearly 10,000 injury deaths in 2004–05, 77% (7,526 deaths) had an injury coded as the underlying cause of death, and the remaining 23% (2,242) had injury coded as an associated cause of death.

Box 5.11: Counting injury deaths

Counting injury deaths is complex, due to how injury is coded in the International Classification of Diseases, which includes 'external cause' (ICD-10 U50–Y98) and 'injury' (ICD-10 S00–T98) codes. Injury deaths reported here follow the method of counting deaths described in Henley et al. (2007). This method classifies a death as an injury death if:

- the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, or Y89; or
- there is an associated cause of death coded to ICD-10 S00–T75, or T79.

By counting injury deaths in this way we obtain a more accurate count than the conventional method based solely on the underlying cause of death being an external cause. The main difference between this new method and the conventional one is that complications of surgical and medical care are not included in the new definition (Henley et al. 2007). However, note that the method used here is not comparable to that used for the diseases covered in the chapter, and is different to the method used in *Australia's health 2006* to count injury deaths. The conventional method results in about 8,000 injury deaths in 2005, compared to the almost 10,000 injury deaths reported in this section.

Intentional self-harm or suicide (29%), falls (21%) and transport injury (17%) accounted for nearly 67% of injury deaths in 2004–05 (6,582 deaths). Suicide was the most frequent external cause of injury death among males, and injury due to unintentional falls was most common among females (Table 5.22).

The number of deaths for some categories in Table 5.22 are likely to be a significant underestimate (see 'Trends in mortality' later in this section).

Table 5.22: Injury deaths[a], by type of external cause, 2004–05 (related to *NHPC indicator 1.08*)

External cause of injury[b]	Males			Females			M:F (rate ratio)
	Count	Per cent	Rate[c]	Count	Per cent	Rate[c]	
Unintentional							
Transport	1,239	20.3	12.4	437	11.9	4.2	2.9
Drowning	174	2.9	1.7	62	1.7	0.6	2.7
Poisoning, pharmaceuticals	508	8.3	5.1	238	6.5	2.2	2.1
Poisoning, other substances	227	3.7	2.3	79	2.1	0.7	2.9
Falls	1,151	18.9	13.7	1,729	46.9	12.5	0.7
Fires/burns/scalds	103	1.7	1.0	53	1.4	0.5	1.9
Other unintentional	1,162	19.1	12.4	661	17.9	5.4	1.8
Subtotal	*4,308*	*70.7*	*46.0*	*3,172*	*86.0*	*25.3*	*1.4*
Intentional							
Intentional, self inflicted	1,609	26.4	16.1	420	11.4	4.1	3.9
Intentional, inflicted by another	116	1.9	1.2	57	1.5	0.6	2.0
Subtotal	*1,724*	*28.3*	*17.3*	*477*	*13.0*	*4.7*	*3.6*
Undetermined intent	68	1.1	0.7	26	0.7	0.3	2.7
Other	12	0.2	0.1	13	0.4	0.1	0.9
All external causes	**6,090**	**100**	**50.1**	**3,687**	**100**	**30.3**	**1.7**

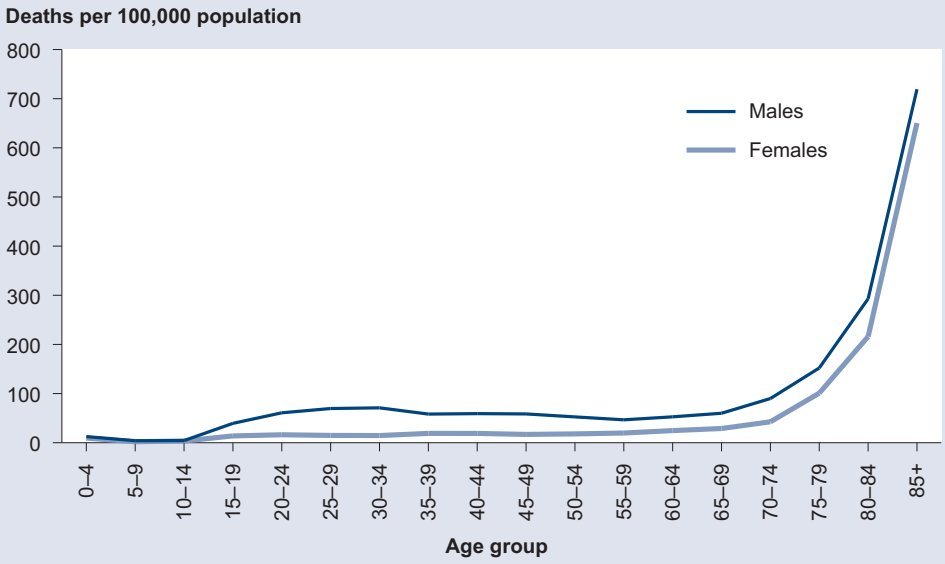
(a) Deaths occurring during 2004–05 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any multiple cause of death coded to ICD-10 S00–T75, T79.

(b) Category definitions and case inclusion follow Henley et al. 2007.

(c) Number of deaths per 100,000 persons. Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Injury death rates are relatively low in childhood (Figure 5.25). However, deaths from all causes are low in this age group, and injury accounted for about 38% of all deaths between the ages 1–14 years in 2004–05. Prominent external causes are transport injuries (especially as car occupants and pedestrians), drowning (especially for toddlers), and fires, burns and scalds. Injury is the main cause of death in the age-range during which teenagers become adults. In 2004–05, 71% of all deaths at ages 15–24 years were injury deaths, mainly due to transport injuries and suicide. Suicide and transport-related injuries are also prominent causes of injury death in middle age. At older ages, fall-related injury predominates.



Notes

1. Includes deaths occurring during 2004–05 for which the underlying cause of death was coded to ICD-10 V01–Y36, Y85–Y86, Y89 or any multiple cause of death coded to ICD-10 S00–T75, T79.
2. Age-standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 5.25: Injury death rates by age and sex, 2004–05 (related to *NHPC indicator 1.08*)

Trends in mortality

Overall injury mortality has tended to decline during recent decades, largely due to a decline in road deaths (Kreisfeld & Harrison 2005). The decline in road deaths has slowed more recently, however. From the late 1990s, noteworthy declines occurred in drug-related deaths and in suicides (Henley et al. 2007).

Interpreting trends in injury mortality for recent years is complicated by coding issues resulting in underestimation of deaths due to certain external causes of injury (ABS 2007; Henley et al. 2007). Information available at the time of writing indicates that underestimation has occurred for road deaths, homicides and suicides. Alternative sources, available for the first two of these types, suggest that road deaths were underestimated in the mortality data by about 12% in 2005 (ATSB 2006) and homicides by about 54% in 2004–05 (Mouzos & Houliaras 2006). No suitable comparison source is available for suicide. Work is in progress to assess these issues.

