

- **Disabilities associated with an acquired brain injury** were experienced by 211,100 persons (1.1% of the total population), of whom 201,600 had activity limitations or participation restrictions. More than one-half of the persons with an acquired brain injury (113,300 persons) had a severe or profound core activity restriction.

Table 2.7 describes the distribution of main disabling conditions. Physical/diverse disabilities were not only the most common disabilities noted in the population but were also the main disabling condition in 2.6 million persons (14.2% of the total population).

Table 2.8: Prevalence of disabling conditions, 1998

Disability group	Age <65 years		Age 65+ years		All ages	
	Number ('000)	% of the population	Number ('000)	% of the population	Number ('000)	% of the total population
All disabling conditions						
Intellectual	376.9	2.3	126.1	5.6	503.0	2.7
Psychiatric	504.1	3.1	264.8	11.7	768.9	4.1
Sensory/speech	685.7	4.2	718.9	31.7	1,404.6	7.5
Acquired brain injury	159.0	1.0	52.0	2.3	211.1	1.1
Physical/diverse	1,903.9	11.6	1,124.6	49.6	3,028.5	16.2
All disabling conditions and activity limitations and participation restrictions						
Intellectual	370.4	2.3	126.1	5.6	496.5	2.7
Psychiatric	493.5	3.0	263.6	11.6	757.1	4.1
Sensory/speech	597.9	3.6	689.0	30.4	1,286.9	6.9
Acquired brain injury	150.8	0.9	50.8	2.2	201.6	1.1
Physical/diverse	1,771.2	10.8	1,082.2	47.7	2,853.4	15.3
All disabling conditions and severe or profound core activity restrictions						
Intellectual	184.8	1.1	117.1	5.2	301.9	1.6
Psychiatric	209.9	1.3	188.4	8.3	398.3	2.1
Sensory/speech	218.7	1.3	305.5	13.5	524.2	2.8
Acquired brain injury	75.2	0.5	38.2	1.7	113.3	0.6
Physical/diverse	517.2	3.2	458.3	20.2	975.4	5.2

Source: AIHW 2003a: Table S1.

2.3 Morbidity and illness

Another major indicator of the health of a population is the extent of morbidity and illness in the population. Such information is important in gauging the need for health services and care. The term 'morbidity' often covers disability. However, in this section morbidity covers the presence of a disease, condition or a disorder. Illness in this context refers to the state of feeling unwell (see Box 2.3). Disability has been discussed in Section 2.2.

Box 2.3: Disease, illness, condition or disorder

*A **disease** is a physical or mental disturbance involving symptoms (such as pain or feeling ill), dysfunction or tissue damage. **Illness** is often used synonymously with disease, but preferably refers to a state of feeling unwell or injured. **Health condition** is a broad term that can be applied to any health problem, including symptoms, diseases, and risk factors such as high blood pressure or obesity. As used here, the term **disorder** is synonymous with condition.*

Several different measures can be used to determine the extent of morbidity and illness in the population. The estimates can be generated in terms of disease incidence, prevalence and case fatality. This information can be obtained from a variety of data sources including population health surveys, disease registers and administrative collections of health service use. The dynamics of the natural history of the disease and severity of the problem can also be studied.

Information on the incidence of common diseases in Australia is limited because of difficulties with definitions and methods. It is often too costly or difficult to use expert methods to diagnose many diseases in surveys that are large enough to represent the population. Therefore, objective information on disease prevalence is difficult to obtain on some of the major diseases. The following information on the extent of morbidity and illness in the Australian population is based on self-reports.

Disease prevalence

The ABS has periodically conducted a National Health Survey since 1977–78 to help assess the level of health and disease in the Australian population (excluding those in hospitals, nursing homes and non-private dwellings). The most recent of these surveys, conducted in 2001, collected self-reported information on the prevalence of a range of diseases, illnesses, conditions and disorders that had lasted or were expected to last for six months or more.

In 2001, 78% of respondents in the National Health Survey said they had one or more long-term health conditions. Among those aged 15 and over, this prevalence was 87%. The corresponding levels in 1995 were 76% and 83% (ABS 2002c).

Table 2.9 lists the most commonly reported long-term conditions in 2001, each reported by 9% or more of survey respondents. Three of these were problems with eyesight: long-sightedness, short-sightedness and presbyopia. Respiratory problems—including hay fever and allergic rhinitis, asthma and chronic sinusitis—were also among the most commonly reported conditions. Other common conditions were back and disc problems, arthritis (all forms), deafness (complete or partial) and hypertensive disease (high blood pressure).

In addition, 21 conditions were each reported by at least 1% of respondents. These are listed in Table 2.10. Migraine and high blood cholesterol levels were each reported by more than 6% of respondents. Circulatory (cardiovascular) diseases, diabetes, neoplasms (including cancers) and mental disorders also feature in this list.

Table 2.9: Most-commonly reported long-term conditions, population prevalence estimates, 2001

Condition	Number ('000)			Rate (per cent)		
	Males	Females	Persons	Males	Females	Persons
Long-sightedness	1,867	2,343	4,210	20.4	24.3	22.4
Short-sightedness	1,685	2,257	3,941	18.3	23.5	20.9
Back pain/disc disorders	1,944	1,993	3,937	21.0	20.7	20.9
Hay fever & allergic rhinitis	1,414	1,522	2,953	15.1	15.9	15.6
Arthritis (all forms)	1,042	1,535	2,576	11.7	15.8	13.9
Asthma	993	1,203	2,197	10.5	12.6	11.6
Chronic sinusitis	833	1,187	2,020	8.9	12.4	10.5
Deafness (complete/partial)	1,267	745	2,013	14.2	7.7	10.8
Hypertensive disease (high blood pressure)	869	1,040	1,909	9.7	10.7	10.3
Presbyopia	792	886	1,677	9.1	9.0	9.0

Note: Rates are age-standardised to the 2001 Australian population.

Source: AIHW analysis of ABS 2001 National Health Survey.

Table 2.10: Frequently reported long-term conditions, population prevalence estimates, 2001

Condition	Number ('000)			Rate (per cent)		
	Males	Females	Persons	Males	Females	Persons
Migraine	334	836	1,171	3.6	8.7	6.2
High blood cholesterol	588	544	1,132	6.5	5.6	6.1
Astigmatism	366	512	878	3.9	5.3	4.6
Anxiety-related problems	317	536	853	3.4	5.6	4.5
Mood disorders	320	529	849	3.4	5.5	4.5
Bronchitis/emphysema	316	349	665	3.5	3.6	3.6
Diabetes (all forms)	272	283	554	3.0	2.9	3.0
Stomach/duodenal/ gastrointestinal ulcer	249	256	506	2.8	2.7	2.7
Varicose veins	98	342	440	1.1	3.5	2.3
Hernia	220	160	380	2.5	1.6	2.0
Cataract	122	239	361	1.5	2.4	2.0
Tachycardia	144	195	338	1.7	2.1	1.9
Psoriasis	143	192	335	1.5	2.0	1.8
Neoplasms (including cancers)	176	135	311	2.0	1.4	1.7
Osteoporosis	52	248	300	0.6	2.5	1.6
Oedema (swelling)	88	208	296	1.0	2.1	1.6
Angina	138	123	260	1.6	1.2	1.4
Rheumatism	114	134	248	1.3	1.4	1.3
Anaemias	28	217	245	0.3	2.3	1.3
Haemorrhoids	89	120	209	1.0	1.2	1.1
Dermatitis and eczema	95	112	207	1.0	1.2	1.1

Note: Rates are age-standardised to the 2001 Australian population.

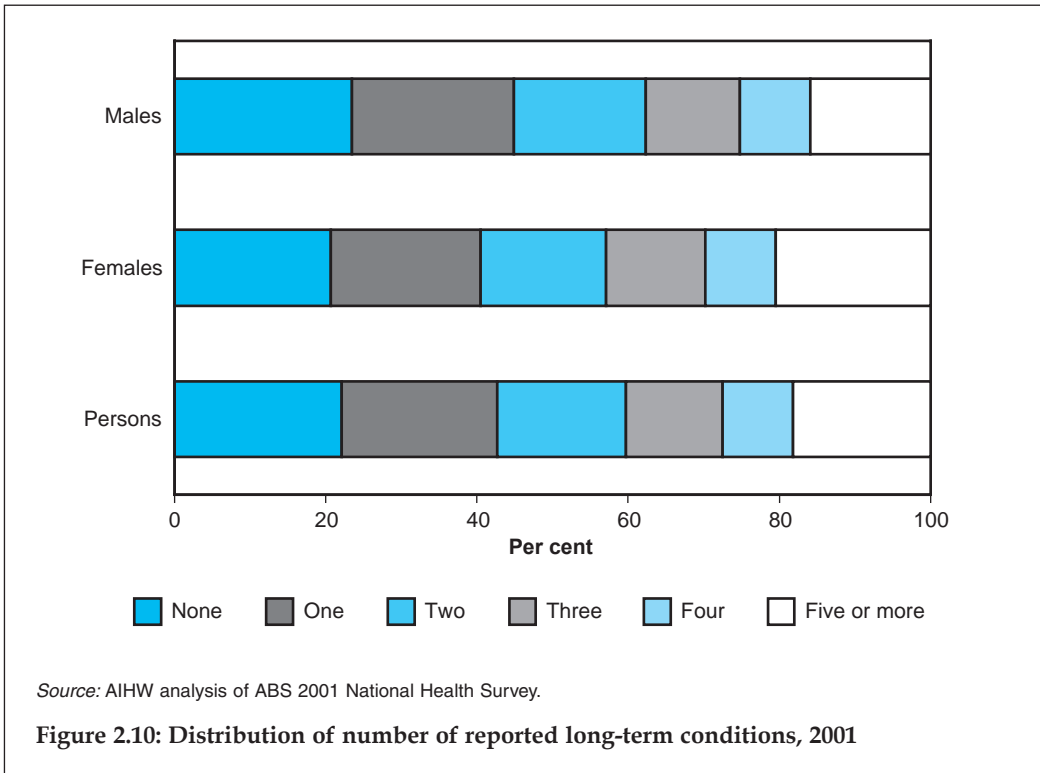
Source: AIHW analysis of ABS 2001 National Health Survey.

