

Immunodeficiency

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

2.2 Burden of disease and injury

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

Mortality

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

Box 2.6: Comparing death rates

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

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

In this report, unless otherwise specified, death rates have been directly age standardised to the Australian population as at 30 June 1991 (ABS 1993b). Both AIHW and ABS have agreed to adopt this as the national standard until population estimates for 30 June 2001 become available. The population at 30 June 1991 was the standard used in the 1996 and 1998 editions of Australia's Health, whereas the 1992 and 1994 editions used the population at 30 June 1988 as the standard. For this reason, age-standardised death rates in this publication cannot be directly compared with those in the 1992 and 1994 editions.

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

Mortality patterns

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

Major causes of death by life stage

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

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

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

Trends in major causes of death, 1921 to 1998

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

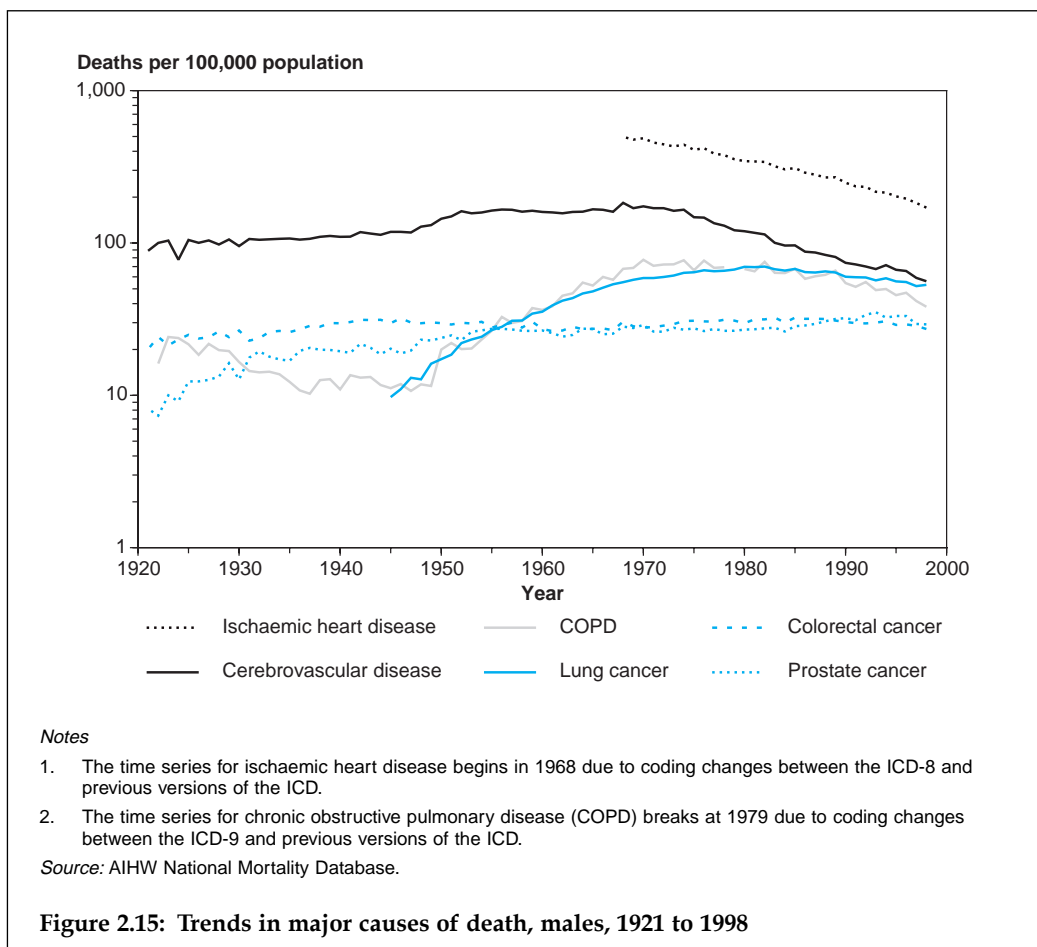
Table 2.3: Leading causes of death by number of deaths and sex, 1998

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

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

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

Source: AIHW National Mortality Database.

