Trends in deaths

Analysis of Australian data 1987–1998 with updates to 2000

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Mortality Surveillance Series
Number 3

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Analysis of Australian data 1987–1998 with updates to 2000

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2002

Australian Institute of Health and Welfare
Canberra

AIHW Cat. No. PHE 40

This publication is part of the Australian Institute of Health and Welfare's Mortality Surveillance Series. A complete list of the Institute's publications is available from the Media and Publishing Unit, Australian Institute of Health and Welfare, GPO Box 570, Canberra ACT 2601, or via the Institute's web site (http://www.aihw.gov.au).

ISSN 1039-3609
ISBN 1 74024 210 6

Suggested citation

AIHW: Dunn C, Sadkowsky K and Jelfs P 2002. Trends in deaths: Australian data, 1987–1998 with updates to 2000. Mortality Surveillance Series no. 3. Cat. No. PHE 40. Canberra: AIHW.

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Published by the Australian Institute of Health and Welfare.

Printed by Panther Printnet

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Preface

This report examines the changing pattern of Australian mortality. It reflects a greater effort by the Australian Institute of Health and Welfare to examine the impact of mortality in population groups and geographic locations, and to examine long-term mortality trends.

The report undertakes a detailed examination of the period 1987 to 1998 and highlights recent changes to 2000. It includes analysis of long-term mortality trends over the past century, and analysis by State and Territory, Indigenous status, socioeconomic status, geographic area and country of birth for 16 feature disease groups and all causes combined. In addition, a companion set of data on deaths from 174 diseases is available on the AIHW web site (www.aihw.gov.au).

Commentary is provided to put the statistics into context and to serve as a guide to further analysis. The report is aimed at a broad audience, but provides enough technical information to be useful for those studying and working in the areas of public health and health policy.

While mortality rates are declining for Australians in general, the decreases have not been shared equally by all Australians. Mortality rates for Indigenous males and females are still significantly higher than for other Australians. Mortality rates are also significantly higher for Australians living in non-metropolitan areas (influenced by Indigenous rates in these areas) and for those with lower socioeconomic status. There have also been worrying increases in the rates of lung cancer among females.

I commend this report to you and trust that it will provide a comprehensive view of mortality in Australia as we start the new century.

Richard Madden

Director

Acknowledgments

This report was prepared by Carolyn Dunn, Krystian Sadkowsky and Paul Jelfs.

The authors are grateful to Dr Len Smith (National Centre for Epidemiology and Population Health) for refereeing the report.

The authors are also grateful to Peter Burke and Maryann Wood (Australian Bureau of Statistics), and Sue Walker (National Centre for Classification in Health, Brisbane, Queensland University of Technology) for their patient guidance and answering of questions on the coding of diseases.

The authors acknowledge the input of staff from within the Australian Institute of Health and Welfare, particularly Michelle Mc Pherson, Dr Paul Magnus, John Harding, Justine Boland, Anne-Marie Waters, Edith Christensen, Robert van der Hoek, Phil Trickett and Zoe Holdensen for their contribution to this report.

Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AHTAC	Australian Health Technology Advisory Committee
AIHW	Australian Institute of Health and Welfare
ASGC	Australian Standard Geographic Classification
ASMR	Age-standardised mortality rate
CI	Confidence interval
COPD	Chronic obstructive pulmonary disease
HALE	Healthy life expectancy
ICD	International Classification of Diseases
NSW	New South Wales
NT	Northern Territory
OECD	Organisation for Economic Co-operation and Development
PYLL	Person years of life lost
Qld	Queensland
RRMA	Rural, Remote and Metropolitan Areas Classification
SA	South Australia
SEIFA	Socioeconomic Indexes for Areas
SES	Socioeconomic status
SIDS	Sudden infant death syndrome
SLA	Statistical Local Area
SMR	Standardised mortality ratio
TAS	Tasmania
USA	United States of America
UK	United Kingdom
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

Summary information for leading causes of death, males, 2000

Conditions	Deaths		Mortality rate[a]	Yearly % change		Median age	Top 10
	Number	% of total		1987–1998	1997–2000		
All causes of death	**66,817**	**100.0**	**7,127**	**–2.3**	**–3.4**	**74**	
All circulatory diseases	**23,756**	**35.5**	**2,555**	**–3.8**	**–6.4**	**78**	
Ischaemic heart disease	14,052	21.0	1,502	–2.6	–7.0	76	1
Cerebrovascular diseases	4,913	7.4	535	–0.9	–4.0	80	2
Diseases of the arteries, arterioles and capillaries	1,321	2.0	143	–4.0	–4.0	78	9
All malignant cancers	**20,153**	**30.2**	**2,116**	**–0.8**	**–1.8**	**72**	
Lung cancer	4,587	6.9	480	–1.9	–2.4	71	3
Prostate cancer	2,663	4.0	288	2.3	–1.1	78	5
Colorectal cancer	2,533	3.8	265	0.4	–2.2	72	6
Other							
Chronic obstructive pulmonary disease	3,281	4.9	355	–1.7	–6.1	77	4
Suicide	1,860	2.8	194	0.5	–6.4	39	7
Diabetes	1,594	2.4	169	3.7	–1.7	75	8
Influenza and pneumonia	1,312	2.0	145	–2.3	6.7	79	
Land transport accidents	1,374	2.0	147	[b]–6.1	–1.0	32	10
Renal failure	803	1.2	88	2.4	–2.3	82	

(a) Mortality rates use Australian 1991 Standard Population and are expressed per 1,000,000 population.
(b) The 1987–1998 trend is calculated using ICD-9 codes E810–819 (motor vehicle traffic accident).