Many of these long-term conditions were more likely to be reported by females. They were nearly eight times as likely as males to report anaemias, four times as likely to report osteoporosis, three times as likely to report varicose veins, and twice as likely to report migraine and oedema. In contrast, more males reported deafness, hernia, neoplasms (including cancers), angina and high cholesterol than females, although for each of these the male prevalence rate was less than twice the female rate.

The estimates provided in Tables 2.9 and 2.10 may not be true measures of prevalence as they are based on self-reports rather than physical examination and medical tests. It may be that some diseases are over-reported because the respondent confused the name of the disease or a doctor at some time had only raised the possibility of the disease but not made a diagnosis. On the other hand, many diseases produce few or no symptoms, at least in their early stages, so this could lead to under-reporting.

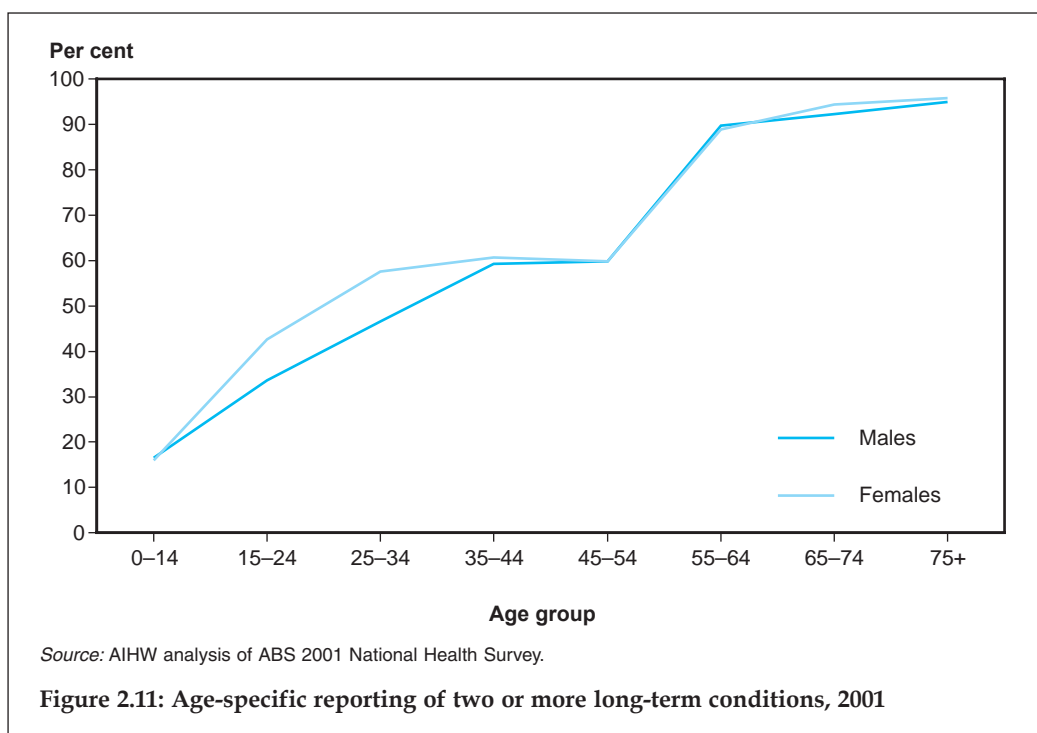
Comorbidity

The prevalences of the 31 diseases and conditions listed in Tables 2.9 and 2.10 add up to more than 100%. This is because 57% of those in the survey reported having two or more conditions (comorbidity), with 18% reporting five or more conditions (Figure 2.10).



The coexistence of two or more conditions is highly correlated with age, rising from 16% among those aged 0–14 to 96% among those aged 75 and over. The increase in comorbidity with age plateaus at around 60% in ages 35–54, before rising again to 90% at ages 55–64.

A larger proportion of females (60%) than males (55%) reported two or more conditions (Figure 2.10). In part, this is because a greater proportion of the female population is in the older age ranges where comorbidity is more common. Also, although roughly equal proportions of males and females with comorbidity reported two, three and four conditions in 2001, a higher proportion of females reported five or more conditions (21% compared with 16%). It is also worth noting that, while the age-specific patterns of comorbidity are generally similar in both males and females, the prevalence rates among females are about 10% higher than those among males at ages 15–34 (Figure 2.11).



Illness and pain

A considerable proportion of the population suffers from conditions that often cause illness (a state of feeling unwell) and pain (Tables 2.9 and 2.10). Major conditions in the second category are musculoskeletal disorders, including back pain/disc disorders, arthritis and rheumatism. Other frequently reported conditions causing physical pain are migraine, digestive system ulcers, varicose veins, hernia and haemorrhoids. Furthermore, many people suffer emotional distress through anxiety-related and mood disorders.

There are no national data on the prevalence of pain in Australia. However, in a large telephone survey of adults aged 16 and over in New South Wales in 1997 (Blyth et al. 2001), chronic pain (defined as pain experienced every day for three months in the six months before interview) was reported by 17% of male and 20% of female respondents. The reporting of pain was strongly associated with age, reaching 30% among those in older age groups. Interference in daily activities due to chronic pain was reported by 11% of male and 14% of female respondents, and was the highest in the 55–59 age group (17% in males and 20% in females).

2.4 Injuries

Injury and poisoning (together called ‘injury’ in this section) are the leading cause of mortality and large contributors to morbidity in the first half of the life span in Australia. Despite recent advances in road safety and occupational health and safety, injuries also contribute significantly to emergency department visits, hospitalisation, disability, and health system costs.

In view of injury’s high impact and strong preventability, injury prevention and control was made one of the National Health Priority Areas from the outset of the initiative. The National Injury Prevention Advisory Council has recommended four main areas—falls in older people, falls in children, drowning and near-drowning, and poisoning in children—for focused attention under its National Injury Prevention Plan (DHAC 2001).

A variety of factors affect a person’s risk of being injured. Prominent among these are age, sex, alcohol use, residence, ethnicity, socioeconomic status and occupation. These personal risk factors influence the type of ‘external’ cause of injury that occurs, such as falls, poisoning, drowning and so forth. The effects of injury on the health of Australians may thus be viewed through the external cause of injury, in particular those that result in death and hospitalisation.

Injury-related deaths

Injuries accounted for 5.8% of all deaths in 2002. A total of 7,820 deaths (5,271 males and 2,549 females) were registered as being due to an external cause of injury or poisoning. Almost one-third (2,445 deaths, 31.3%) of these deaths were of males aged between 20 and 44.

Among those aged less than 45, injury was the leading cause of death, representing 43.0% of all deaths in that age group. Injury death rates were the highest among young males and for both sexes in old age.

Suicide accounted for the largest proportion (2,320 deaths, 29.7%) of injury deaths in 2002, followed by deaths due to transport injuries (1,907 deaths, 24.4%) and falls (1,517 deaths, 19.4%) (Table 2.11).

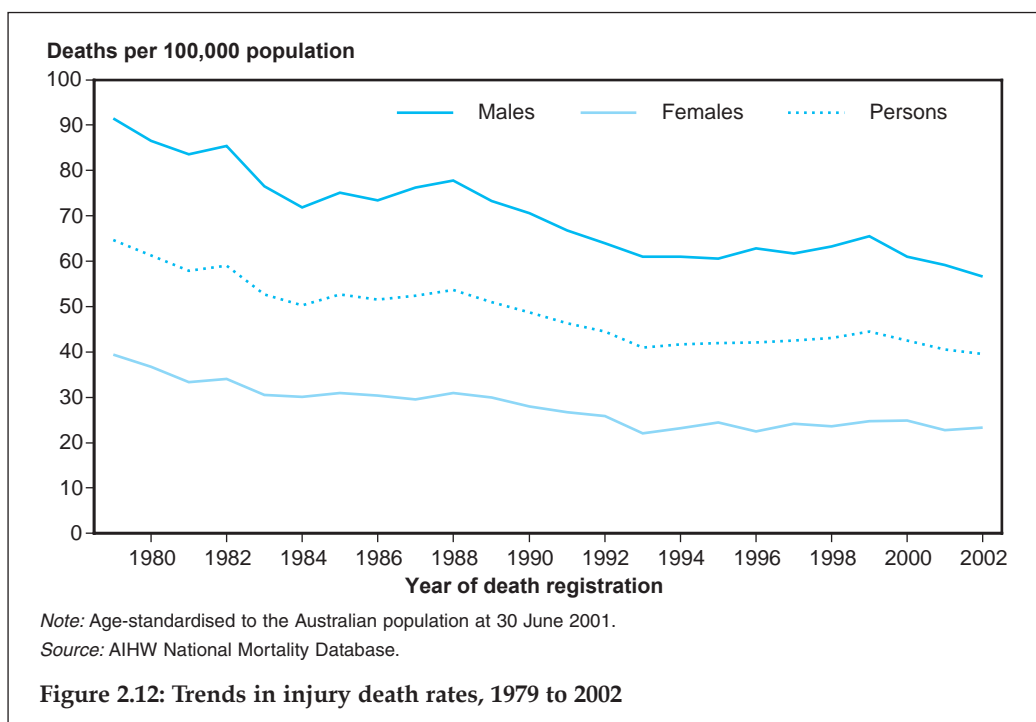
Trends in injury deaths

Injury deaths have declined significantly over the past several decades. However, throughout the 1990s the death rates showed little change (Figure 2.12).