Disability and chronic injury

The nature and severity of an injury will determine the likelihood and degree of long-term disability and impairment experienced by an individual. For minor injuries recovery is usually quick, typically resolving within days or weeks. More serious injuries can have major effects, resulting in a requirement for lifetime care and support. These most serious cases are sometimes described as catastrophic injuries.

Catastrophic injuries such as persisting spinal cord injury (SCI) and severe traumatic brain injury lead to long-term disability. Each year in Australia, about 300–400 new cases of SCI from traumatic and non-traumatic causes are added to an estimated prevalent SCI population of about 9,000 (AIHW: Cripps 2007). More than 13,000 cases of hospitalised traumatic brain injury (TBI) occurred each year during the 6-year period 1999–00 to 2004–05 (AIHW National Morbidity Database). TBI cases can vary in severity but it is important to note that even low threat-to-life cases of TBI can have lifelong consequences for the individual.

Other injuries such as burns, fractures, and back injuries can also have profound effects on long-term health and wellbeing. The results of the 2004–05 NHS revealed that about 2.1 million Australians had a long-term condition due to an injury (ABS 2006a). The conditions most commonly reported as being caused by an injury were musculoskeletal (25.4%)—injury was identified as the cause of 31.2% of back problems, 15.9% of rheumatism and soft tissue disorders, and 12.2% of arthritis conditions.

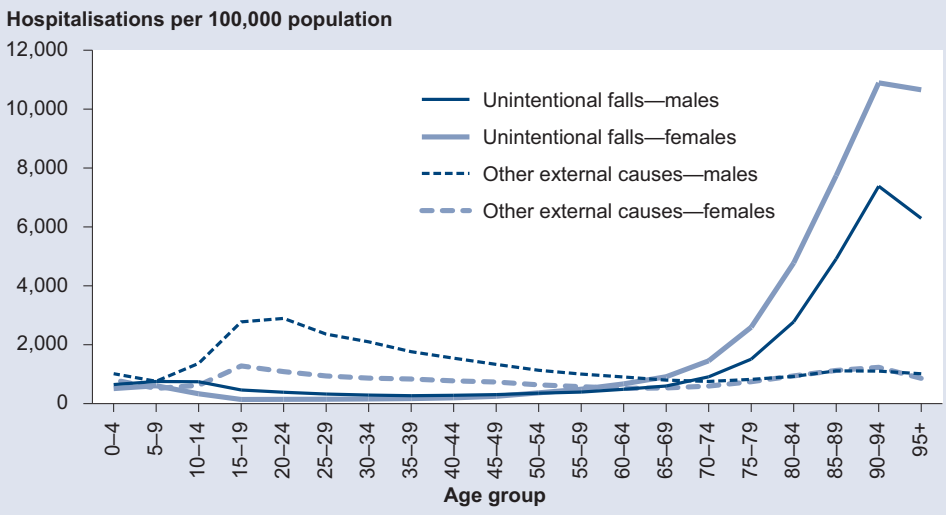
Burden of disease

Injury accounted for an estimated 7% of the total burden of disease and injury in Australia in 2003 (Begg et al. 2007), most of which was due to premature death rather than years lived with disability. About two-thirds of the injury burden was from three injury types: suicide and self-inflicted injuries, road traffic accidents and falls. Males accounted for the majority of burden for two of the three injury types, suicide and self-inflicted injuries and road traffic accidents, whereas for falls the burden was shared more equally between males and females. Early adulthood had the highest burden of injury because of high death rates mainly from road traffic accidents and suicide.

Fall-related injury

Falls account for about a third of all hospitalised injury cases and a fifth of all fatal injury in Australia. The overall age-standardised rate of injurious falls requiring hospitalisation in 2005–06 was 618.5 per 100,000 population. The rate increased exponentially with age—for Australians aged 65 years and over the rate of hospitalised fall cases in 2005–06 was about 2,350 per 100,000. At ages 85 years and over, unintentional falls accounted for about seven times the number of injury incidents attributed to all other external causes combined. Unlike for most other types of external cause, rates of hospitalisation because of falls were higher for older females than older males (Figure 5.26; see also Bradley & Harrison 2007). Deaths following injurious falls also rise rapidly with age, especially after about 70 years of age (Henley et al. 2007).

Falls by older people commonly result in a fracture, often a hip fracture. Nearly a third of hospitalised fall-related injuries for older Australians in 2005–06 involved the hip or thigh. Head injuries due to a fall were also common, particularly for males. Most injurious falls are due to slips, trips and stumbles and other falls on the same level (54% of injurious falls for people aged 65 years and over in 2005–06). Seven out of ten injurious falls resulting in hospitalisation of older people in 2005–06 occurred either in the home or in aged care facilities. Rates of injurious falls in aged care facilities have been found to be higher than those in the home (Bradley & Harrison 2007).



Note: Includes cases where principal diagnosis was coded to ICD-10-AM S00–T75 or T79 and first external cause was coded to V01–Y89.

Source: AIHW National Hospital Morbidity Database.

Figure 5.26: Hospitalisation rates for unintentional falls and for all other external causes of injury, by age and sex, 2005–06

Injurious falls by older people place a heavy burden on the hospital system because they are numerous and cases have a long average stay. These cases often require a period of rehabilitation after acute care. It is estimated that the average total hospital stay (including rehabilitation) due to an injurious fall by an older person was 15 days in 2003–04 (Bradley & Harrison 2007).

The direct cost of fall-related acute episodes of care for Australians aged 65 and over in 2003–04 was estimated to be $566 million (Bradley & Harrison 2007). The total hospital cost is likely to be considerably higher than this, because episodes of care classified as rehabilitation and certain other types could not be accounted for in this estimate.

Injury among Aboriginal and Torres Strait Islander peoples

In 2005–06, the rate of hospitalised injury for Aboriginal and Torres Strait Islander males was 2.2 times as high as the rate for other Australian males, and the corresponding rate for females was 1.8 times as high (Table 5.23). Injury mortality has been found to be about three times as high among Aboriginal and Torres Strait Islander Australians as it is in the remainder of the population (Helps & Harrison 2004). The values reported here include data only from four jurisdictions: Queensland, Western Australia, South Australia and the Northern Territory.

Accidental falls (17%) and transport injuries (9%) are prominent external causes of hospitalised injury for Indigenous people, just as they are in the overall Australian population (Table 5.23). More common than either of these external causes in the Indigenous population is hospitalisation due to injury inflicted by another person (34% of cases), which occurred at a rate 12 times that of the rest of the population.

Suicide and transport-related injuries are common causes of fatal injury, as they are in the general population. Rates of fatal injury due to interpersonal violence among Indigenous Australians are much higher than in the general population (Helps & Harrison 2004).