Summary information for leading causes of death, females, 2000

Conditions	Deaths		Mortality rate[a]	Yearly % change		Median age	Top 10
	Number	% of total		1987–1998	1997–2000		
All causes of death	**61,474**	**100.0**	**4,507**	**–1.9**	**–3.0**	**81**	
All circulatory diseases	**25,931**	**42.2**	**1,726**	**–3.6**	**–5.5**	**84**	
Ischaemic heart disease	12,469	20.3	840	–1.9	–6.7	84	1
Cerebrovascular diseases	7,387	12.0	483	–1.0	–3.8	85	2
Diseases of the arteries, arterioles and capillaries	1,296	2.1	86	–4.2	–5.0	85	9
All malignant cancers	**15,475**	**25.2**	**1,280**	**–0.4**	**–2.0**	**74**	
Female breast cancer	2,511	4.1	215	0.0	–4.1	67	3
Lung cancer	2,291	3.7	196	1.4	1.3	72	4
Colorectal cancer	2,179	3.5	175	–0.2	–3.0	76	5
Other							
Chronic obstructive pulmonary disease	2,015	3.3	156	2.6	–5.7	78	6
Diabetes	1,412	2.3	107	2.1	–4.1	79	7
Influenza and pneumonia	1,625	2.6	101	–1.7	2.7	82	8
Renal failure	913	1.5	60	2.5	0.4	84	10
Suicide	503	0.8	52	–0.1	–6.0	40	
Land transport accidents	532	0.9	55	[b]–5.8	–2.5	37	

(a) Mortality rates use Australian 1991 Standard Population and are expressed per 1,000,000 population.
(b) The 1987–1998 trend is calculated using ICD-9 codes E810–819 (motor vehicle traffic accident).

Summary of findings

This publication presents profiles for 16 causes of death—ischaemic heart disease, cerebrovascular disease, lung cancer, prostate cancer, breast cancer, colorectal cancer, chronic obstructive pulmonary disease, asthma, suicide, motor vehicle traffic accidents, homicide, diabetes, mental disorders, dementia, and smoking- and alcohol-related disease—as well as all deaths. Each disease profile discusses age and sex trends in mortality rates for the period 1987–1998; comparisons of mortality rates for the Indigenous population, metropolitan, rural and remote populations, and the States and Territories; and comparisons of mortality rates by socioeconomic status and country of birth.

Life expectancy, premature loss of life and general mortality patterns are also discussed, and an overview is given of the major causes of death by age and sex.

You will also find age and sex trends for 174 diseases on the mortality portal of the AIHW web site at http://www.aihw.gov.au.

Hundreds of statistical measurements have been made in the analyses for this report. However, rather than present every one of them, we have presented those that show statistical significance. To limit repetitive description of these statistics, the term 'significantly' has been used to describe measurements that are statistically significantly different.

Mortality

Overall

Over the 20th century, the male age-standardised mortality rate declined by 63%, from 19,503 deaths per million population in 1907 to 7,127 in 2000. The female age-standardised mortality rate declined by 72% over the same period, from 16,133 to 4,507 deaths per million population.

Twelve-year trends 1987–1998

During the period 1987–1998 the mortality rate fell by 22.5% for males (from 10,054 deaths per million population), and by 19.4% for females (from 5,837 deaths per million population). Mortality rates for males aged 0 to 4 years fell by 27%, while for females the rates fell by 19%.

The mortality rate decreased for all five-year age groups except males aged 35–39 and males aged 30–34 (where there was a small but statistically significant increase). The rates decreased for females aged 10–14, 30–34 and 35–39 (where decreases were not as pronounced).

Life expectancy

Life expectancy at birth increased by about 20 years over the 20th century, from 55.2 and 58.8 years for males and females respectively in 1901 to 76.6 and 82.1 years in 2000 (Figure 2.1; Table 2.1).

For the analysis period 1987–1998, the gains were 2.9 years for males and 2.2 years for females.

Healthy life expectancy in Australia was compared in this report with 20 countries that either had health systems comparable with Australia's or had large migrant populations residing in Australia. Among these countries, healthy life expectancy was ranked sixth highest for Australian-born males, and third highest for Australian-born females (Figure 2.2; Table 2.2).

Major causes of death

In 1998, the top 10 causes of death in descending order were:

- Ischaemic heart disease (heart attack)
- Cerebrovascular disease (stroke)
- Lung cancer
- Chronic obstructive pulmonary disease
- Bowel cancer
- Diabetes
- Suicide
- Breast cancer
- Prostate cancer
- Pneumonia.

Together these accounted for 56% of all deaths (see Table: Summary information for leading causes of death, pages x–xi).

Ischaemic heart disease and cerebrovascular disease were the two leading causes of death for males and females, ischaemic heart disease having been the most common cause of death for the last 60 years. Lung cancer and chronic obstructive pulmonary disease were the third and fourth most common causes of death for males. For females, breast cancer was the third most common, followed by colorectal cancer.

Causes of death can be compared as single causes (e.g. lung cancer and ischaemic heart disease), or as group causes (e.g. all cancers and cardiovascular disease). The ranking of a cause of death is thus determined by how the causes were grouped. This publication generally uses single causes of death and only uses group causes when it is desirable to aggregate deaths as a single disease entity for epidemiological or management purposes.

Premature loss of life

In health statistics, premature loss of life is a concept used as a summary measure, allowing comparisons of premature loss of life between different causes of death. Person years of life lost (PYLL), used in this report, is one of a set of measures of premature loss of life based on mortality data (see Appendix D). The global burden of disease work undertaken at the World Health Organization has extended the concept of life lost due to premature mortality to include equivalent years of 'healthy' life lost in states of less than full health, 'disability', and measured by disability-adjusted life years (DALY). This work has been continued at the Australian Institute of Health and Welfare in the publication *The Burden of Disease and Injury in Australia* (1999), by Colin Mathers, Theo Vos and Chris Stevenson.

There were more than one million PYLL to the Australian population during 1987 because of premature death (defined as death before the age of 75 years). This amount reduced to about 940,000 PYLL during 1998.

Suicide was the largest single contributor to PYLL for males (12.2%) while breast cancer was the main contributor for females (9.0%). However, the mortality from conditions attributed to tobacco smoking was responsible for an estimated 118,000 PYLL in 1998—a preventable 13% of all premature loss of life (14.5% for males, 10.2% for females).

Major causes of death by age and sex in 1998

For infants (less than 1 year old), conditions emerging from the perinatal period (e.g. maternal complications of pregnancy, and complications of placenta, cord and membranes) were the largest cause of death for both males and females. These include deaths due to conditions that have their origin in the perinatal period, from 22 completed weeks of pregnancy to 28 days following birth, even though death may occur later (AIHW 1999c).

For those aged 0 to 24, injury was the main cause of death for both males and females.

For males aged 25 to 44, injury was the main cause of death, considerably greater than other causes for males. For females, breast and cervical cancer were the main causes by age 35.

For males aged 45 to 64, the main causes of death were colorectal and lung cancer, while for females, breast and colorectal cancer were the most common.