Table 2.11: Deaths due to injury and poisoning, 2002

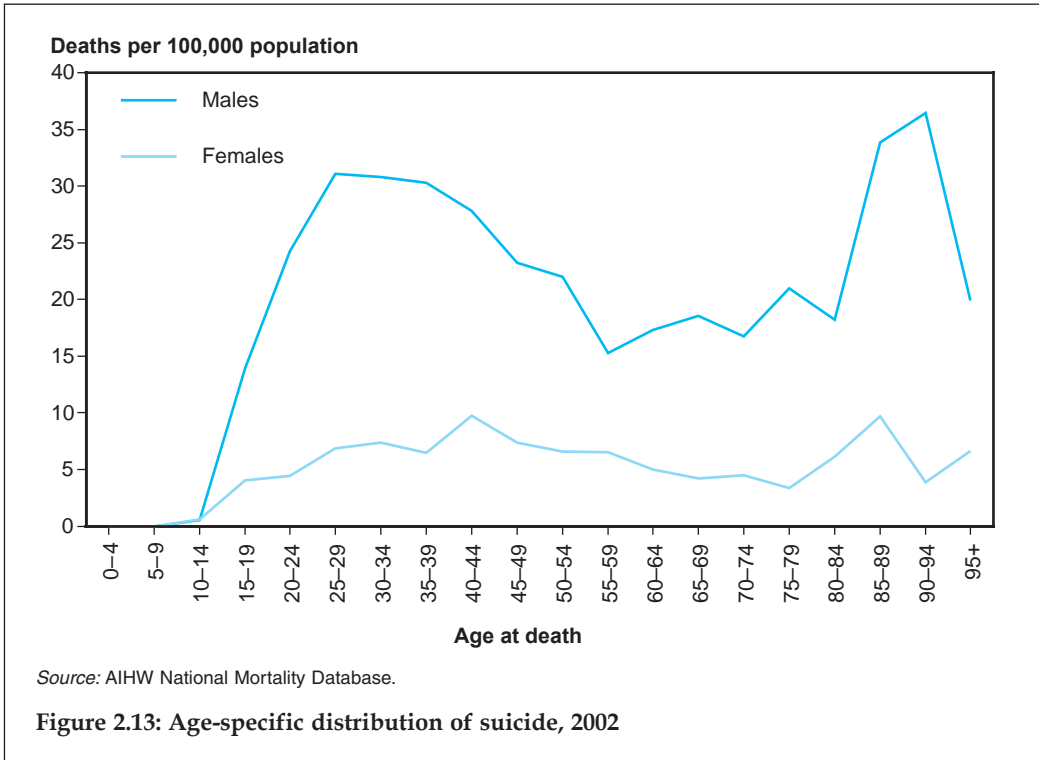
External cause group	Males	Females	Total	Per cent of all injury deaths
Transportation	1,403	504	1,907	24.4
Drowning	176	56	232	3.0
Poisoning, pharmaceuticals	318	178	496	6.3
Poisoning, other substances	55	17	72	0.9
Falls	674	843	1,517	19.4
Fires/burns/scalds	72	43	115	1.5
Other unintentional	458	198	656	8.4
Intentional, self-inflicted	1,817	503	2,320	29.7
Intentional, inflicted by another	199	104	303	3.9
Undetermined intent	35	30	65	0.8
Complications of medical and surgical care	64	73	137	1.8
Total	5,271	2,549	7,820	100.0

Source: AIHW National Mortality Database.



Suicide

Suicide is a leading cause of injury death, comprising nearly 30% of all such deaths in 2002. As in previous years, the male suicide rate was considerably higher than that for females, across all age groups. Similarly, the male rate showed characteristic peaks in early adulthood (25–39 years) and old age (85 years and over), whereas the female rate remained relatively constant across all age ranges (Figure 2.13).



Suicide rates have declined in recent years in Australia, from 14.7 per 100,000 persons in 1997 to 11.8 in 2002. This is chiefly due to a reduction in rates for young adult males, whose suicide rates are the lowest since 1984. Rates for older males and for females have also declined, but to a smaller extent and with smaller effect on the number of suicide deaths.

The suicide rate for males aged 15 to 29 peaked at 34.0 per 100,000 persons in 1997, after which it declined sharply to 24.2 in 2000. The rate was similar in 2001 (24.5) and declined further in 2002 to 23.1. The number of deaths corresponding to these rates was 711 in 1997, declining to 475 in 2002. Corresponding numbers for all ages were 2,720 in 1997 and 2,320 in 2002.

Transportation

There were 1,907 deaths attributed to transportation (mainly road accidents) in 2002, comprising 24.4% of all deaths due to injury in that year, at an age-standardised rate of 9.7 per 100,000 persons. This was a slight decrease from the rate in 2001 (10.3 per 100,000). Age-specific rates of death due to transportation vary greatly, being highest among young adults, lower in middle age, and rising again with age at older ages. The male age-standardised death rate was 2.9 times the rate for females. Among those aged 25-34, the male rate was five times the female rate. These differences can be explained in part by risk-taking behaviour in young males and related variations in risk exposure (Senserrick et al. 2003; Symmons et al. 2004).

There was much variation in the proportion of deaths due to various modes of transport (Table 2.12). Motor vehicle traffic accidents were the major contributor (87.3%) to transport-related deaths.

Table 2.12: Transport-related deaths, 2002

Type of transport	Males	Females	Total	Per cent of all transport deaths
Motor vehicle traffic	1,206	460	1,666	87.3
Occupant (car, truck, van, etc.)	760	344	1,104	57.9
Motorcyclist	199	15	214	11.2
Pedal cyclist	29	4	33	1.7
Pedestrian	169	75	244	12.8
Unspecified	49	22	71	3.7
Pedal, other	6	0	6	0.3
Pedestrian, other	42	21	63	3.3
Other land transport	80	11	91	4.8
Other transport	69	12	81	4.2
Total	1,403	504	1,907	100.0

Source: AIHW National Mortality Database.

Falls

Deaths due to accidental falls numbered 1,517 in 2002, accounting for 19.4% of all deaths due to injury in 2002 (Table 2.11). More than three-quarters of the deaths (78.4%) occurred in ages 75 and over, and females were much less likely to have fatal falls below this age than males. In those aged 75 and over, the rates rose rapidly with advancing age, especially from about 85 years on (Cripps et al. 2002) (Figure 2.14).

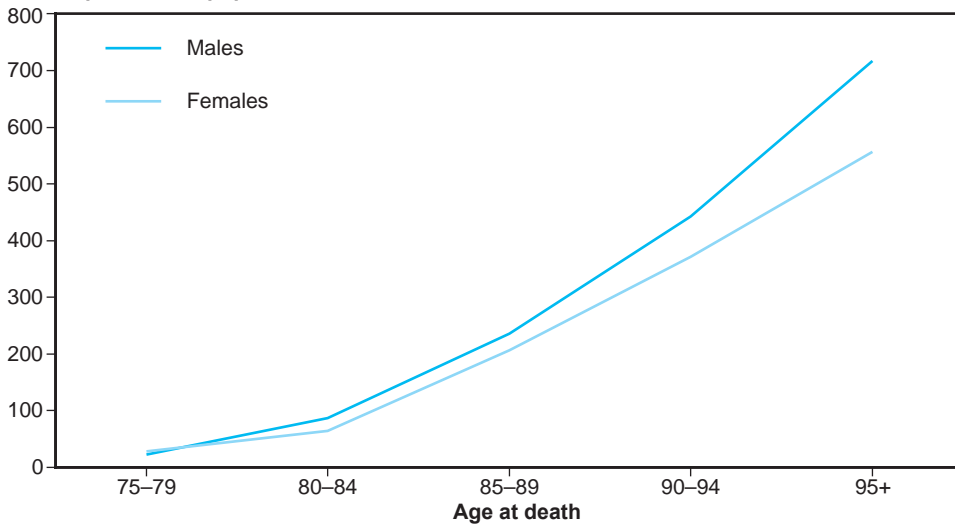
Age-specific rates were similar for both males and females at older ages, but males were predominant among the (much less numerous) deaths due to falls at younger ages. The overall age-standardised death rate was higher among males (8.9 deaths per 100,000) than females (6.5 deaths per 100,000).

Indigenous deaths

Injury mortality is substantially higher among Indigenous than non-Indigenous Australians. Due to incompleteness and poor enumeration of Indigenous deaths and population numbers, the statistics presented here are derived from data collected in South Australia, Western Australia, Queensland and the Northern Territory only. Data from these jurisdictions are considered to be more complete than in other states and the Australian Capital Territory, though still subject to uncertainties (Harrison et al. 2001).

Indigenous deaths due to injury and poisoning accounted for 8.0% of all deaths registered in those parts of Australia (252 out of 2,896 deaths) in 2002. Intentional self-harm (suicide) was the leading cause (34.1% of Indigenous injury deaths), followed by deaths related to transport accidents (27.0%). The proportion of injury deaths attributed to assault was much higher in the Indigenous population (12.7% of injury deaths) than in the non-Indigenous population (3.5%). The relative excess of injury deaths among Indigenous persons occurred across nearly all age groups (Figure 2.15).

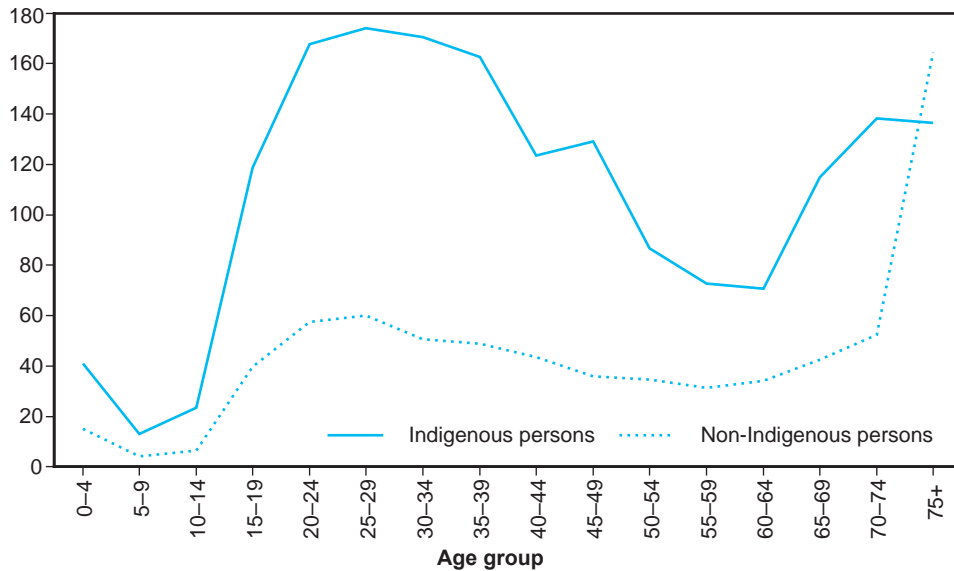
Deaths per 100,000 population



Source: AIHW National Mortality Database.

Figure 2.14: Age-specific death rates due to falls among older people, 2002

Deaths per 100,000 population



(a) Western Australia, South Australia, Northern Territory and Queensland only.

Source: AIHW National Mortality Database.

Figure 2.15: Age-specific death rates for injury among Indigenous and non-Indigenous persons, 1997-2002^(a)

Hospitalisation due to injury

Injury is a large cause of hospitalisation in Australia, accounting for about 6.8% of hospital separations from public, private and psychiatric hospitals in 2001–02. The separation rate for injury was much higher for males than for females (an age-standardised ratio of 1.39:1). Other key indicators of injury separations further emphasise this difference (Table 2.13).