Table 5.23: Hospitalisation due to injury and poisoning[a], by external cause groups, Aboriginal and Torres Strait Islander peoples, selected jurisdictions[b], 2005–06

External cause of injury[c]	Count	Per cent of total	Rate[d]	Rate ratio[e]
Unintentional				
Transport	1,028	9	257.6	1.0
Drowning & submersion	11	0	1.6	0.6
Poisoning, pharmaceuticals	186	2	48.8	1.6
Poisoning, other substances	59	1	15.1	1.2
Falls	1,928	17	686.9	1.2
Fires/burns/scalds	303	3	81.5	2.6
Other unintentional	3,080	27	793.5	1.3
Intentional				
Self-inflicted	684	6	182.1	1.6
Inflicted by another person	3,884	34	1,084.9	12.2
Undetermined intent	154	1	44.0	2.6
Other & missing	47	0	23.2	2.0
Total	**11,364**	**100**	**3,219.1**	**1.8**

(a) Includes cases where the principal diagnosis was coded to ICD-10-AM S00–T75 or T79.

(b) Includes Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only for the Northern Territory).

(c) ICD-10-AM External Cause codes aggregated as in Berry Harrison 2007.

(d) The number of cases per 100,000 persons, directly standardised to the Australian population as at 30 June 2001.

(e) Ratio of Aboriginal and Torres Strait Islander rates to rates for other Australians.

Source: AIHW National Hospital Morbidity Database.

Rates of hospitalised and fatal injury were higher at almost every age for Indigenous Australians than for the rest of the population. The risk excess (that is, the difference between the two sets of rates) was greatest at about 20–50 years of age. Hence, as with cardiovascular disease, injury is one of the causes of mortality which contribute to the low life expectancy of Indigenous Australians, mainly because of high rates at early and middle adult ages.

For injury overall, and for most specified external causes, hospitalisation and mortality rates for Aboriginal and Torres Strait Islander peoples and other Australians increase with remoteness (Helps & Harrison 2004: Helps & Harrison 2006).

5.11 Infectious diseases

The term 'infectious disease' refers to illness, fever or rash due to harmful organisms (mostly micro-organisms) or their toxic products. Generally acute in nature, infectious diseases are large causes of illness, disability and death in many parts of the world. From a public health perspective, the distinctive feature of infectious diseases is that some can occur in outbreaks that affect many people, especially if they can spread rapidly through a community through human-to-human contact.

In Australia and similar developed countries, infectious diseases are not among the leading contributors to the burden of disease. With improved sanitation, the introduction of antibiotics and immunisation programs, the impact of infectious diseases on Australia's health has reduced markedly over the last century.

Yet the burden of infectious diseases continues to be significant in Australia. Infections and immunisations account for about 7% of all GP consultations (AIHW: Britt et al. 2005). Almost 4% of deaths annually are attributed to infection (AIHW 2007d) and a similar percentage of hospitalisations in 2005–06 were for pneumonia, urinary tract infections and gastrointestinal infections (AIHW 2007c). Also, the potential for serious outbreaks continues to present a challenge in public health and requires planning and constant vigilance.

Health departments continue to monitor trends over time for certain important infections. The infections chosen for surveillance usually meet at least one of the following criteria:

- They have a high risk of death, especially if this includes young and otherwise healthy people.
- They are highly contagious.
- They have not been seen until recently; for example, severe acute respiratory syndrome (SARS), and avian influenza.
- They are not established in Australia.
- They are vaccine-preventable.
- They are related to lifestyle factors; for example sexual activity or injecting drug use.
- They arise from contaminated food.
- They can be used for bioterrorism.
- They require worldwide monitoring, even though they are not so relevant to Australia; for example, cholera.

There are four main data sources used in this section. See Box 5.12 for more information.

Box 5.12: Infectious diseases data

Four main data sources are used in this section:

- The incidence of infectious diseases is largely based on information from the National Notifiable Diseases Surveillance System (NNDSS). A disease may be made notifiable to jurisdictional health authorities depending on its significance to public health. Each state or territory has specific requirements under its public health legislation for notification by medical practitioners, laboratories and hospitals.
- Information on the number of deaths from infectious diseases has come from the AIHW National Mortality Database.
- Information on hospitalisations for infectious diseases has come from the AIHW National Hospital Morbidity Database.
- Burden of disease information comes from *The burden of disease and injury in Australia, 2003* report (Begg et al. 2007).

In this section, only deaths and hospitalisations coded to the 'certain infectious and parasitic diseases' chapter (ICD-10 and ICD-10-AM codes A00–B99) have been included. This is consistent with the method used in the burden of disease study, but differs from estimates provided in *Australia's health 2006*.

Overview

Incidence

Infectious diseases remain relatively common. Although there are no data on the incidence of infectious disease overall, some of these diseases are notifiable, meaning that the law requires them to be notified to government health authorities. A selection of the main notifiable diseases is included in Table 5.24. Among this group of diseases, chlamydia infection was the most common with over 50,000 notifications. Other leading notifiable diseases were campylobacteriosis (a gastrointestinal disease), hepatitis C and laboratory confirmed influenza.

Table 5.24: Selected notifiable diseases, 2007

Disease	Notifications	Number per 100,000
Vaccine-preventable diseases		
Meningococcal infection	310	1.5
Pneumococcal disease (invasive)	1,485	7.1
Pertussis (whooping cough)	5,396	25.7
Mumps	570	2.7
Influenza (laboratory confirmed)	10,687	50.8
Mosquito-borne diseases		
Barmah Forest virus infection	1,695	8.1
Ross River virus infection	4,152	19.8
Malaria	578	2.8
Dengue	318	1.5
Sexually transmitted infections		
HIV[(a)]	998	5.0
Syphilis[(b)]	3,057	14.5
Gonococcal infection	7,553	35.9
Chlamydial infection	51,089	243.1
Hepatitis		
Hepatitis B[(c)]	7,694	36.6
Hepatitis C[(c)]	13,436	64.0
Gastrointestinal diseases		
Campylobacteriosis[(d)]	17,663	84.0
Salmonellosis (nec)	9,694	46.1
Tuberculosis	1,116	5.3

nec = not elsewhere classified

(a) 2006.

(b) Includes all syphilis categories (see Table S22).

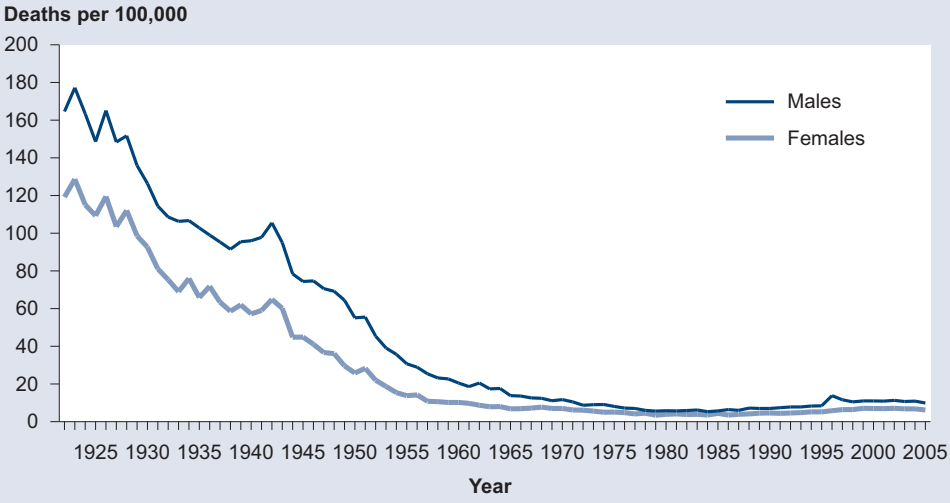
(c) Includes incident and unspecified cases.