For both males and females aged 65 to 84, cardiovascular disease, largely ischaemic heart disease, overtook cancer as the principal cause of death.

For both males and females 85 years and older, the principal cause of death was cardiovascular disease, followed by cancer and respiratory disease.

Indigenous status

In 1995–1997, the number of Aboriginal and Torres Strait Islander deaths was three times higher than the expected number when based on the rates for the Australian population as a whole. Data was analysed from the Northern Territory, Western Australia and South Australia where identification of Indigenous status was considered of a good enough standard for the analysis period 1995–1997.

Trends in Aboriginal and Torres Strait Islander deaths were not analysed due to the generally poor quality of Indigenous identification in mortality and population data in earlier years.

Geographic comparisons

There were significant differences in mortality rates between metropolitan and non-metropolitan areas in Australia. Those living in rural areas had significantly higher mortality rates than those living in metropolitan areas. Rates were highest for residents of remote regions.

These differences were influenced by many factors, including the proportion of the Indigenous population, the socioeconomic status of the population, level of public health infrastructure, availability of health services and environmental risks.

Socioeconomic status

Mortality rates by cause of death were generally inversely related to socioeconomic status, with rates lowest for high socioeconomic status populations, and highest for low socioeconomic populations. Breast cancer was one of the causes of death that was contrary to this relationship.

Country of birth

Mortality rates for Australian residents showed significant differences in respect of country of birth. However, the findings should be treated with caution because of the relatively small numbers for many countries, particularly the findings for individual disease groups. Australian males and females born in Korea, Hong Kong and Macau had significantly lower mortality rates, indicative of an overall pattern of lower mortality rates for those born in Asian countries. Mortality rates were highest among Australian males and females born in Israel, and in males born in Finland, Poland and the United States of America.

Summary of disease profiles

1. Ischaemic heart disease (heart attack) was the leading cause of death in Australia, claiming 22% of all deaths in 1998. During 1998 the mortality rates were 1,730 and 942 deaths per million population for males and females respectively. Of the 28,103 deaths, 15,173 were males and 12,930 were females. This accounts for 96,000 PYLL each year (ranked first overall for persons, but second behind suicide for males, and second behind breast cancer for females, on this measure).
2. Cerebrovascular disease (stroke) was the second largest underlying cause of death, responsible for 10% of all deaths in 1998, with rates of 593 and 535 deaths per million population for males and females respectively. Of the 12,612 deaths that occurred during 1998, 5,065 were males and 7,547 were females. It accounts for about 29,000 PYLL (ranked ninth).
3. Lung cancer was the leading cause of cancer death for males in Australia and the third for females, with rates of 532 male deaths per million population and 186 female deaths in 1998. Of the 6,874 deaths, 4,821 were males and 2,053 were females. It accounts for about 45,000 PYLL each year (ranked fifth).
4. Bowel cancer was the second most common cause of cancer deaths and responsible for 4% of all deaths, with rates of 288 and 196 per million population for males and females respectively in 1998. Of the 4,916 deaths in 1998, 2,605 were males and 2,311 were females. It accounts for about 33,000 PYLL each year (ranked seventh).
5. Prostate cancer is a major cause of death in older males, with 83% of prostate cancer deaths occurring in males aged 70 years and older, and 44% in males aged 80 years and older. During 1998, there were 2,556 deaths from prostate cancer (296 deaths per million population).
6. Breast cancer deaths were associated with about 30,000 PYLL, making breast cancer the highest contributor to premature death for females in Australia. During 1998 there were 2,568 deaths (232 deaths per million population) from breast cancer.
7. Chronic obstructive pulmonary disease contributed 4% of all deaths. During 1998 the mortality rates were 402 and 171 deaths per million population for males and females respectively. Of the 5,575 deaths during 1998, 3,500 were males and 2,075 were females.

It is estimated that 16,000 PYLL before the age of 75 years each year makes this a major cause of premature death for males and females.

8. Mental disorders contributed to 2.5% of all deaths in 1998 with rates of 214 and 145 deaths per million population for males and females respectively. Of the 3,903 deaths during 1998, 1,855 were males and 1,720 were females. It is estimated that in 1998 there were about 33,000 PYLL for males (ranked sixth on this measure) and about 9,000 PYLL for females (ranked tenth).
9. Mortality rates due to dementia and related disorders were 171 and 182 deaths per million population for males and females respectively during 1996 (see explanation in Chapter 18). There were 3,873 deaths during 1996—1,294 males and 2,579 females.
10. Two per cent of all deaths in 1998 were attributed to diabetes. During that year the diabetes mortality rate was 171 deaths per million population for males and 113 per million for females. Of the 2,927 deaths, 1,515 were males and 1,412 were females. There were an estimated 15,000 PYLL each year because of diabetes before age 75. The death rates for the Indigenous population were considerably higher than the rates for the general population for the period 1995–1997.
11. Mortality rates from asthma in 1998 were similar for both males and females (32 and 36 deaths per million population). In that year, one out of every two hundred deaths were due to asthma. Of the 699 deaths, 284 were males and 415 were females.
12. Suicide accounted for 2% of all deaths in 1998, and the mortality rate for males (231 deaths per million population) was about four times higher than for females (56). Of the 2,682 deaths, 2,150 were males and 532 were females. There were an estimated 92,000 PYLL due to suicide each year making it first in rank for males and fourth for females on this measure.
13. Deaths from motor vehicle accidents accounted for 1.3% of all deaths in 1998. Of these 1,731 deaths, 1,224 were males and 507 were females. In 1998, motor vehicle mortality rates were 134 deaths per million population for males and 53 deaths per million population for females. Age-specific rates were significantly greater between ages 15–34 years and for 70 years and over, although the effect of age was less pronounced for females than males. There were an estimated 64,000 PYLL due to motor vehicle traffic accidents in 1998, making it third in rank for males and fifth for females on this measure.
14. Homicide accounted for about 0.2% of all deaths in 1998. The mortality rates were 21 and 11 deaths per million population in 1998. Of these 298 deaths, 197 were males and 101 were females.
15. Tobacco smoking was responsible for an estimated 17,800 deaths in 1998 (accounting for 14% of all deaths). Males represented 12,849 (72%) of the smoking-related deaths and this accounted for 19% of all male deaths. The mortality rate for males (1,437 per million) was three times higher than the rate for females (428). Deaths due to smoking represented about 13% of PYLL in 1998, making it the largest preventable cause of death. These estimates refer only to active smoking of cigarettes, not to passive smoking.
16. Excessive alcohol consumption was responsible for an estimated 2,344 male deaths and 1,193 female in 1998. Deaths due to alcohol-related disease represented about 3.5% of all deaths, and about 7% of PYLL.