Table 2.13: Key indicators for separations due to injury, 2001–02

Measure	Males	Females	Persons
Number of injury separations	249,939	186,566	436,513
All hospital separations	2,974,106	3,420,234	6,394,498
Injury as percentage of total ^(a)	8.4	5.5	6.8
Crude separation rate ^(b)	2,579	1,897	2,235
Age-standardised separation rate ^{(b) (c)}	2,626	1,806	2,232

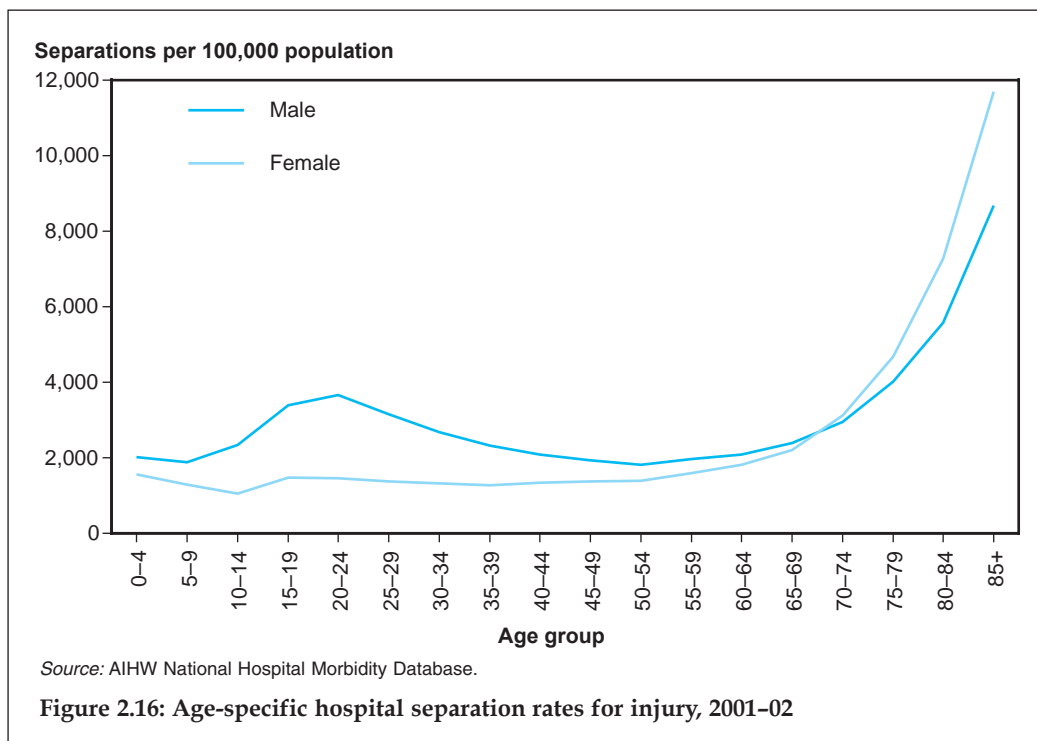
(a) Hospital separations due to injury and poisoning as percentage of all separations.

(b) Number per 100,000 population.

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

Source: AIHW National Hospital Morbidity Database.

Age-specific hospitalisation rates for females were much the same for all age groups from 15–19 to 50–54 (Figure 2.16). The rates were higher for males in their teens and twenties than for boys or middle-aged men, levelling out at the 50–54-years age group. In the elderly (65 and over), rates in both sexes increased rapidly, reaching maximum rates in the very old. In the age groups 75 and above, the female rates were higher than the male rates.



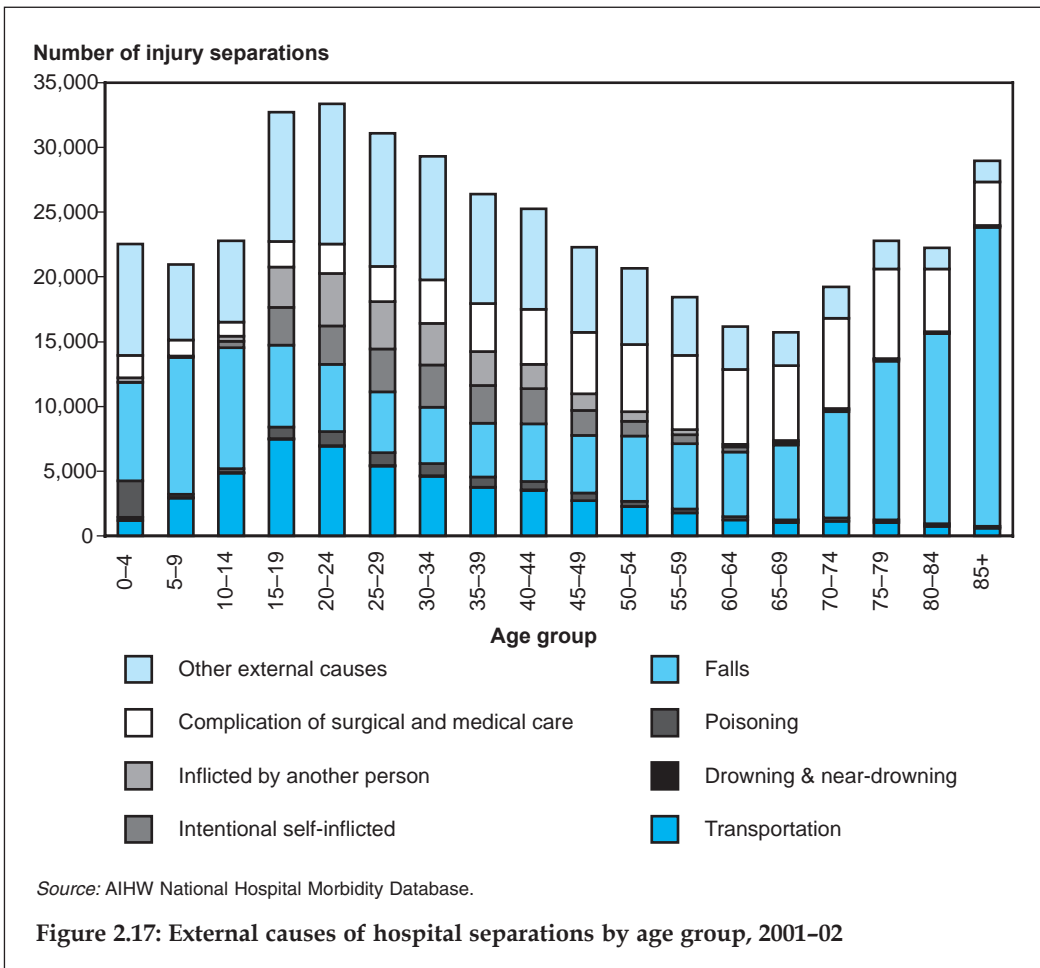
External causes

Common types of external cause of the injury cases which separated from hospitals in 2001–02 are shown in Figure 2.17.

The most common of these external causes among males was falls (26.4%), followed by transportation (14.9%) and complications of medical and surgical care (14.7%). In female hospital separations, falls (40.7%) were followed by complications of medical and surgical care (19.1%) and transportation (9.1%) as the three most common external causes.

Males had a higher hospitalisation rate than females for intentional injuries inflicted by another person, with the ratio being nearly 3:1. Transportation and drowning as external causes for hospital separations were also twice as common in males. The rate for intentional self-inflicted injury was, however, higher among females.

Proportions of injury separations by external cause group were very similar to those seen in 1999–00, and the rank order of the categories remained unchanged.



2.5 Mortality

Death rates and causes of death are key indicators of the health of a population. They not only reflect circumstances around the time of death but also provide some insight into changing social and environmental conditions, medical interventions, lifestyles and trends in underlying risk factors.

This section describes the patterns of mortality in the Australian population, examining causes of death, age and sex patterns, and their recent and long-term trends. Box 2.4 refers to some important considerations in making comparisons using mortality data.

Box 2.4: Comparing death rates: age-standardisation and disease classification

Statistics relating to deaths are sometimes presented as crude death rates, that is, the number of deaths in a year divided by the size of the corresponding population indexed to 100,000. The crude death rate in Australia was 680 deaths per 100,000 persons in 2002.

However, the risk of dying varies greatly with age. This may make comparisons across populations misleading if they have different age structures, and even small age differences may lead to false conclusions. Similarly, analysis of time trends in death rates may be flawed unless this age relationship is taken into account. Age-specific comparisons can be made, that is, comparing death rates at specific ages, but this can be cumbersome because it requires numerous comparisons. However, variations in age structure, between populations or over time, can be adjusted by a statistical procedure called age-standardisation.

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

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

A total of 133,707 deaths were recorded in Australia in 2002, approximately 5,200 more than in 2001. About 70% of male deaths and 80% of female deaths were of people aged 65 or older. The median ages at death in 2002 were 76.2 years for males and 82.2 years for females, and the age-standardised rates were 821 deaths per 100,000 males and 543 deaths per 100,000 females.

There has been a steady increase in the number of deaths in Australia since 1982, by an average of 0.8% annually, reflecting the increasing size of the population. However, the crude death rate has fallen from 756 per 100,000 in 1982 to 680 in 2002—in spite of the ageing of the Australian population.

Male deaths outnumber female deaths. There were 68,885 male and 64,822 female deaths in 2002, with a crude ratio of 106 male deaths for every 100 female deaths. This gap has closed considerably over the last two decades: in 1982 the ratio was 123 to 100. This change was due primarily to greater improvement in male mortality, relative to female mortality, at older ages (Table 2.14).

Table 2.14: Age- and sex-specific distribution of deaths, 2002

Age (years)	Males		Females		Sex ratio	
	Number	Age-specific rate ^(a)	Number	Age-specific rate ^(a)	Crude ^(b)	Age-specific ^(c)
0	699	553.6	565	471.2	124	117
1–14	374	19.5	244	13.4	153	146
15–24	1,058	76.4	382	28.6	277	267
25–44	3,772	129.5	1,884	63.9	200	203
45–64	11,609	502.7	7,162	311.7	162	161
65–84	36,889	3,626.5	28,766	2,412.4	128	150
85+	14,433	16,440.7	25,787	13,389.1	56	123
Missing age	51	..	32
Total	68,885	705.7	64,822	653.9	106	108

.. Not applicable.