(d) Notified as 'foodborne disease' or 'gastroenteritis in an institution' in New South Wales.

Sources: NNDSS 2007; NCHECR 2007.

Mortality

Deaths from infectious diseases have declined dramatically since the early part of the last century (Figure 5.27). In 1922, they accounted for 15% of all deaths, but by 2005 they accounted for a little over 1%. In 2005, there were just over 1,700 infectious diseases deaths, a death rate of 7.8 per 100,000 (age-standardised). Septicaemia accounted for the largest proportion of these (1,053 deaths) and the next most common was viral hepatitis (162 deaths).



Note: Includes deaths with an underlying cause of death coded to ICD-10 A00–B99 and corresponding codes in earlier versions of ICD.

Source: AIHW 2007d.

Figure 5.27: Deaths from infectious diseases, 1922–2005

Burden of disease

The infectious diseases group was a relatively small contributor to the burden of disease in 2003, accounting for 1.7% of the total burden (Begg et al. 2007). The highest infectious disease burden was for older people, particularly for those aged 75 years and over. Most of the burden (69%) was because of premature death rather than years lived with disability.

Hospitalisations

Over 87,000 hospitalisations in 2004–05 were attributed to infectious diseases (ICD-10-AM codes A00–B99 as the principal diagnosis), a figure that has remained fairly steady in recent years. Intestinal infectious diseases were the largest group (38%). The largest number of admissions were for children, particularly those aged under 5 years.

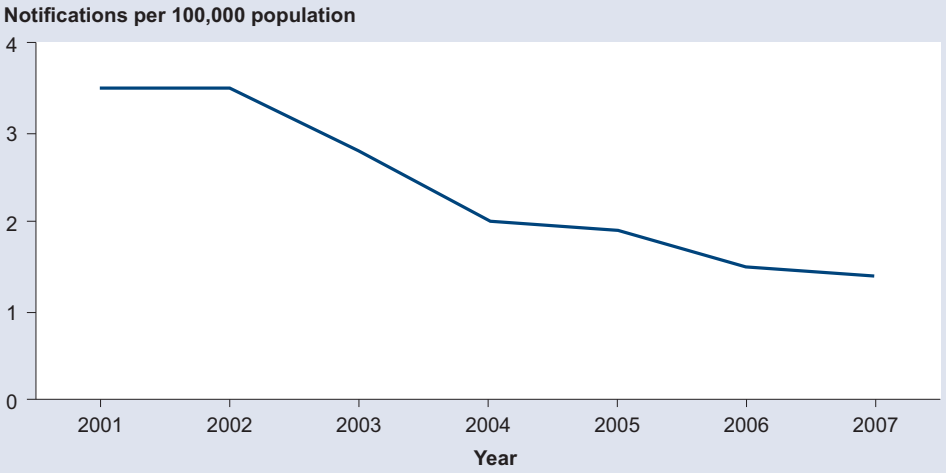
Vaccine-preventable infections

Immunisation has had a dramatic impact on rates of illness and death from a wide variety of infections. This section focuses on a select number of infections for which childhood immunisation programs exist, namely meningococcal disease, invasive pneumococcal disease, measles, pertussis, mumps and poliomyelitis.

Invasive meningococcal disease

This bacterial infection is caused by *Neisseria meningitidis* (also known as 'meningococcus'). It is one of the highest profile infections in Australia because of the rapid and serious way it can attack children and young adults. Infection is usually most common in children aged under 5 years and those aged 15–24 years (Senanayake 2007: 230). Around 10% of those infected die (Rosenstein et al. 2001), which is a high rate for an acute infection. Since 2003, there has been a nationally funded immunisation program to vaccinate against one of the five strains of the disease, namely the C strain.

Notification rates for infections due to meningococcal disease have been falling in recent years (Figure 5.28). The reasons for this are not clear but the fall is unlikely to be due solely to the introduction of the vaccine. Three main reasons point to other possible factors: the rate started to fall before the immunisation program began, rates of the B strain have also fallen, and adults older than 25 years (who are outside the target vaccination age range) were the age group with the greatest decrease, about 30% (Australian Meningococcal Surveillance Programme 2007).



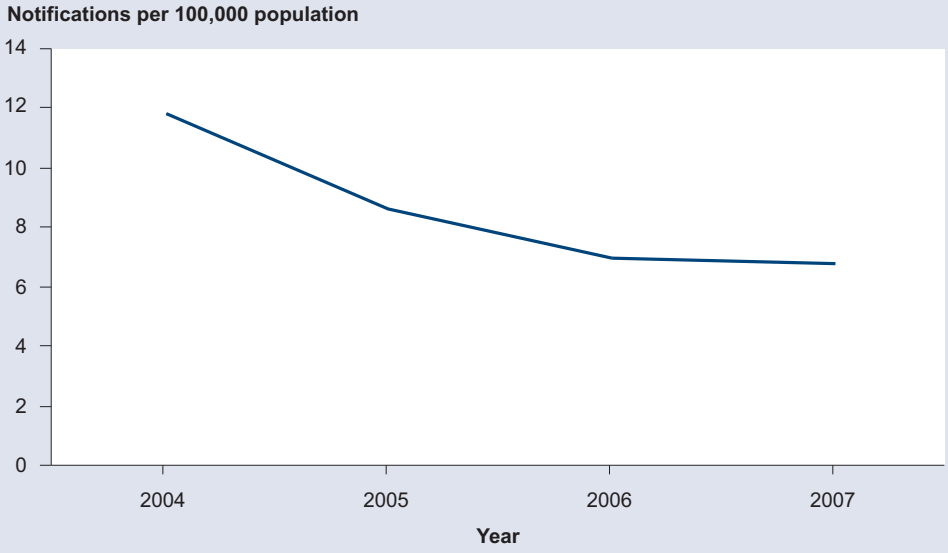
Source: NNDSS 2007.

Figure 5.28: Rates of meningococcal infections, 2001–2007

Invasive pneumococcal disease

Invasive pneumococcal disease (IPD) is due to a bacterium called *Streptococcus pneumoniae* (also known as 'pneumococcus'). An individual can be classified as having IPD only if pneumococcus is isolated from a so-called sterile site. Blood, spinal fluid and fluid from around the lung are examples of sterile sites; therefore, most middle ear and chest infections due to pneumococcus are not included in the notifications for IPD since they are not classified as sterile sites. Rates of IPD tend to be largest at the extremes of age, namely in children under 2 years and the very elderly (McIntyre et al. 2000).