Part I
An overview of mortality in Australia

1 Introduction

Background

Considerable progress has been made in improving health over the past 100 years in Australia, evidenced by substantial decreases in age-standardised mortality rates and increases in life expectancy. It is generally believed that these gains have mainly been brought about through:

- improved understanding of environmental factors that affect health and the resulting improvements to public infrastructure (e.g. clean water supply, sewerage, sanitation, housing, and improved food supply);
- improved understanding of the risk factors and beneficial factors that can be changed at the level of individuals, and gains in levels of education within the population leading to changes in behaviour within the community. These have resulted in reduced incidence of some diseases. For example, understanding the association between tobacco smoking and lung cancer and other respiratory diseases has led to anti-smoking campaigns, while understanding exposure to the sun and risk of skin cancer has led to 'sun-safe' campaigns. Also, work safety and road safety campaigns, and improvements in transport infrastructure have aimed at reducing accidents;
- medical and surgical advances (e.g. antibiotics, immunisation, blood pressure lowering drugs, scanning and imaging equipment, and surgical techniques) and improvements in access to medical and other health services. However, differences in socioeconomic status across the population have led to an unequal distribution in access to, and benefits from, some medical and surgical advances.

Over the century the focus of public health has changed. Some major disease epidemics have declined considerably or disappeared. Public health specialists now discuss 'silent' epidemics such as diabetes and obesity. The high cost of available treatments and increasing healthcare budgets are also highlighting the need to focus on prevention of disease in addition to treatment.

Health researchers have shown that some groups of the population have higher mortality from different diseases, raising questions about the equity of health systems.

Advances made in reducing the risk of death for the younger age groups (e.g. from birth complications, infectious disease, accidents and injuries) have contributed to an ageing population. This in turn has changed the patterns in causes of death, so that diseases associated with older age groups are becoming the major causes of death within the population.

Why focus on mortality?

Mortality data are important in the measurement of health and disease, and in the planning of public health care. Measures of incidence (the rate of new cases in a given period) are desirable but involve substantial resources and are only available for a limited number of diseases. This is because routine incidence data are generally collected only for legally notifiable diseases (under State and Territory legislation), which mostly include communicable diseases and cancers. Incidence data are only collected in other areas when

monitoring of disease is required because of disease outbreaks or potential outbreaks, or in high-risk areas.

In contrast, mortality data are collected routinely. This information is recorded by attending medical practitioners who are required to lodge medical certificates of cause of death with their respective State Registrars of Births, Deaths and Marriages. The accuracy of a death certificate will vary among medical practitioners depending on their knowledge of the medical history before death, the complexity of the diseases associated with the death, and the social sensitivity of the cause of death. Nevertheless, mortality data are still the most comprehensive and readily available data to health researchers. The usefulness of mortality data has been strengthened considerably since 1997 by the coding of associated causes of death in addition to the underlying cause of death. In this publication, however, mortality is analysed only by underlying causes of deaths. Future reports will undertake analyses by underlying and multiple causes of death.

Studies of the trends in mortality help explain how the health status of the population is changing and assist in evaluation of the health system. Mortality data also provide a basis for investigating the incidence of disease, its severity and the quality of life before death (see Measuring the effect of mortality, p. 4). The patterns of mortality in the community, in terms of cause, age, sex, population group and geographical distribution, inform the work of epidemiologists, medical personnel and those working in health policy, planning and administration.

Comparing mortality rates across populations also helps to highlight health differences among different groups of people (e.g. people of various cultural or social backgrounds, or different age groups). It may also help suggest any inequities in access to health care that may affect some groups.

In discussing mortality it is necessary to identify the effect of reductions in mortality. This effect is often best appreciated through increases in life expectancy. This report also takes a brief look at changes in life expectancy over the past 100 years and how changes in mortality rates directly influence life expectancy.

Collection of mortality data

Death registration has been compulsory in all States and Territories since the mid-1850s and this information is registered with the State and Territory Registrars of Births, Deaths and Marriages. Since 1906, the Australian Bureau of Statistics (ABS), formerly known as the Commonwealth Bureau of Census and Statistics), has compiled the information collected by the Registrars, and has published national and State death information.

Information about a death is recorded on a death certificate, and includes demographic and administrative information as well as the disease or condition leading directly to death and the other contributing diseases or conditions. From this the ABS determines the underlying and multiple (or contributing) causes of death, which are recorded with the accompanying demographic information in the mortality database. Death certification can be completed in three ways:

1. If a medical practitioner had treated the deceased recently and the medical practitioner was certain of the cause of death, then the medical practitioner can provide the required certificate.
2. If no medical practitioner can certify the cause of death (e.g. unexplained deaths), then the case is referred to the government pathologist to conduct an autopsy to determine the cause of death.

3. In many cases referred to the government pathologist, the coroner determines the cause of death (e.g. many deaths resulting from accidents are referred to the coroner).

The information collected on death certificates has been standardised to a large degree and guidance for completion of death certificates is outlined in *Cause of Death Certification Australia* produced by the ABS (ABS 1997b).

Classification of diseases

In this publication, 'disease' has been used as a general term to describe all causes of death. A cause of death can be a particular disease (such as ischaemic heart disease), a disorder (such as a mental disorder) or an injury (accidental or intentional).

The modern system of disease classification began with the work of Dr William Farr, and was first used in England in 1839 (Cumpston 1989). The Farr system was modified over time, and in 1881 was completely modified by Dr William Ogle, becoming known as the Farr-Ogle system. This modified system was adopted at varying times during the 1880s by each of the Australian colonies. The Farr-Ogle system of classification of death was phased out between 1903 and 1906, with the States substituting for a classification being used by the Registrar General of England, making comparisons between States difficult for this period.

In 1906 the Commonwealth and the States adopted the International Classification of Diseases (ICD) to classify causes of death. In doing so, the Commonwealth Statistician began the production of a set of internationally consistent information on causes of death. Consequently many of the statistical series begin in 1907 (Cumpston 1989).