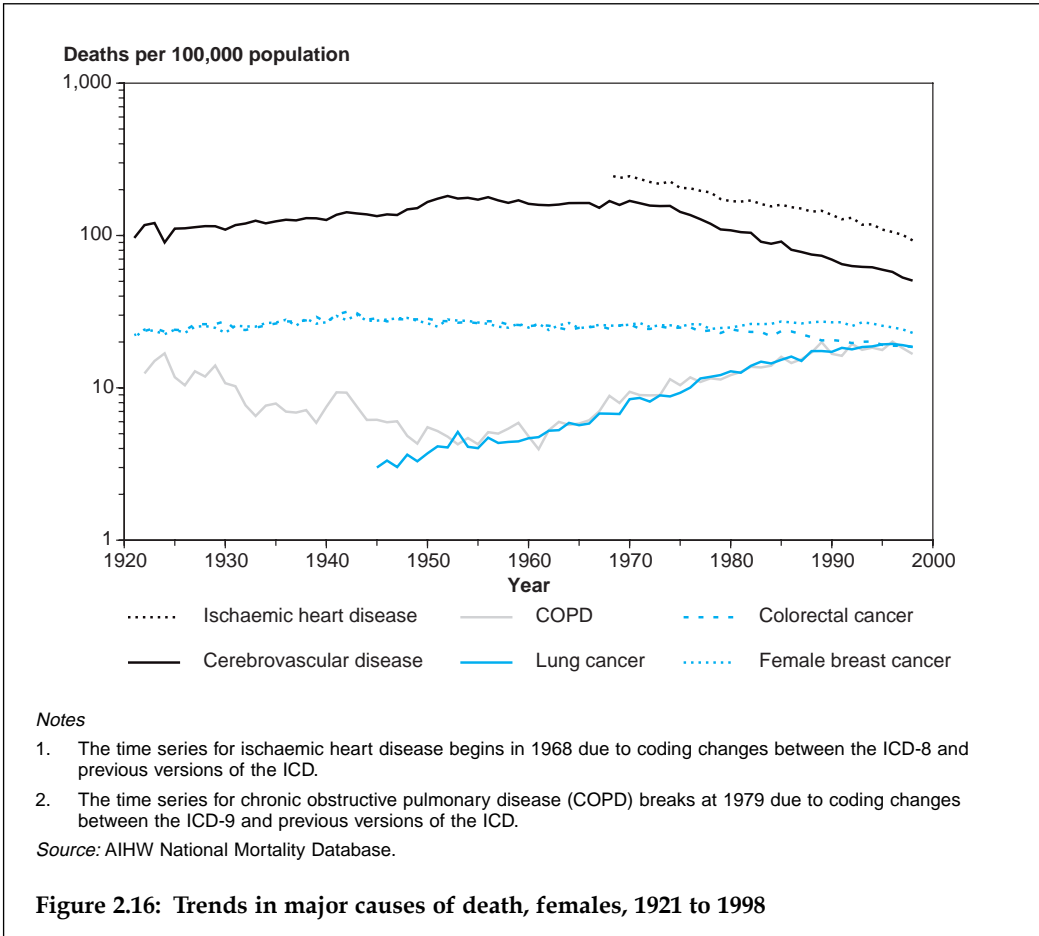


Ischaemic heart disease is the biggest cause of death in Australia. In 1998, there were 171 deaths per 100,000 males and 93 deaths per 100,000 females with IHD as the underlying cause of death.

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

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

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



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

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

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

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

females has continued to rise, more steeply in the period 1967 to 1993. However, since 1993, the death rate for lung cancer in females has been relatively stable, albeit decreasing slowly at a rate of 0.3% per annum.

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

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

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

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

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

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

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

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

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

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

Multiple causes of death

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

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

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

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

Source: ABS 1999a.

Illness, morbidity and health conditions

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

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

The scale of the problem

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

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

Recent and long-term conditions

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

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

Disease incidence and prevalence

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

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

Table 2.5: Most prevalent health conditions, 1996

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

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

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

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

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

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

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

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

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

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

(j) Symptomatic benign prostate enlargement resulting in treatment.

Source: Australian Burden of Disease and Injury Study.

Table 2.6: Most common new health conditions, 1996

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

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

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

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

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

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

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

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

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

(i) Incidence estimated from hospitalisation data for Australia.

(j) Symptomatic benign prostate enlargement resulting in treatment.

Source: Australian Burden of Disease and Injury Study.