Before January 2005, only certain at-risk children were eligible for free immunisation against IPD. However, from then the Australian Government expanded its program to fund vaccination for all infants and children and all adults aged 65 years and over (Roche et al. 2007a). Since these changes, there has been a reduction in notification rates of IPD (Figure 5.29), including among age groups which are not covered by the vaccination program (NNDSS 2007). This is most likely to represent a phenomenon known as 'herd immunity', where unvaccinated groups benefit from vaccination of others.



Source: NNDSS 2007.

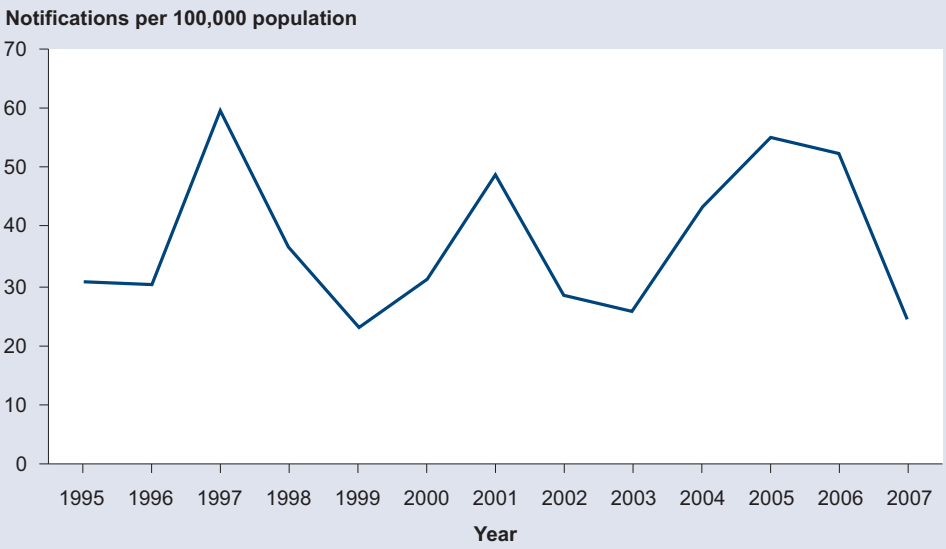
Figure 5.29: Notification rates of invasive pneumococcal disease, 2004–2007

Pertussis (whooping cough)

Pertussis is an infection usually due to the bacterium *Bordetella pertussis*. It is best known for its chronic cough and severe coughing fits that can be life-threatening, particularly in infants.

Despite global immunisation programs, pertussis remains a significant problem in both developing and developed nations (WHO 2005). This includes Australia, where pertussis is the most commonly notified vaccine-preventable infection. Since vaccination began among children in Australia, there has been a shift upwards in the age distribution of pertussis, with over 90% of notifications since 2003 occurring in those aged over 10 years and 60% in those aged 20–59 years. Although adolescents and adults tend to have a milder illness than infants, the concern is that these older individuals could go on to infect susceptible infants, the group most likely to die from the infection (Brotherton et al. 2004).

The notification rates from 1995 to 2007 show a fairly typical pattern for pertussis, namely a background rate of cases annually interrupted by an epidemic peak every 4 years or so (Figure 5.30) (NNDSS 2007; Cherry 2005).



Source: NNDSS 2007.

Figure 5.30: Notification rates of pertussis, 1995–2007

Australian surveillance data for pertussis have shown at least two positive trends which both may be attributable to the impact of changes in the immunisation schedule (NNDSS 2007; Quinn & McIntyre 2007). First, the drop in notification rates in children aged 5–9 years since 1999 probably reflects the addition of a fifth dose of vaccine in 1994–1995. Second, a reduction since 2005 may be due to introducing the 'whole of high school' vaccination program in 2004.

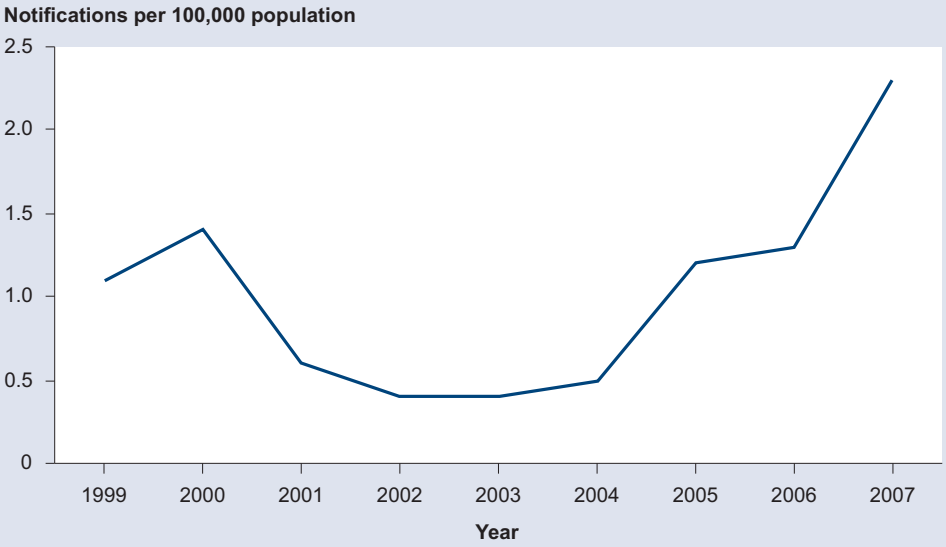
Poliomyelitis

Poliomyelitis (or 'polio') is a viral infection that can cause paralysis of limbs in previously well people, typically in children. Polioviruses are excreted in faeces and transmitted through oral ingestion of the virus. Because of global immunisation programs, transmission of naturally occurring polioviruses has been largely eradicated from most countries, including Australia. However, naturally occurring polioviruses are still being transmitted in some countries (Grassly et al. 2007), and a case occurred in Australia in early 2007 in a student who had recently travelled in Pakistan.

Mumps

Mumps is a vaccine-preventable viral disease that may be experiencing a resurgence. It causes swelling of the salivary glands in the face and can lead to a variety of complications such as meningitis, inflammation of the testicles in post-pubertal males, and pancreatitis. In susceptible populations, it is a highly infectious disease (WHO 2007a).

Notification rates of mumps have increased in Australia over the last 5 years (Figure 5.31). In addition, whereas mumps was traditionally an infection of mainly young children, it now also affects adolescents and adults (NNDSS 2007). This is probably due to a combination of vaccine failure in childhood (especially in those who received only one dose of vaccine) and waning immunity from childhood immunisation in adults (Cohen et al. 2007, Harling et al. 2005).



Source: NNDSS 2007.

Figure 5.31: Notification rates of mumps, 1999–2007

Influenza

Influenza is a common viral respiratory infection that affects many people around the world each year. The classical infection consists of fevers, generalised muscle aches, headache, cough and sore throat. This combination of symptoms is also called an 'influenza-like illness' or 'ILI', since other bacteria or viruses can produce a similar sickness. The most serious complication of influenza is pneumonia, which can be due to the influenza virus itself or a secondary bacterial infection. More details about influenza are provided in Box 5.11.