Since 1906 the ICD has changed nine times. The most recent revision was the 10th revision, implemented with the 1999 mortality data (with backcoding for 1997 and 1998 mortality data). The revisions are a response to the recognition of new diseases (e.g. AIDS), increased knowledge of diseases and changing terminology in the description of disease. This report bases its analysis on the 9th revision.

The ICD encompasses the entire range of disease and injury within chapters that are based on body systems, disease types and external causes of injury. For example, *diseases of the circulatory system* includes rheumatic heart disease and ischaemic heart disease.

In a clinical or epidemiological setting, many of these entities are grouped as they have similar symptoms, outcomes or risk factors. This occurs in the disease profiles used in this publication. For example, ischaemic heart disease consists of four different conditions—acute myocardial infarction, other acute and subacute forms of ischaemic heart disease, old myocardial infarction and other forms of chronic ischaemic heart disease.

Measuring the effect of mortality

In trying to measure and compare the effect of mortality in populations, two important concepts are used:

- mortality rates; and
- life expectancy.

In analysing mortality rates, three major measures are used:

1. Crude mortality rates present the total number of deaths in relation to the population at risk. The crude mortality rates calculated for this report are expressed as number of deaths per million population. These rates do not take into account that different populations may have different age and sex structures and consequently different risks of dying.

2. Age- and sex-specific mortality rates are expressed for narrow age bands and separated for males and females which can make for more direct comparisons. These rates are expressed as number of deaths per million population.
3. Age-standardised mortality rates (ASMR) allow populations to be compared more meaningfully by eliminating the effect of differences in their age structures. They combine and summarise the age- and sex-specific rates using a comparative population as the standard population. In this publication these rates are simply referred to as the mortality rate. These rates are standardised to the estimated resident population of Australia at 30 June 1991 and are expressed as number of deaths per million population.

In analysing life expectancy four major measures are also used:

1. Life expectancy is the average number of years a person is expected to live given the current mortality rates. It can be specified as life expectancy at birth or as years remaining at different ages.
2. Person years of life lost (PYLL) is a measure of premature death if a person is expected to live to a specified age (in this report, the age of 75 years). This measure takes into account the number of deaths that take place and the ages at which they occur. It counts the number of potential years of life lost for each death occurring before the age of 75 years. A death at a younger age would have a greater PYLL than a death at an older age.
3. Adjusted life years is a measure of life expectancy adjusted for long term disability. These are known as quality adjusted life years (QALYs) or, conversely, disability adjusted life years (DALYs). The latter is based on an adjusted value for life expectancy to allow for long-term disability. It is used to calculate burden of disease (AIHW: Mathers et al. 1999).
4. Lifetime risk is a measure that approximates the risk of dying of a particular disease or condition in a lifetime, if the mortality risks at the time of estimation prevail.

Hundreds of statistical measurements have been calculated in the analyses for this report, but we have presented only those that show statistical significance. To limit repetitive description of these statistics, the term 'significantly' has been used to describe measurements that are statistically significantly different.

Scope of the report

For this report 174 mortality profiles were produced and are published in Excel spreadsheets on the web site of the Australian Institute of Health and Welfare (AIHW) (http://www.aihw.gov.au). From these, 16 disease profiles, and all deaths, were selected for detailed analysis. The disease profiles were selected because they were major causes of death, creating a particular concern in the health field, or conditions amenable to reduction due to modifiable risk factors. This report analyses death by socioeconomic status, country of birth, State/Territory and geographic area, Indigenous status and international comparisons. The disease profiles were analysed over a 12-year period (1987–1998), using the ICD 9th revision for cause of death codes.

A break in time series has been created with the change over from manual to automatic coding of deaths by the ABS in 1997. The automated coding applies cause of death rules differently from the previous manual coding. To minimise the effect of this change, comparability factors have been applied to the affected causes of death for 1997 and 1998.

The 17 disease profiles reported in this publication are:

All conditions	**ICD-9 codes: 001–799, E800–E999**
Cardiovascular disease	
Ischaemic heart disease	ICD-9 codes: 410–414 (ischaemic heart disease)
Cerebrovascular disease	ICD-9 codes: 430–438 (cerebrovascular disease)
Cancers	
Lung cancer	ICD-9 code: 162 (malignant neoplasm of trachea, bronchus and lung)
Prostatic cancer	ICD-9 code: 185 (malignant neoplasm of the prostate)
Breast cancer	ICD-9 code: 174 (malignant neoplasm of female breast)
Colorectal cancer	ICD-9 codes: 153 (malignant neoplasm of colon), 154 (malignant neoplasm of rectum) and 159 (malignant neoplasm of other and ill-defined sites within the digestive organs and peritoneum)
Respiratory disease	
Chronic obstructive pulmonary disease	ICD-9 codes: 491 (chronic bronchitis), 492 (emphysema) and 496 (chronic obstruction, not elsewhere specified)
Asthma	ICD-9 code: 493 (asthma)
Injuries	
Suicide	ICD-9 codes: E950–E959 (suicide and self-inflicted injury)
Motor vehicle traffic accidents	ICD-9 codes: E810–E819 (motor vehicle traffic accidents)
Homicide	ICD-9 codes: E960–E969 (homicide and injury purposely inflicted by other persons)
Diabetes	
Diabetes	ICD-9 code: 250 (diabetes mellitus)
Mental health	
Mental disorders	ICD-9 codes: 290–319 (mental disorders)
Dementia and related disorders	ICD-9 codes: 290 (senile and pre-senile organic psychotic conditions), 294.1 (other organic psychotic conditions (chronic—dementia in conditions classified elsewhere) and 331 (other cerebral degenerations)
Other	
Smoking-related diseases	Application of the attributable fractions according to English et al. (1995).
Alcohol-related diseases	Application of the attributable fractions according to English et al. (1995).