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

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

Disability

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

Expected years of life with disability and core activity restriction

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

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

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

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

Australian Burden of Disease and Injury Study

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

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

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

Box 2.7: Defining disability

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

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

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

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

Box 2.8: Disability-adjusted life year (DALY)

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

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

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

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

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

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

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

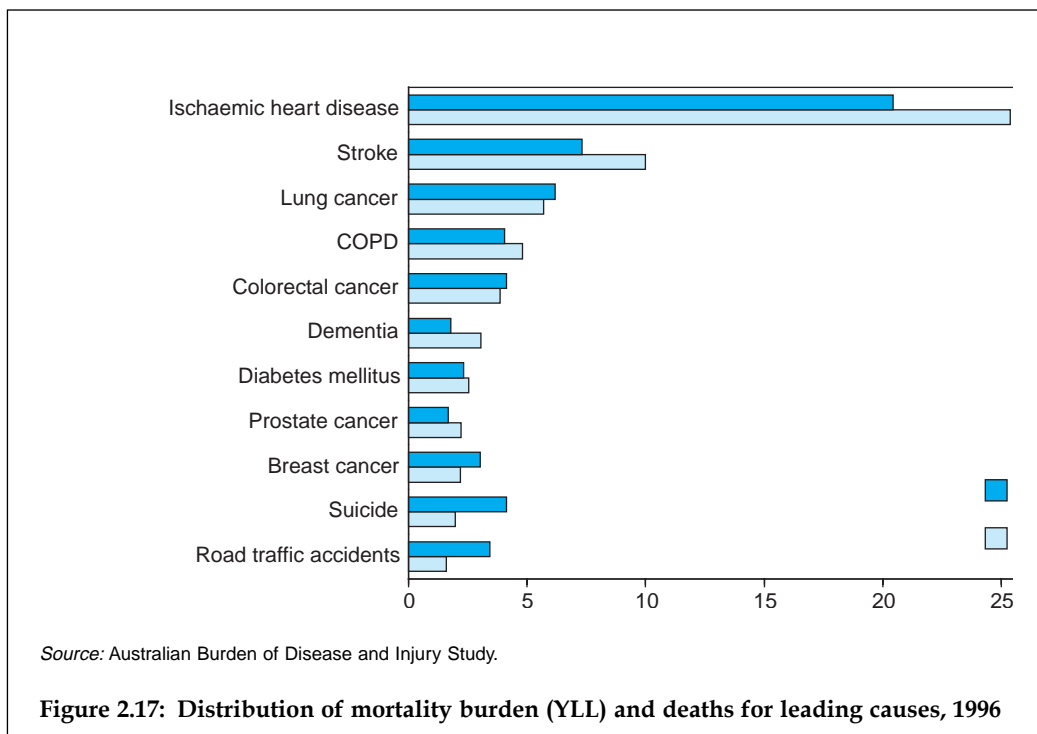
The burden of disease associated with each of the National Health Priority Areas is described in section 2.3. The disease and injury burden in Australia attributable to major risk factors is described in chapter 3. Socioeconomic differentials and sex differentials in disease and injury burden are described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