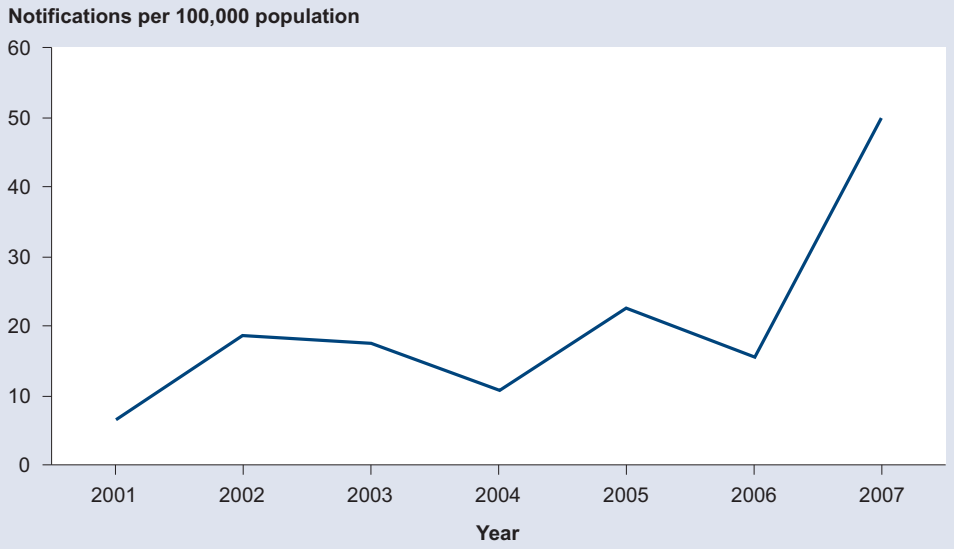
Box 5.11: Influenza characteristics and vaccination

Not all influenza viruses are the same—they are distinguished in different ways. First, they can be classed as influenza A, B or C. Influenza B and C are exclusively human viruses, whereas influenza A can also be found in aquatic birds and other mammals. Influenza A viruses can then be further subdivided into 'H' and 'N' strains based on two of their proteins (Zambon 1999). For example, avian influenza ('bird flu') is the influenza A strain H5N1.

Influenza tends to be a seasonal illness in temperate climates where it usually occurs from June to September in southern hemisphere nations (such as Australia) and December to April in the northern hemisphere. It can occur throughout the year in tropical countries (Li et al. 2005). The annual seasonal influenza epidemics are due to small changes in the virus (antigenic drift), or when a new virus subtype emerges (antigenic shift). The problem with antigenic shift is that the human population has no underlying immunity to the new virus; therefore, devastating worldwide epidemics (known as pandemics) can result. There have been three influenza pandemics since the beginning of the 20th century: 1918 (H1N1), 1957 (H2N2) and 1968 (H3N2).

Influenza vaccines need to be given just before the influenza season. Since the viruses continually mutate, a new influenza vaccine has to be given every year. The vaccine usually covers three strains of influenza: two A strains and one B strain (National Health and Medical Research Council 2003).

In 2007 Australia had a large rate of influenza notifications (Figure 5.32). In fact, 2007 marked the first year with 10,000 influenza notifications (NNDSS 2007). Although this is likely to truly represent increasing cases, other contributing factors probably include increased demand for influenza testing and the increased availability and use of more rapid and efficient testing kits.



Source: NNDSS 2007.

Figure 5.32: Notification rates of laboratory-confirmed influenza, 2001–2007

Mosquito-borne infections

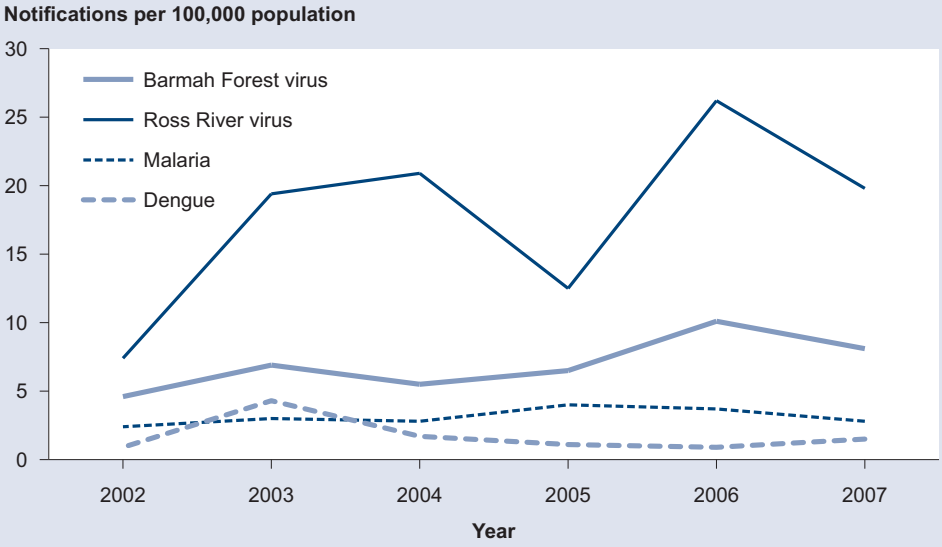
Australia has numerous notifiable mosquito-borne infections including:

- infections acquired only within Australia (such as Ross River virus and Barmah Forest virus)
- infections usually acquired only overseas (malaria)
- infections that could have been acquired in either location (such as Japanese encephalitis and dengue).

Barmah Forest virus and Ross River virus

Barmah Forest virus and Ross River virus come from a family of viruses called alphaviruses. They are transmitted to humans by a variety of species of mosquitoes. Both viruses typically cause an illness associated with fevers, rash and joint pains. Despite their geographical names, cases have now been reported throughout Australia for both infections, with most notifications being from Queensland, South Australia and New South Wales (Liu et al. 2006; NNDSS 2007).

The notification rates for both infections have fluctuated over the last few years (Figure 5.33).



Source: NNDSS 2007.

Figure 5.33: Notification rate for mosquito-borne infections, 2002–2007

Malaria

Malaria is a parasitic infection transmitted by the night-feeding Anopheles mosquito. Although hundreds of cases are reported in Australia every year, these cases have almost certainly been acquired overseas. Malaria commonly causes fevers within 2 weeks of the person being infected, although some people only become unwell many months after being bitten. Even people who take all their medication during their travel to prevent malaria can still be infected. One species of the malaria parasite can kill humans quickly if untreated, especially when it spreads to the brain ('cerebral malaria').

The 2007 data show a slight decrease in notification rates from the previous years (2.6 per 100,000 population, 545 cases) but no marked changes (Figure 5.33).