Mortality data appendix at the AIHW web site

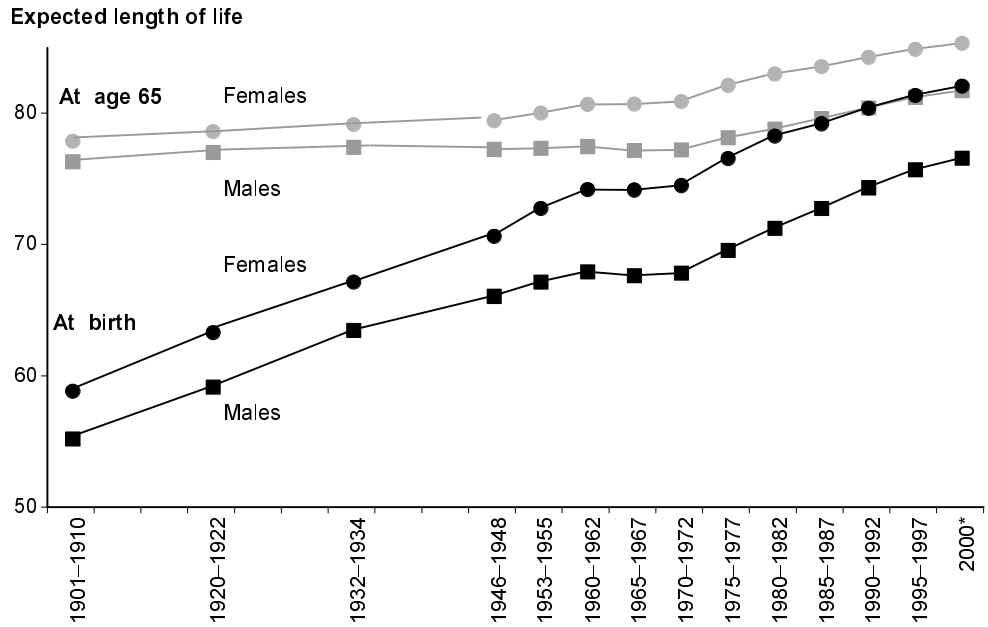
Supporting this publication are two presentations of death data. They are presented as self-contained Excel spreadsheets located at the AIHW web site http://www.aihw.gov.au.

- A series of 174 mortality profiles based on the codes and categories used in the ICD-9 (see Appendix E for listings).
- A series of long-term spreadsheets containing data from when cause of death was first coded nationally in Australia (mostly from 1907). For selected causes of death, these contain numbers of deaths, age-specific and age-standardised rates, and cohort analyses.

2 Life expectancy and premature loss of life

Life expectancy is an indication of how long a person can expect to live given prevailing mortality rates. It is the average number of years of life remaining to a person at a specified age, assuming current age-specific mortality rates continue during the person's lifetime. It is therefore a good measure of population health. Low infant mortality rates and an ageing population are both indicative of longer life expectancy.

The expected length of a life is inversely related to the mortality rates at that time. In Australia, life expectancy has increased significantly over the century, reflecting decreases in mortality rates from infectious diseases in the first half of the century and from cardiovascular disease in the later part of the century (Table 2.1). For instance, mortality rates for cardiovascular disease began decreasing in 1968, which in turn resulted in an increase in life expectancy (see further discussion in Chapter 3).



Sources: Australian Government Actuary 1999, WHO 2002.
* Estimated.

Figure 2.1: Expected length of life at birth and at 65 years, by sex, Australia, 1901–1910 to 2000

There are many influences on mortality and life expectancy, for instance cigarette smoking. Cigarette smoking increased over the century, peaking in 1945 for males and 1976 for females (Winstanley et al. 1995). As a result, mortality rates due to lung cancer increased and growth in life expectancy decreased (there is a time lag of 20 to 30 years between smoking patterns and mortality rates). Measures aimed at decreasing tobacco smoking (increases in tobacco taxes, restriction of tobacco advertising and health promotion campaigns) were then introduced, and smoking prevalence for males declined, resulting in a decline in male deaths due to lung cancer (since 1982). Smoking rates for females have changed little since 1945 and lung cancer mortality rates continue to rise.

Table 2.1: Life expectancy, Australia, selected years

	At birth		At age 1		At age 15		At age 65	
Year	Males	Females	Males	Females	Males	Females	Males	Females
				Annual averages				
1901–1910	55.2	58.8	60.0	62.9	49.0	51.9	11.3	12.9
1920–1922	59.2	63.3	62.7	66.0	51.4	54.6	12.0	13.6
1946–1948	66.1	70.6	67.3	71.5	54.3	58.3	12.3	14.4
1960–1962	67.9	74.2	68.5	74.5	55.1	61.0	12.5	15.7
1970–1972	67.8	74.5	68.3	74.7	54.8	61.2	12.2	15.9
1980–1982	71.2	78.3	71.1	78.0	57.4	64.3	13.8	18.0
1990–1992	74.3	80.4	73.9	79.9	60.2	66.1	15.4	19.3
1995–1997	75.7	81.4	75.2	80.8	61.4	67.0	16.2	19.9
2000*	76.6	82.1	76.0	81.4	62.2	67.6	16.7	20.2

Source: Australian Government Actuary 1999; WHO 2002.
* Estimated.

A boy born during 2000 was expected to live to 76.6 years, on average, while a girl was expected to live to 82.1 years, on average. However, a boy and girl aged 15 in 2000 could expect to live to ages 77.2 and 82.6 years, respectively.

Over the period 1901–2000, life expectancy at birth increased by 21.4 years for males and by 23.3 years for females. However, the rate of growth in life expectancy over the century was not constant. This is illustrated by the analysis over three periods—1900 to 1950, 1950 to 1970, and 1970 to 1998 (Figure 2.1).