The burden of premature mortality—YLL

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

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

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



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

Trends in mortality burden, 1981 to 1996

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

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

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

Leading causes of the disability burden—YLD

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

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

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

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

Total burden of disease and injury—DALYs

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

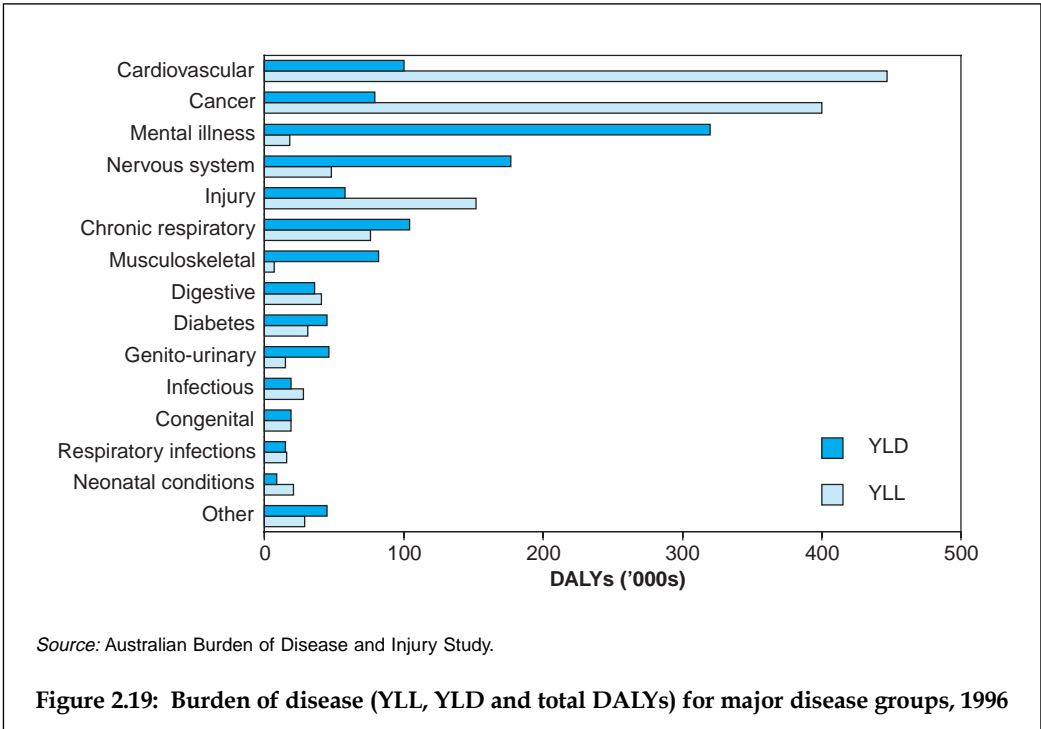
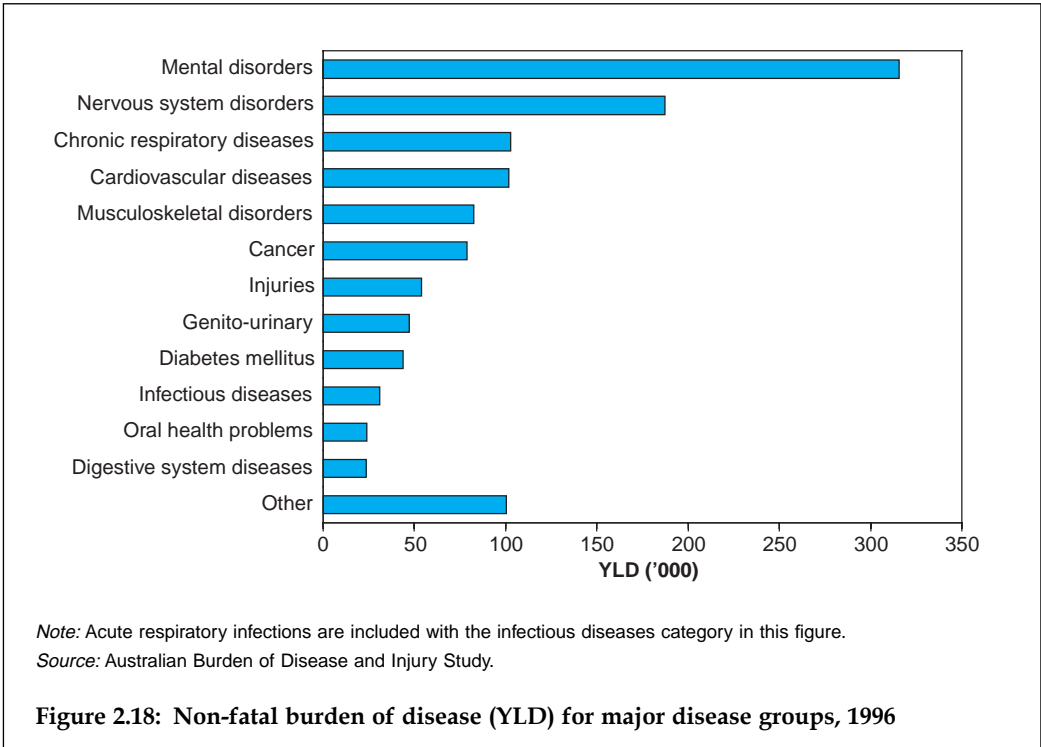


Figure 2.19 shows the YLL and YLD contributions to total DALYs for the major disease groups and injury. Inclusion of non-fatal health outcomes provides a substantially different picture from that provided separately by traditional mortality or disability statistics: mental disorders were the third leading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

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

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

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

(a) Chronic bronchitis and emphysema.

Source: AIHW: Mathers et al. 1999a.

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

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

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

2.3 NHPA diseases and conditions

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

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

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

Cardiovascular disease

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