Dengue

Dengue is a viral infection found worldwide and transmitted by the day-feeding Aedes mosquito. The Aedes mosquito is found in Australia and there was a large local outbreak in 2001 in North Queensland (Hanna et al. 2002; Hills et al. 2002). There are four different types of dengue virus and infection with one type does not protect from future infections with others. If people become unwell with dengue, this usually causes an illness with fevers, rash, headache and muscle aches in the neck and back that can be very severe (Senanayake 2006). Although most people completely recover, serious complications may occur in some.

Apart from a dramatic rise in 2003, notification rates for dengue were fairly stable over the last few years (Figure 5.33). Analysis of 200 cases from 2005–2006 found that 46% of notifications were reported as imported, 43% were locally acquired and 11% had an unknown source (Liu et al. 2006).

Sexually transmitted infections

Human immunodeficiency virus

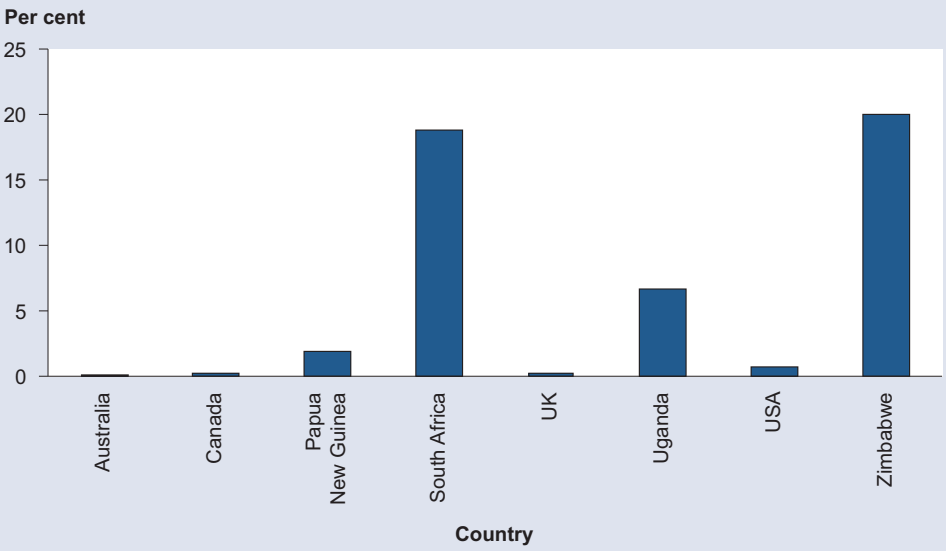
Human immunodeficiency virus (HIV) can be transmitted by sexual contact with an infected person, through infected blood products, to the fetus during pregnancy, and to infants through breastfeeding from an infected mother. Those infected can remain well for many years without treatment but are still able to infect others. In most untreated cases, the virus will damage their immune system over many years until they become susceptible to a number of serious infections and cancers. This stage is known as the acquired immune deficiency syndrome (AIDS).

Infections with HIV cannot be cured and there is no vaccine to prevent it, although research into a vaccine continues. However, a wider variety of more effective antiviral medications has allowed people with HIV to lead relatively normal lives. It has become a disease that many more people now live with rather than die from, as they previously did.

Although HIV continues to be a global problem, Australia has maintained a very low prevalence of the infection compared with other countries (Figure 5.34).

Between 1993 and 2006, more than 12,000 new HIV infections were notified in Australia. Although there was a decline in the annual number of notifications from 1993 to 1999, there was a rise from 2000 (763 in 2000 to 998 in 2006) (Guy et al. 2007). Male-to-male sex was the risk factor in 70% of these notifications, mirroring a pattern seen in other developed nations (Hamers et al. 2006; Centers for Disease Control and Prevention 2005). Only 18% of new cases were due to heterosexual contact.

Despite the rise in HIV notifications, AIDS notifications have remained relatively stable at around 230 cases each year since about 2001 (NCHECR 2007). This probably reflects the availability of more effective combinations of antiviral medications which are preventing, or at least delaying, many cases from progressing to AIDS. The reasons for the overall increase in HIV notifications are not certain but possibilities include increased testing of individuals at risk of HIV and increased levels of unsafe sexual practices (Guy et al. 2007).



Source: UNAIDS 2006.

Figure 5.34: Estimated prevalence of HIV in adults aged 15–49 years in selected countries

Syphilis

Syphilis is a complex sexually transmitted infection due to an organism known as *Treponema pallidum*. It responds well to penicillin but untreated it becomes a chronic disease with a variable course and long latent (symptom-free) periods. Its most serious expressions are tertiary (third stage) syphilis and congenital syphilis, where a child is infected by its mother during pregnancy. In a proportion of untreated cases, tertiary syphilis can arise about 10 or more years after the original infection, with serious damage to the brain, other parts of the nervous system, and the cardiovascular system. Congenital syphilis is a serious condition that can result in a variety of problems for the child from birth or even much later in life.

In Australia, there has been a resurgence of infectious syphilis, particularly in the homosexual communities. Risk factors probably include an increase in unprotected sexual practices, being HIV-positive, having more partners and using more recreational drugs (Botham et al. 2006; Jin et al. 2005). The increase of notifications is not limited to Australia and is part of a wider pattern in the developed world (Centers for Disease Control and Prevention 2004; Fenton et al. 2001).

Notifications of congenital syphilis have remained low in Australia (8–13 cases per year or 0–0.1 per 100,000 population per year from 2005 to 2007) (NNDSS 2007). This reflects effective screening and treatment of pregnant women for syphilis.

Gonococcal infection and chlamydia

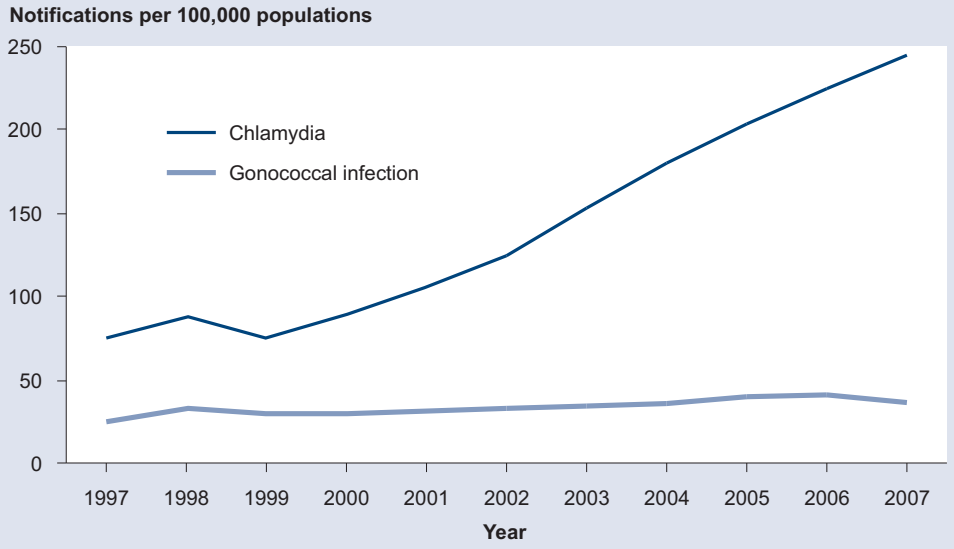
Gonococcal infection is due to a bacterium called *Neisseria gonorrhoeae* (also known as 'gonococcus'). Although it can cause localised genital disease, such as gonorrhoea or pelvic inflammatory disease, gonococcus can also cause eye disease and a more widespread illness

known as disseminated gonococcal infection (DGI). DGI causes an acute illness typically with fevers, rash and inflamed joints. Antibiotic resistance is a problem in treating some of these infections.