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

(b) Male deaths per 100 female deaths.

(c) Male rates divided by female rates, multiplied by 100.

Source: AIHW National Mortality Database.

Major causes of death

The ‘cause of death’ information, gained from death certificates, provides insights into the events close to the end of life that either directly lead to or contribute to death. Such information also provides insights into factors that contribute to mortality at the population level.

Cause of death statistics usually rely on the ‘underlying cause’, which is the single disease, medical condition or event considered to be most directly responsible for the death. In addition, other conditions or events that are not the underlying cause, but are still considered to contribute to the death, are known as associated causes.

The mortality information provided below has been organised to reflect the underlying cause of death at a specific disease level rather than at a broad ICD chapter level. Information on cancer deaths, for example, has been provided according to individual cancer types. Similarly, information on circulatory (cardiovascular) diseases has been categorised to the level of more specific diseases or conditions. However, to present information for various age groups, statistics are provided at the ICD chapter level.

Leading underlying causes of death

The top 20 specific causes of death given in Table 2.15 were responsible for about 75% of all deaths in 2002. Coronary heart disease (also known as ischaemic heart disease: heart attack and related disorders) and cerebrovascular disease (stroke) were the two leading specific causes of death in both sexes and accounted for approximately 30% of all deaths that year.

Table 2.15: Leading underlying causes of death, all ages, 2002

Rank	Males			Females		
	Cause of death	Number of deaths	% all male deaths	Cause of death	Number of deaths	% all female deaths
1	Ischaemic heart disease (I20–I25)	13,855	20.1	Ischaemic heart disease (I20–I25)	12,208	18.8
2	Cerebrovascular disease (I60–I69)	4,969	7.2	Cerebrovascular disease (I60–I69)	7,564	11.7
3	Lung cancer (C33–C34)	4,760	6.9	Other heart diseases (I05–I09, I11, I13, I26, I27, I30–I52)	4,687	7.2
4	Other heart diseases (I05–I09, I11, I13, I26, I27, I30–I52)	3,423	5.0	Dementia and related disorders (F01–F03, G30–G32)	3,024	4.7
5	Chronic obstructive pulmonary disease (J41–J44)	3,327	4.8	Breast cancer (C50)	2,698	4.2
6	Prostate cancer (C61)	2,852	4.1	Lung cancer (C33–C34)	2,543	3.9
7	Colorectal cancer (C18–C21)	2,448	3.6	Chronic obstructive pulmonary disease (J41–J44)	2,270	3.5
8	Suicide (X60–X84)	1,817	2.6	Colorectal cancer (C18–C21)	2,201	3.4
9	Diabetes (E10–E14)	1,771	2.6	Pneumonia and influenza (J10–J18)	1,731	2.7
10	Dementia and related disorders (F01–F03, G30–G32)	1,461	2.1	Diabetes (E10–E14)	1,558	2.4
11	Diseases of the arteries, arterioles and capillaries (I7)	1,382	2.0	Unknown primary site cancers (C76–C80, C26, C39)	1,378	2.1
12	Pneumonia and influenza (J10–J18)	1,353	2.0	Diseases of the arteries, arterioles and capillaries (I7)	1,259	1.9
13	Land transport accidents (V00–V89)	1,329	1.9	Renal failure (N17–N19)	1,006	1.6
14	Unknown primary site cancers (C76–C80, C26, C39)	1,268	1.8	Pancreatic cancer (C25)	891	1.4
15	Pancreatic cancer (C25)	943	1.4	Ovarian cancer (C56)	852	1.3
16	Renal failure (N17–N19)	919	1.3	Lymphomas (C81–C85, C96)	733	1.1
17	Liver diseases (K70–K77)	918	1.3	Exposure to unspecified factor (X59)	606	0.9
18	Lymphomas (C81–C85, C96)	864	1.3	Leukaemia (C91–C95)	581	0.9
19	Leukaemia (C91–C95)	843	1.2	Septicaemia (A40–A41)	572	0.9
20	Stomach cancer (C16)	762	1.1	Suicide (X60–X84)	503	0.8
	Total leading causes	51,264	74.4	Total leading causes	48,865	75.4
	All deaths	68,885	100	All deaths	64,822	100

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

Source: AIHW National Mortality Database.

Lung cancer was the third leading underlying cause of male deaths, followed by 'other heart diseases', a category which includes heart failure. In contrast, 'other heart diseases' was the third leading cause of mortality among females, followed by dementia and related disorders. Prostate cancer and suicide were other prominent causes of male deaths. In females, breast cancer, and pneumonia and influenza were prominent. Lung cancer, chronic obstructive pulmonary disease (COPD), colorectal cancer, dementia and diabetes were among the top 10 leading causes of death in both sexes. Other than suicide, and pneumonia and influenza, all conditions listed as top 10 causes of death are generally chronic in nature.

Major underlying causes of death by life stage

The relative contribution of different underlying causes of death varies with age, as shown in Table 2.16. Conditions emerging from the perinatal period dominate the infant mortality statistics, followed by congenital anomalies. Similarly, injuries and poisoning are the most common cause of death in the age groups 1–14 and 15–24.

Table 2.16: Leading underlying causes of death^(a) by age group, 2002

Age group	Males		Females	
	Cause of death	% deaths ^(b)	Cause of death	% deaths ^(b)
Infants (less than one year)	Conditions emerging from the perinatal period	50.9	Conditions emerging from the perinatal period	52.4
	Congenital anomalies	20.9	Congenital anomalies	24.4
	Sudden death	10.6	Sudden death	8.0
	Nervous system diseases	2.6	Injury and poisoning	3.0
1–14	Injury and poisoning	40.4	Injury and poisoning	32.0
	Cancer	17.1	Cancer	22.1
	Nervous system diseases	9.4	Nervous system diseases	10.7
	Congenital anomalies	7.2	Congenital anomalies	7.4
15–24	Injury and poisoning	75.8	Injury and poisoning	59.4
	Cancer	7.0	Cancer	11.5
	Nervous system diseases	4.9	Nervous system diseases	4.2
	Cardiovascular disease	3.4	Endocrine disorders	4.2
25–44	Injury and poisoning	52.4	Cancer	34.7
	Cancer	14.0	Injury and poisoning	31.5
	Cardiovascular disease	13.5	Cardiovascular disease	11.1
	Digestive disorders	3.7	Nervous system disease	3.6
45–64	Cancer	40.8	Cancer	56.4
	Cardiovascular disease	28.6	Cardiovascular disease	15.8
	Injury and poisoning	9.7	Injury and poisoning	5.9
	Digestive disorders	5.0	Respiratory system diseases	5.8
65–84	Cardiovascular disease	36.1	Cardiovascular disease	37.9
	Cancer	35.4	Cancer	31.0
	Respiratory system diseases	10.1	Respiratory system diseases	9.5
	Endocrine	3.7	Endocrine	4.1
85+	Cardiovascular disease	44.8	Cardiovascular disease	53.2
	Cancer	17.1	Cancer	10.8
	Respiratory system diseases	12.0	Respiratory system diseases	8.7
	Genitourinary diseases	3.5	Mental disorders	4.7

(a) Organised at ICD chapter level.

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

Source: AIHW National Mortality Database.

The shifts with age in leading causes of death to chronic diseases reflects both longer exposure to various environmental factors and the underlying ageing processes. Among those aged 25–44, injuries are the leading cause of death in males, but cancer takes over as the leading cause of death among females. In both sexes, cancer is the most common cause of death among those aged 45–64, followed by cardiovascular disease, which includes both coronary heart disease and stroke. Cardiovascular disease becomes the most prominent cause of death among those aged 65 and over.

Mention must be made of the importance of respiratory diseases as an underlying cause of death with advancing age. Prominent among these is COPD, a leading contributor to deaths overall. Respiratory diseases are responsible for almost 10% of deaths among persons aged 65 and over. Endocrine diseases, mainly diabetes, are another leading cause of death among those aged 65–84. The endocrine death statistics provided here do not reflect the contribution diabetes makes to other underlying causes of death, in particular cardiovascular diseases.

Associated causes of death

A fuller picture of events and circumstances around the time of death may be generated from ‘multiple causes of death’ data, made available by the ABS since 1997. This data set includes all causes and conditions reported on the death certificate, listed either as an underlying cause or an associated cause of death. The information is useful for further assessing the contribution of a disease or condition to death.

In assessing the contribution of various disorders to death, it may be useful to examine the underlying cause as a proportion of all listings, both underlying and associated (Table 2.17). Cancer is mostly listed as an underlying cause of death: when it was listed on the death certificate during 1997–02 it was as an underlying cause 88% of the time for males and 90% for females. On the other hand, other circulatory diseases (other than coronary heart disease (CHD) and stroke) were listed as an underlying cause of death in less than 25% of cases.

Table 2.17: Selected diseases as underlying or associated causes of death, 1997–02

Type of cause of death	Cause of death					
	CHD	Stroke	Other circulatory	Endocrine	Cancer	Respiratory
	Males					
Underlying	87,725	29,516	26,992	12,759	121,118	34,077
Associated	36,931	25,048	99,685	32,703	16,456	45,492
Total	124,656	54,564	126,677	45,462	137,574	79,569
% underlying	70.4	54.1	21.3	28.1	88.0	42.8
	Females					
Underlying	76,458	44,403	31,969	12,539	93,550	28,697
Associated	27,834	25,378	98,502	29,808	10,127	31,363
Total	104,292	69,781	130,471	42,347	103,677	60,060
% underlying	73.3	63.6	24.5	29.6	90.2	47.8

Notes

1. Total: the total number of deaths with the selected disease listed as an underlying or associated cause of death.
2. % underlying: underlying cause of death listings/total listings as percentage.

Source: AIHW National Mortality Database.

Multiple causes of death data also provide some insights into the comorbidities or co-occurrence of diseases. For example, with regard to male deaths in 1997–02, whenever CHD was listed as a cause of death (underlying or associated), CHD itself was the underlying cause in 70.4% of the cases, stroke in 2.6%, other circulatory diseases in 2.7%, endocrine diseases (mainly diabetes) in 5.2%, cancer in 7.5%, respiratory diseases in 4.6%, and all other diseases in 7.0% (Table 2.18). When cancer was listed as a cause of death (underlying or associated) for males, however, CHD was the underlying cause of death in only 4.3% of the cases and stroke in only 1.4%.