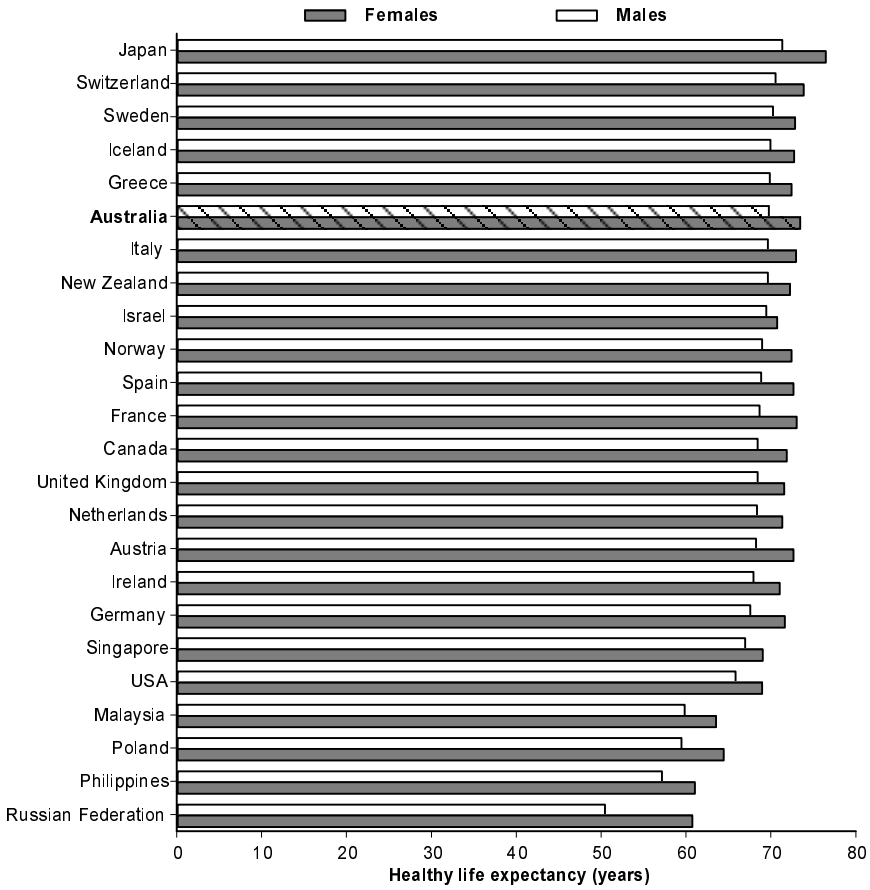
International comparisons

Worldwide life expectancy increased considerably in the last decades of the 20th century, and Australians have among the highest life expectancies in the world. The increase world wide is due to a decrease in mortality rates, which can be largely explained by general socioeconomic gains, resulting in improved standards of living and health care (e.g. improved methods of treatment, public health strategies such as immunisation campaigns) (Cambois & Robine 1994).

As part of the measure of overall life expectancy, the World Health Organization (WHO) has proposed 'healthy life expectancy' (HALE) as a measure of the expected number of years to be lived without reduced functioning. HALE calculations adjust the overall life expectancy by the years of life lived with reduced functioning because of ill health (WHO 2002).

Australia's healthy life expectancy is among the highest in the world. Australian males can expect to live 69.9 years of life without reduced functioning, ranked sixth in the world, and females 73.3 years, ranked third (Figure 2.2; Table 2.2).

The comparison countries were selected on the basis of having a comparable health system or relevance to immigrant communities living in Australia, and availability of data. Of the selected countries, Japan had the highest healthy life expectancy for both males and females. Healthy life expectancy was lowest for males and females in the Russian Federation (where life expectancy decreased since the early 1980s). The greatest difference in healthy life expectancy between males and females was in the Russian Federation where the difference was 10.3 years. The smallest difference was in Israel, where the difference was 1.3 years.



Source: WHO 2002.

Figure 2.2: Healthy life expectancy at birth by sex, selected countries, 2000

Table 2.2: Expected length of life (years) at birth by sex, selected countries, 2000

Males				Females			
		Healthy life expectancy				Healthy life expectancy	
	Life expectancy	Years	Per cent		Life expectancy	Years	Per cent
Japan	77.5	71.2	91.9	Japan	84.7	76.3	90.1
Switzerland	76.7	70.4	91.9	Switzerland	82.5	73.7	89.3
Sweden	77.3	70.1	90.7	**Australia**	**82.1**	**73.3**	**89.3**
Iceland	77.1	69.8	90.5	France	83.1	72.9	87.8
Greece	75.4	69.7	92.4	Italy	82.4	72.8	88.4
Australia	**76.6**	**69.6**	**90.9**	Sweden	82.0	72.7	88.7
Italy	76.0	69.5	91.5	Iceland	81.8	72.6	88.7
New Zealand	75.9	69.5	91.5	Austria	81.4	72.5	89.1
Israel	76.6	69.3	90.4	Spain	82.3	72.5	88.1
Norway	75.7	68.8	90.8	Greece	80.8	72.3	89.5
Spain	75.4	68.7	91.2	Norway	81.4	72.3	88.8
France	75.2	68.5	91.1	New Zealand	80.9	72.1	89.0
Canada	76.0	68.3	89.8	Canada	81.5	71.7	88.0
United Kingdom	74.8	68.3	91.3	Germany	80.6	71.5	88.6
Netherlands	75.4	68.2	90.4	United Kingdom	79.9	71.4	89.4
Austria	74.9	68.1	91.0	Netherlands	81.0	71.2	88.0
Ireland	74.1	67.8	91.5	Ireland	79.7	70.9	89.0
Germany	74.3	67.4	90.7	Israel	80.6	70.6	87.6
Singapore	75.4	66.8	88.6	Singapore	80.2	68.9	85.9
USA	73.9	65.7	88.9	USA	79.5	68.8	86.6
Malaysia	68.3	59.7	87.4	Poland	77.7	64.3	82.8
Poland	69.2	59.3	85.6	Malaysia	74.1	63.4	85.5
Philippines	64.6	57.0	88.1	Philippines	71.1	60.9	85.7
Russian Federation	59.4	50.3	84.7	Russian Federation	72.0	60.6	84.2

Premature loss of life

As described earlier, PYLL is a measure of premature death before the age of 75, and as such can be used as a measure of the cost of mortality to a population. The two main contributors to PYLL in 1998 were cancer, accounting for about 35%, and cardiovascular disease, accounting for about 10%. The largest single cause of PYLL was suicide for males (12.2%) and breast cancer for females (9.1%). Another major cause for loss of life was motor vehicle accidents. While PYLL due to motor vehicle accidents halved over the 1987–1998 period to about 64,000 in 1998, it still represented about 7% of PYLL for all causes in 1998. PYLL due to AIDS peaked in 1994 before falling to about 6,000 in 1998. In 1998, tobacco smoking was

responsible for an estimated 118,000 PYLL, representing a preventable 13% of all premature loss of life (Table 2.3).