Chlamydia can cause a variety of sexually transmitted genital infections similar to gonococcal infection. A systematic review of genital chlamydia notifications in Australia from 1997 to 2004 found that young adults and especially Indigenous Australians had unacceptably high rates (Vajdic et al. 2005).

Notification rates of both gonococcal infection and chlamydia have risen since 1999. The increase has been far greater for chlamydia notifications (Figure 5.35).

There is a striking sex difference in the infection patterns: gonococcal rates are more than twice as common in males, and chlamydia is more common in females (NNDSS 2007).



Source: NNDSS 2007.

Figure 5.35: Notification rate of chlamydia and gonococcal infections, 1997–2007

Hepatitis B and C infections

Hepatitis B and C viruses can cause chronic liver damage and liver cancer. Rates of new cases of hepatitis B and C viruses have remained fairly stable in recent years at just over 1 and just over 2 per 100,000 population respectively each year (NNDSS 2007).

A program to increase vaccine coverage in the 15–19 year age group may explain a drop in rates of new hepatitis B infections between 2002 and 2006 that occurred among those aged 15–29 years. Injecting drug use accounted for about 50% of new cases of hepatitis B infection with another 21% attributed to heterosexual sex (NCHECR 2007).

Between 2002 and 2006, there was a large decline in the diagnosis of hepatitis C infections in those aged 15–39 years. This is thought to be due largely to less injecting drug use, which is considered one of the most important causes of hepatitis C transmission (NCHECR 2007).

Gastrointestinal outbreaks

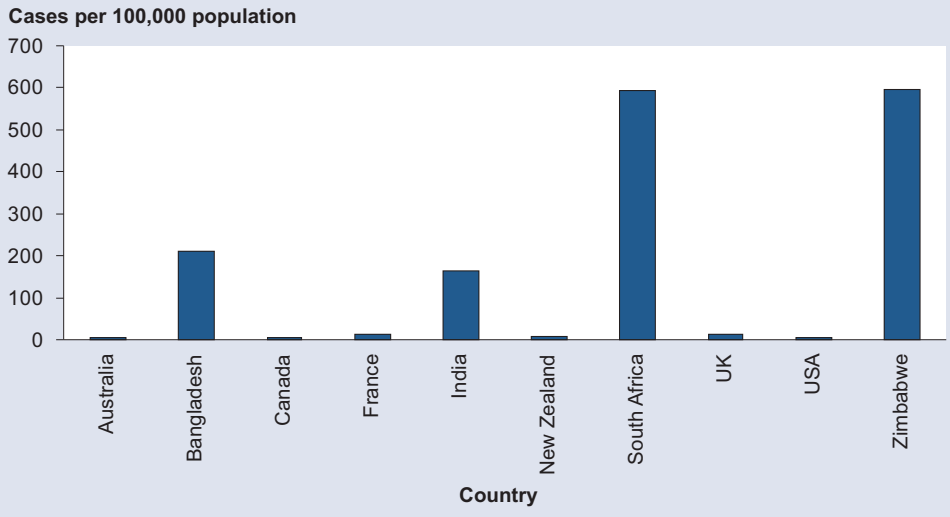
Gastrointestinal infections are common, with only limited data available to monitor them. Some data are available from OzFoodNet, a federal government agency that specialises in investigating outbreaks of gastrointestinal illness and clusters of disease due to contaminated food (OzFoodNet Working Group 2006a, 2006b, 2006c, 2007a, 2007b, 2007c). These reports under-represent the true number of outbreaks since many are not reported to health authorities (OzFoodNet Working Group 2007a).

There were 2,143 outbreaks of gastrointestinal illness notified to OzFoodNet during the 18-month period from 1 January 2006 to June 2007, an average of 27 per week around the country. Most of the outbreaks were attributed to person-to-person spread. The number of people affected in a quarter ranged from 4,522 to 14,688. The number hospitalised from these outbreaks ranged from 72 to 306 per quarter, with a death rate ranging from 0.06% to 0.30%.

The organism causing these outbreaks was often not identified but when it was, salmonella was the most common cause. Salmonella is a bacterium found in a variety of animals, including humans, and it can contaminate virtually any food.

Tuberculosis

Tuberculosis (TB) is a potentially serious infection caused by a group of bacteria known as the TB complex, with most cases caused by *Mycobacterium tuberculosis*. It especially affects the lungs, with fever-like symptoms and destruction of tissue. New TB cases still occur in Australia, with about 1,000 new cases identified annually, representing an incidence of around 5 per 100,000 population (NNDSS 2007). This is low compared with other developed and developing nations (Figure 5.36). Despite this, the rate is disproportionately high in certain groups, namely Indigenous Australians and people born overseas (Roche et al. 2007b). Also, rates of TB in people born overseas have been rising since 1991 while they have been falling in Australian-born individuals (Roche et al. 2007b).



Sources: Estimated from WHO 2007b and Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat 2006.

Figure 5.36: Incidence of tuberculosis in selected countries, 2005

People with HIV are prone to TB and this has become a problem overseas. The death rate for TB in HIV-positive individuals is much higher than in non-HIV individuals (Corbett et al. 2003). A US study found that 26% of their TB cases in 2007 were associated with HIV. In Australia though, out of 373 individuals with TB who were tested for HIV, only 9 (2%) were positive (Roche et al. 2007b).

Although TB can affect virtually any part of the body, TB of the lungs is still the most common form in Australia, occurring in over 55% of cases in 2005 (Roche et al. 2007b). TB of the lungs is especially important because, unlike other forms of TB, it can be spread to other individuals.

Emerging infections

Avian influenza

Avian influenza ('bird flu') currently remains rare worldwide. In 2007, there were 77 human cases of bird flu worldwide, two-thirds of whom died. This takes the total number of cases between the end of 2003 to the end of 2007 to 340, with 61% dying. There have been no human cases in Australia since the outbreak began (WHO 2007c).

Chikungunya

This is a viral infection transmitted by mosquitoes that typically causes severe joint pains, rash and conjunctivitis. Recently, there have been large epidemics of chikungunya in Asia and Africa involving hundreds of thousands of individuals (Charrel et al. 2007). Two of the major mosquito vectors involved in its transmission are both found in Australia; therefore, if people with chikungunya enter Australia from overseas, this could lead to local epidemics within Australia.

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