Table 2.18: Comorbidities at the time of death, 1997–02 (as per cent of deaths listing selected cause of death)

Underlying cause	Underlying or associated causes					
	CHD	Stroke	Other circulatory	Endocrine	Cancer	Respiratory
Males						
CHD	70.4	12.3	32.8	23.6	4.3	4.2
Stroke	2.6	54.1	5.4	6.4	1.4	5.3
Other circulatory	2.7	5.9	21.3	5.0	1.3	3.4
Endocrine	5.2	4.7	4.2	28.0	0.6	0.7
Cancer	7.5	8.2	13.7	17.7	88.0	15.7
Respiratory	4.6	3.4	8.4	5.3	1.8	42.8
Other	7.0	11.0	14.2	14.0	2.6	27.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Females						
CHD	73.3	11.1	30.1	22.4	3.0	4.6
Stroke	3.6	63.6	7.7	9.8	1.4	8.9
Other circulatory	2.3	6.3	24.5	6.3	1.3	6.3
Endocrine	5.0	3.8	4.2	29.6	0.5	0.9
Cancer	4.6	4.7	10.4	13.6	90.2	12.4
Respiratory	3.7	1.8	6.5	5.0	1.0	47.8
Other	7.5	8.7	16.6	14.3	2.6	19.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: AIHW National Mortality Database.

Trends in mortality

Death rates in Australia have fallen considerably, by almost two-thirds, over the past century. The male age-standardised rate fell by 63%, from 2,234 deaths per 100,000 in the early 1900s to 821 deaths per 100,000 in 2002. The female death rate fell by almost 70% during the corresponding period, from 1,844 deaths to 543 deaths per 100,000 (Figures 2.18 and 2.19). These reductions occurred in several different phases, and were due to a combination of better living conditions, strong public health and safety initiatives, and improved medical treatments.

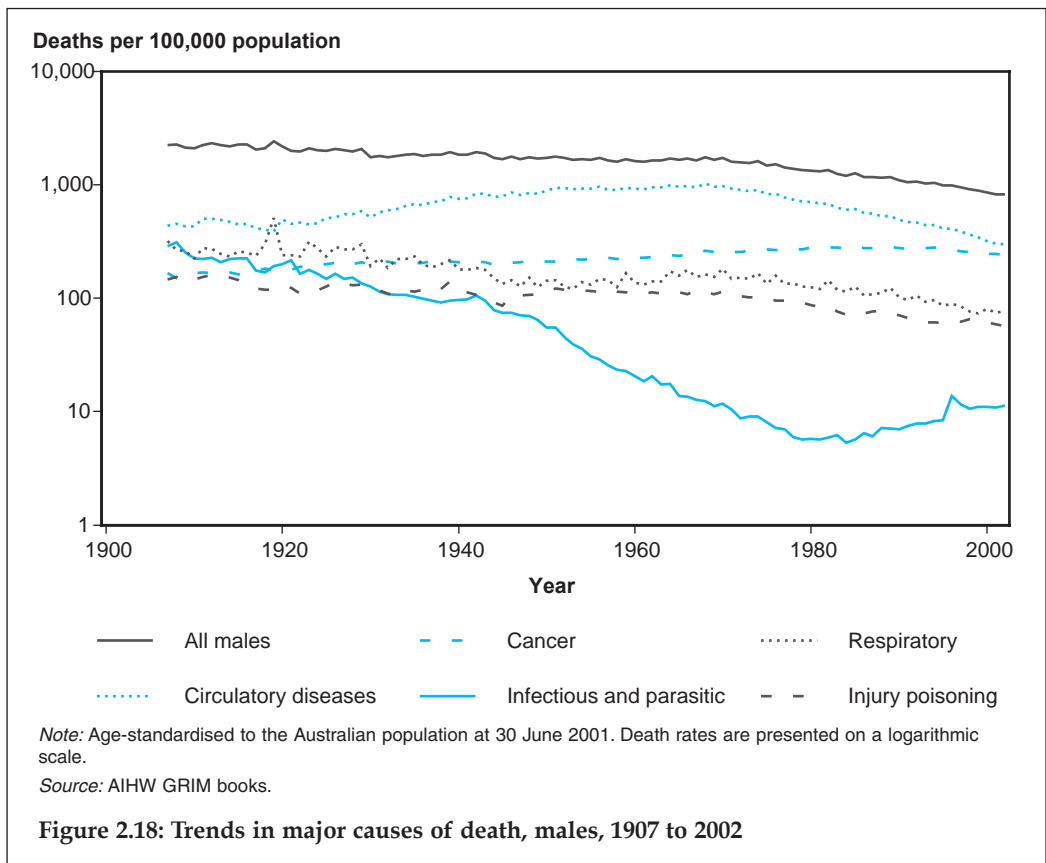
Prominent features of these trends have been large reductions in infant mortality, a significant decline in deaths from communicable diseases, and, over the last four decades, shrinking rates of cardiovascular deaths. Chronic, non-communicable

diseases now have an ever-growing share of these declining rates, with the deaths being increasingly concentrated among older age groups. At the beginning of the 20th century, deaths of children aged less than five years accounted for 26% of all deaths, compared with 1% in 2002. At the start of the 21st century, more than 70% of all male deaths and over 80% of all female deaths occurred among those aged 65 and over.

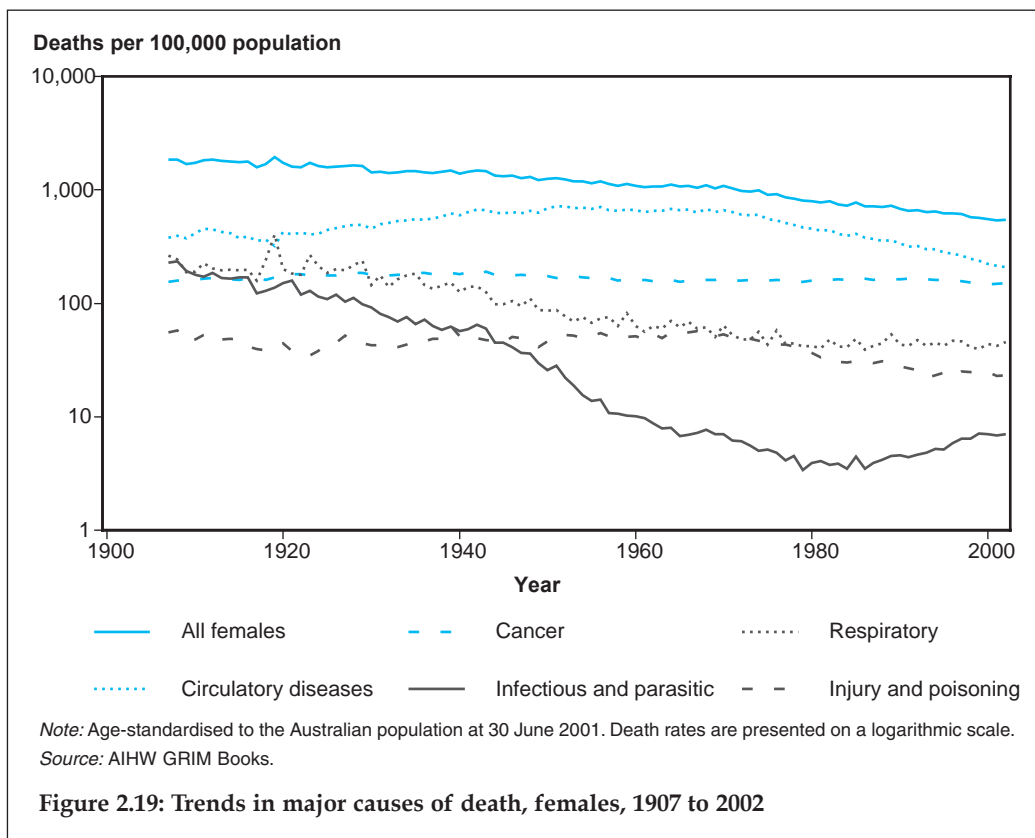
Mortality trends at ICD chapter level

Long-term trends in cause-specific mortality do not follow the steadily declining slopes noted for all-cause mortality, although by the end of the 20th century all major causes of death had experienced some reductions in rates. The trends fluctuate considerably, particularly among males (Figures 2.18 and 2.19). Age-standardised long-term trends for several major disease groups have shown the following patterns over the past century:

- Circulatory (cardiovascular) system diseases:** The death rate for males increased from 437 deaths per 100,000 males in 1907 to 1,020 in 1968. Between 1968 and 2002, the rate fell to 297 deaths per 100,000. In females, it increased from 379 deaths per 100,000 females in 1907 to 718 in 1952, before decreasing to 209 in 2002.



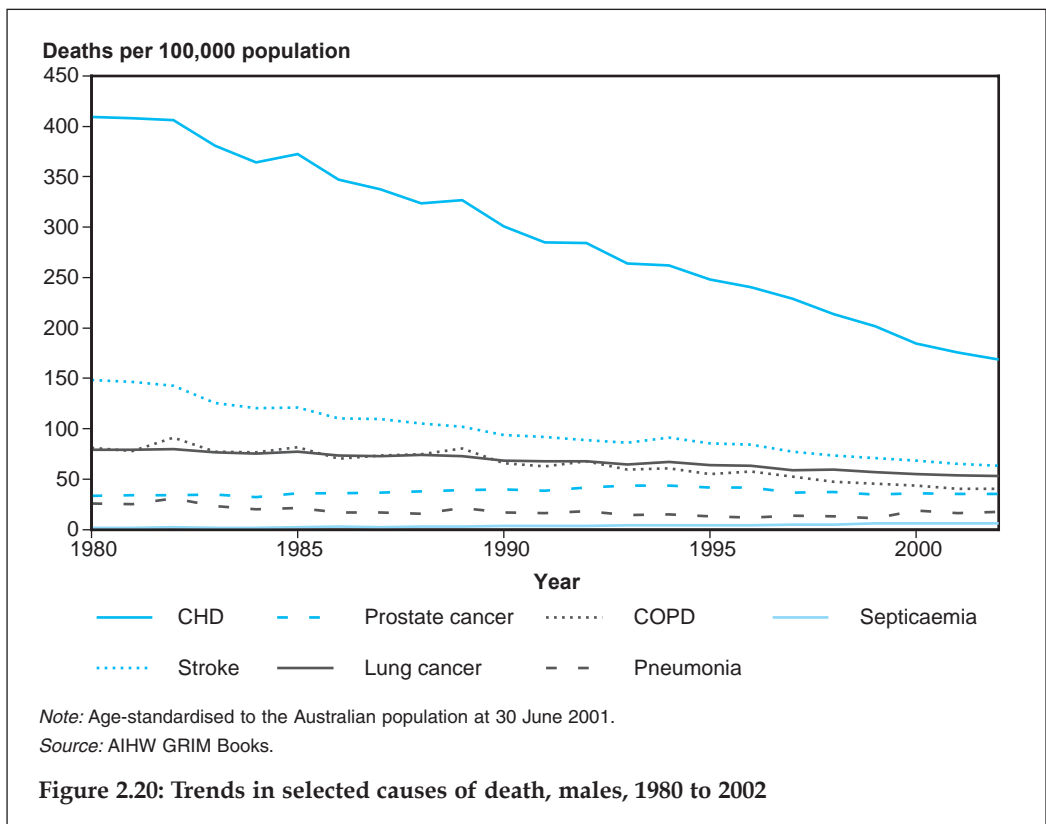
- **Cancers:** Among males, the overall death rate for cancers increased from 166 deaths per 100,000 males in 1907 to 287 in 1985 before falling to 241 in 2002. Among females, the death rate rose from 154 deaths per 100,000 in 1907 to 190 in 1943. Between 1943 and 2002, the death rate fell to 150, however.
- **Infectious and parasitic diseases:** The death rate in males fell from 288 in 1907 to 5 in 1984, but rose to 11 deaths per 100,000 males by 2002. Similarly, among females the rate fell from 229 in 1907 to 3 in 1979 but stood at 7 deaths per 100,000 females in 2002. This ICD chapter of diseases excludes pneumonia and influenza, currently the largest contributors to communicable disease mortality (see Section 2.7).
- **Respiratory diseases:** In males, the death rate fell from 320 deaths per 100,000 males in 1907 to 77 in 2002, while in females the rate fell from 263 deaths per 100,000 females in 1907 to 45 in 2002. These trends exclude the spikes of 511 deaths per 100,000 males and 405 deaths per 100,000 females resulting from the 1918–19 influenza pandemic.
- **Injuries and poisoning:** The male death rate declined from 147 deaths per 100,000 males in 1907 to 57 in 2002, while among females the rate fell from 263 deaths per 100,000 females in 1907 to 45 in 2002. These declines were interrupted briefly during the third quarter of the last century by an increase in motor vehicle accident deaths.



Mortality trends for individual diseases

The mortality trends at the ICD chapter level, described above, conceal significant variation at the individual disease level (Figures 2.20 and 2.21). In particular, death rates for different types of cancer vary considerably in trends, a good example of the underlying diversity in trend patterns.

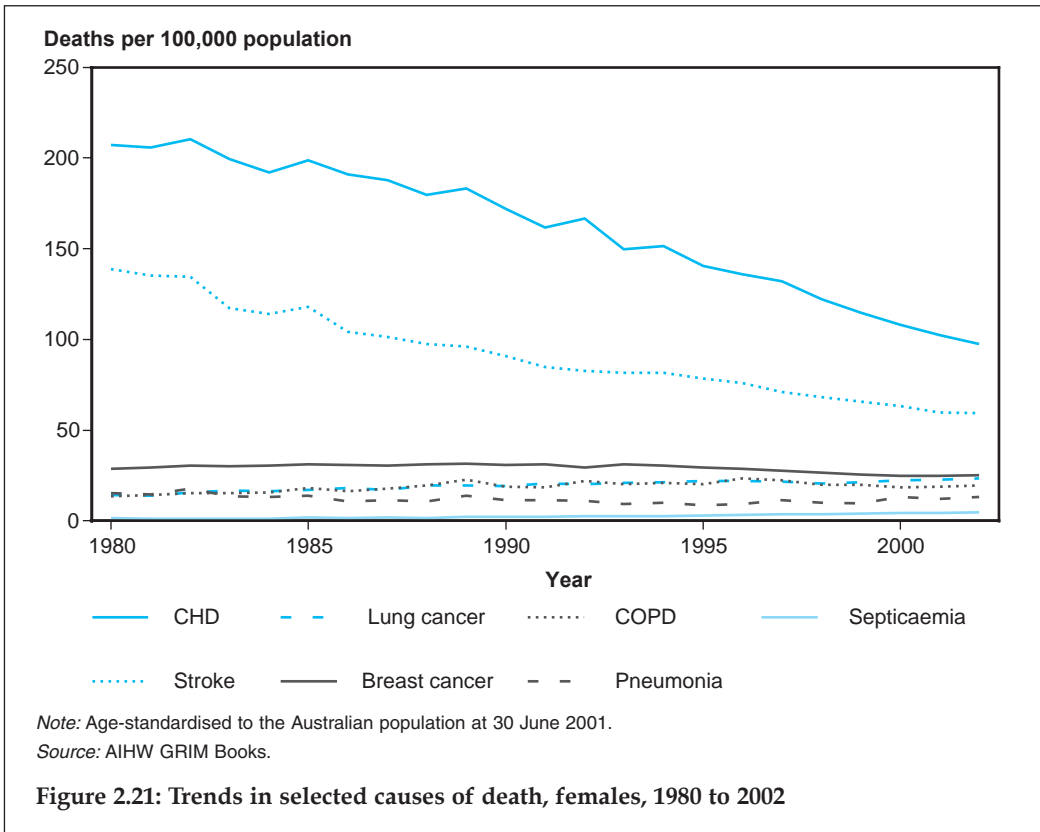
This is because cancer is not a single disease but a collection of many disorders that all feature uncontrolled cell growth. Death rates for cancers such as melanoma, brain cancer, non-Hodgkin's lymphoma and leukaemia have increased in both sexes since the mid-20th century (flattening towards the end of the century), while the death rates for colorectal cancer have been declining in females since the 1940s, and in males since the 1980s (AIHW 2003d). Lung cancer death rates have been decreasing for males since the 1980s, while for females they have continued to increase, mirroring the different smoking trends among males and females and the typical 20- to 30-year time lag before lung cancer develops.



Lung cancer is the leading cause of male cancer deaths, with 53 deaths per 100,000 males in 2002. Between 1940 (when lung cancer was first listed as a specific cause of death) and 1982, the death rate for males increased steadily. Since 1982, however, the rate has been declining consistently. Between 1998 and 2002, the male lung cancer

death rate declined annually by an average of 2.6%. In contrast, the lung cancer death rate among females continued to rise beyond 1982. Since 1998, the death rate for lung cancer in females has risen by 3.2% annually, from 21 to 25 deaths per 100,000 females, becoming the second most common cause of cancer deaths among females.

Death rates for breast cancer, the leading cause of cancer deaths among females, peaked in the early 1940s, having increased slowly since 1921. The rate decreased between 1940 and 1950, and then remained relatively stable until 1993, fluctuating between 28 and 30 deaths per 100,000 females. Since 1998, the breast cancer death rate has fallen annually by 1.4%.



Prostate cancer is a major cause of death in older males, with 83% of such deaths occurring among those aged 70 and over. Since 1921, the rate has been increasing slowly. The early 1990s saw a high of 44 prostate cancer deaths per 100,000 males. However, since 1998, the rate has decreased annually by 1.1% to 35 deaths per 100,000 males in 2002.

Colorectal cancer is the third most common cause of cancer deaths in both sexes, with rates of 28 deaths per 100,000 males and 20 deaths per 100,000 females in 2002. These rates have fluctuated considerably in the past, increasing between 1921 to the early

1940s, in both sexes. Among males, the rate continued to climb further to a high of 38 deaths per 100,000 in 1983, but since has declined steadily. Between 1998 and 2002, the colorectal cancer death rate for males declined by 2.8% annually. The death rate in females has been declining over a much longer period, since 1942. Between 1998 and 2002, it declined by an average of 2% annually.

The mortality trends for circulatory (cardiovascular) system diseases have also varied, although CHD and stroke have generally followed the same patterns. CHD was the largest contributor to cardiovascular deaths all through the 20th century, especially in the middle of the century. CHD death rates climbed steadily until 1968, and have declined markedly since then. Between 1998 and 2002, the death rates declined annually by 5.7% in males and 5.5% in females. In 2002, with 170 deaths per 100,000 males and 97 deaths per 100,000 females, CHD was still the most common cause of death in both sexes.

Stroke (cerebrovascular disease) is the second largest individual underlying cause of death, with 63 deaths per 100,000 males and 60 deaths per 100,000 females in 2002. Stroke mortality has declined steadily, with the rates declining annually by 3.7% in males and 3.4% in females between 1998 and 2002.

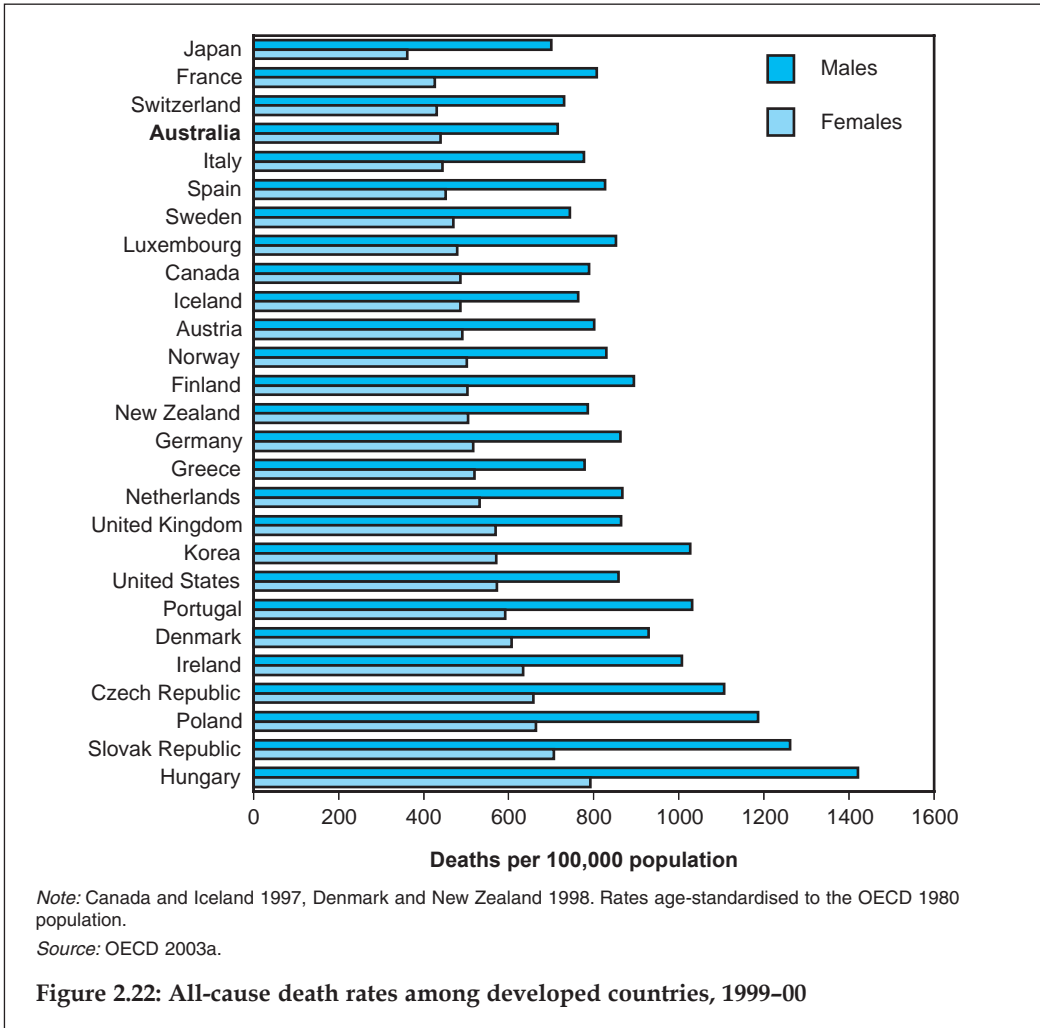
Mortality trends for COPD are broadly similar to those observed for lung cancer, with smoking being the major cause. Septicaemia mortality, on the other hand, has increased from 5.8 to 11.3 deaths per 100,000 males and from 3.9 to 7.0 deaths per 100,000 females between 1980 and 2002. A large proportion (30%) of this increase is attributed to definitional changes between ICD revisions 9 and 10, and the introduction of an automated coding system (AIHW GRIM Books).

The number of deaths due to pneumonia declined considerably, by almost half during the period 1970–86, and then stabilised for a decade. Since the turn of the 21st century, pneumonia deaths have risen again, almost to the levels of the early 1970s. In particular, they increased by almost 50% between the periods 1997–99 and 2000–02.

These variations in mortality trends reflect several interacting influences—the underlying trends in risk factors, the ageing of the population, and the various methods of preventing and treating diseases. There is an apparent paradox in that, although reductions in mortality influence how long people live, age itself becomes a factor in the type of diseases people eventually die of and die with.

International comparisons

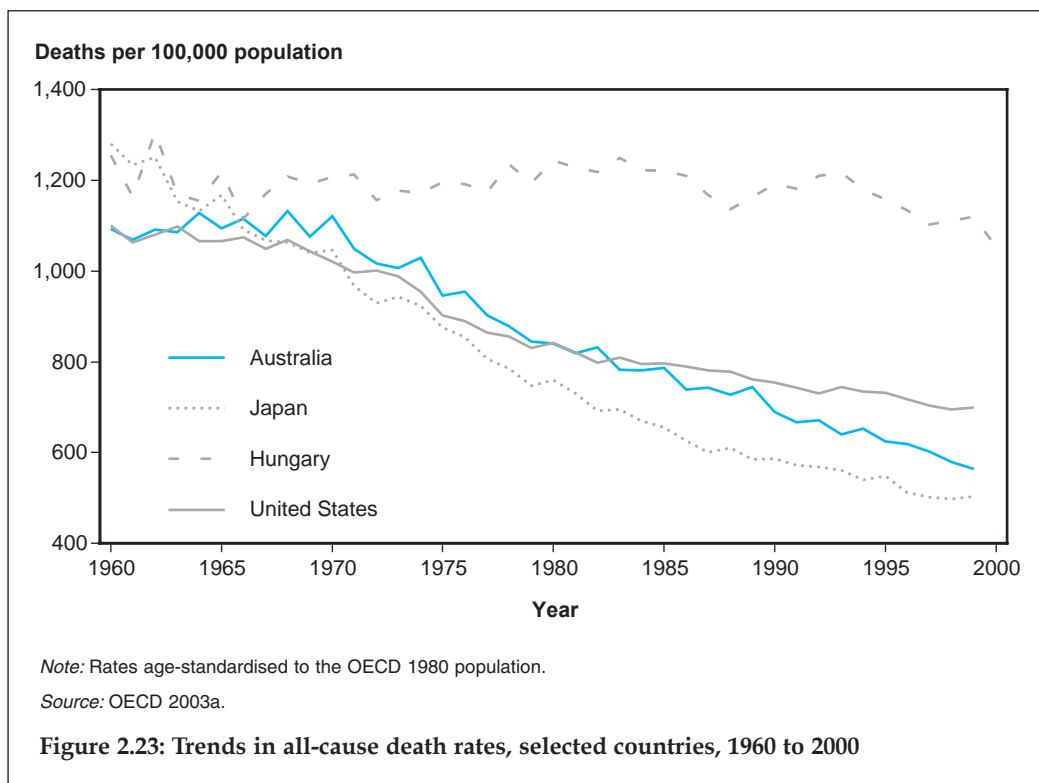
At the end of the 20th century, Australia's overall death rate compared well with other OECD countries (Figure 2.22). For males, Australia's age-standardised rate of 714 deaths per 100,000 males ranked the second lowest among OECD countries; and for females, Australia's rate of 440 deaths per 100,000 ranked the fourth lowest. Only Japan had lower overall death rates, with France and Switzerland also having lower female death rates. In contrast, Ireland and the Eastern European countries of Hungary, the Czech and Slovak Republics, and Poland had 40% higher death rates than Australia.



Almost all OECD countries have experienced large declines in mortality in the last several decades. Since 1960, Japan has seen its male death rate decline by 54% and its female death rate by 67% (Figure 2.23). Although from a lower base rate than Japan's in 1960, Australia's decline of 47% among males and 50% among females in the same period is also notable. Other countries with significant declines in death rates include Italy, Finland, France and Germany. The Nordic countries (Denmark, Sweden, Norway and Iceland) experienced more modest declines, but their base rates in 1960 were comparatively low. Death rates in Eastern European countries have begun to decline in more recent years.

During the 1950s and 1960s, death rates in Australia and many other developed countries stabilised. The rates remained steady among children and adults to middle age, although small improvements were noted among older persons. By the mid-1960s and early 1970s, it was considered that the mortality trends had levelled off and that

any further gains would be minimal (AIHW: de Looper & Bhatia 1998). Since then, further declines have occurred at all ages. The pattern was slightly different in Japan, where consistent declines have been seen throughout this period (AIHW: de Looper & Bhatia 1998).



Declines in cardiovascular disease mortality, and in particular CHD, have contributed greatly to recent falls in death rates among many developed countries. CHD is one of the leading causes of mortality for both sexes in developed countries, responsible for between 15–20% of all deaths. Since the 1970s, countries such as Australia, Canada, the United States and Portugal have seen CHD death rates fall by around 60% (OECD 2003b).

At the ICD chapter level, cancer is the second leading cause of death in most OECD countries, accounting for some 20–30% of all deaths. In countries such as Australia, Canada, Ireland, Italy, New Zealand, the United Kingdom and the United States, death rates for cancer peaked in the 1980s and have declined since then. New cases of cancer, however, continue to increase as the population ages.

Much of these reductions in mortality is attributed to changes in lifestyle and public health interventions, reducing known high risk factors such as smoking and high blood pressure, as well as to progress in medical care and improvements in economic and social conditions.

The widespread reductions in death rates, especially for persons in older age groups, hail significant increases in life expectancy at all ages. For example, life expectancy at birth across all OECD countries increased by 8.7 years between 1960 and 2000, from 68.5 to 77.2 years. Premature mortality (that is, death before age 70) has fallen by half in OECD countries since the early 1960s, assisted by the downward trend in infant mortality and declines in deaths from heart disease. Only modest reductions in premature mortality have occurred in some Central and Eastern European countries, due to persistently high mortality from cardiovascular disease and liver disease, particularly cirrhosis. These slow trends reflect continuing higher rates of tobacco and alcohol consumption by males in these countries. In comparison, high rates of premature mortality in the United States are due to deaths from external causes, such as accidents, suicide and homicide (OECD 2003b).

2.6 Non-communicable diseases

The bulk of ill health, disability and premature death in Australia today arises from non-communicable diseases. Prominent among these are cardiovascular diseases, cancers, mental problems and disorders, diabetes, asthma, arthritis, nervous system disorders and kidney diseases. Most of these diseases are chronic (long-term) in nature.

The non-communicable diseases vary considerably in the nature and extent of their community impact. While some diseases are large contributors to premature mortality, others contribute more to disability. Illness associated with these diseases also varies considerably, and the intermittent nature of several diseases makes it somewhat difficult to assess their full impact.

Surveillance and monitoring of diseases has traditionally been disease-specific. Although this approach does not enable an integrated account of these diseases and their risk factors, it persists in light of available data sources.

To generate profiles of individual non-communicable diseases, information has been extracted from a variety of sources, in particular from mortality and hospitalisation data sets, population surveys and other health-related collections. The varying emphasis in the choice and use of information depends upon the nature and progression of the disease. State-based information has been used where national data are not available.

A summary statistic, disability-adjusted life year (DALY), has also been used to describe the burden of disease associated with each major disorder. The DALY statistic takes into account premature mortality caused by a disease, the amount of disability it causes, and its prevalence. DALY is a measure of the years of healthy life lost due to illness or injury – one DALY is one year of ‘healthy’ life lost. It is a combination of years of life lost due to premature mortality (YLL) and the equivalent years of ‘healthy’ life lost due to poor health or disability (YLD). The AIHW estimated that the total burden of disease and injury in Australia in 1996 was 2.5 million DALYs, 54% of which were YLL and 46% YLD.

Some of the non-communicable diseases covered in this section receive special attention under the National Health Priority Areas initiative (see the Appendix). The priority areas covered in this section relate to cardiovascular health, cancer control, mental health, diabetes, asthma, and arthritis and musculoskeletal conditions. Several other diseases covered in this section are also significant contributors to the burden of disease in Australia.