Table 2.3: Person years of life lost to the Australian population for major causes of death by sex, Australia, 1998

		Person years of life lost (PYLL)					
Rank	Disease	Males	%	Females	%	Persons	%
1	Ischaemic heart disease	74,000	12.1	22,000	6.6	96,000	10.2
2	Suicide	75,000	12.2	17,000	5.2	92,000	9.8
3	All other cancers (ICD-9 140–208) not listed in this table	38,000	6.3	29,000	8.7	67,000	7.1
4	Motor vehicle accidents	47,000	7.6	17,000	5.0	64,000	6.7
5	Cancer of the lung	31,000	5.0	14,000	4.3	45,000	4.8
6	Mental disorders	33,000	5.3	9,000	2.8	42,000	4.4
7	Colorectal cancer	19,000	3.1	14,000	4.2	33,000	3.5
8	Breast cancer	—	—	30,000	9.1	30,000	9.1
9	Cerebrovascular disease	16,000	2.6	13,000	3.8	29,000	3.0
10	Lymphoma[(a)]	11,000	1.9	9,000	2.7	20,000	2.2
11	Cancer of the brain	9,000	1.5	7,000	2.1	16,000	1.7
12	Chronic obstructive pulmonary disease	10,000	1.6	6,000	1.9	16,000	1.7
13	Leukaemia	9,000	1.5	7,000	2.0	16,000	1.7
14	Diabetes	9,000	1.5	6,000	1.7	15,000	1.6
15	Chronic liver disease due to alcohol	9,000	1.4	3,000	1.0	12,000	1.3
16	Homicide	8,000	1.3	4,000	1.2	12,000	1.2
17	Melanoma of the skin	7,000	1.2	4,000	1.2	11,000	1.2
18	Cancer of the pancreas	6,000	1.0	4,000	1.2	10,000	1.1
19	Cancer of the stomach	5,000	0.8	3,000	0.9	8,000	0.9
20	Asthma	3,000	0.5	4,000	1.3	7,000	0.8
21	Cancer of the prostate	6,000	1.0	—	—	6,000	0.7
22	Dementia[(b)]	1,000	0.2	1,000	0.4	2,000	0.2
	Smoking-related diseases	86,000	14.1	32,000	9.9	118,000	12.6
	Alcohol-related diseases	52,000	8.5	15,000	4.7	67,000	7.2

(a) Includes non-Hodgkin's disease and Hodgkin's disease (ICD-9 200–202).

(b) Data are for 1996. See Appendix D Coding issues.

3 Major causes of death in 1998 by age and sex

Many causes of death are age- and sex-specific. In some cases, a major cause of death in one age group may be relatively minor for the total population.

Five-year age groups have been used as the basis for this analysis, with infants (aged less than 1 year) examined separately. The 5-year age groups have been grouped according to common patterns in major causes of death: infants (less than 1 year), 1–14 years, 15–24 years, 24–44 years, 45–64 years, 65–84 years, and age 85 and older.

Age groups

The following outlines the major groups of causes of death found for each age group in 1998 (Tables 3.1 to 3.8):

- For infants aged less than 1 year, congenital anomalies and conditions originating in the perinatal period accounted for almost 75% of all deaths.
- Between ages 1 and 14, more than 50% of deaths for males and females resulted from injuries and poisoning, and cancer.
- In the age group 15–24, injuries and poisoning was the major cause of death, accounting for almost 75% of deaths for males and more than 50% for females.
- In the age group 25–44, injuries and poisoning accounted for about 50% of deaths for males, while for females cancer accounted for 35% of deaths, and injuries and poisoning accounted for 27%.
- In the age group 45–64, cancer accounted for 41% of all deaths for males and cardiovascular disease for 30%, while 55% of all deaths for females were caused by cancer.
- In the age group 65–84, cardiovascular disease accounted for 41% of deaths for males and 43% for females, and cancer accounted for 33% of deaths for males and 28% for females.
- For persons older than 85 years, cardiovascular disease accounted for 46% of deaths for males and 55% for females, and cancer conditions accounted for 16% of deaths for males and 11% for females. Respiratory disease was also a major cause of death for this age group, causing 14% of deaths for males and 11% for females.

Major causes of death by age group and sex

Age-specific patterns in relation to major causes of death are useful when planning targeted public health interventions. For instance, a campaign to reduce deaths due to motor vehicle accidents might best be aimed at those age groups where it is a major cause of death (e.g. those aged 15–24 years). The following figures (3.1 to 3.7) present major causes of death by specific age group. When referring to the figures it is important to be aware of the changes in scale between each age group. The percentages given in the commentary refer to the distribution of the mortality rates of the specific diseases within the broad condition. For example, within the 1–4 age group (Table 3.3), 33% of all deaths were due to injury and

poisoning. Of that 33%, 31% were due to accidental drowning, and 28% to motor vehicle traffic accidents.

Table 3.1: Major causes of death by age and sex, 1998

Age group	Males	Per cent of deaths	Females	Per cent of deaths
Infants (less than 1 year)	Conditions emerging from the perinatal period	44.7	Conditions emerging from the perinatal period	46.1
	Congenital anomalies	26.1	Congenital anomalies	27.9
	Sudden death	11.8	Sudden death	10.0
	Injury and poisoning	5.0	Injury and poisoning	3.1
1–14	Injury and poisoning	36.5	Injury and poisoning	32.8
	Cancer	20.8	Cancer	19.6
	Nervous system disease	11.0	Nervous system diseases	11.8
	Respiratory system disease	6.1	Respiratory system diseases	6.8
15–24	Injury and poisoning	73.2	Injury and poisoning	57.4
	Mental disorders	8.9	Cancer	11.5
	Cancer	4.8	Mental disorders	7.2
	Nervous system diseases	3.2	Cardiovascular disease	5.4
25–44	Injury and poisoning	50.5	Cancer	35.3
	Cancer	12.7	Injury and poisoning	26.8
	Cardiovascular disease	12.4	Cardiovascular disease	12.9
	Mental disorders	9.4	Mental disorders	5.2
45–64	Cancer	40.6	Cancer	54.6
	Cardiovascular disease	30.3	Cardiovascular disease	18.7
	Injury and poisoning	9.3	Respiratory system diseases	6.1
	Respiratory system diseases	5.0	Injury and poisoning	5.9
65–84	Cardiovascular disease	40.7	Cardiovascular disease	43.3
	Cancer	33.0	Cancer	28.4
	Respiratory system diseases	11.9	Respiratory system diseases	9.8
	Endocrine	3.1	Endocrine	3.5
85+	Cardiovascular disease	45.6	Cardiovascular disease	55.1
	Cancer	16.2	Respiratory system diseases	11.3
	Respiratory system diseases	14.4	Cancer	10.5
	Mental disorders	3.3	Mental disorders	4.7

Note: Percentages in this column do not add up to 100% because only the major groups of death are listed.

Leading causes of death

The leading causes of death varied with age. For males aged 35–39 years, the leading causes of cancer death were melanoma of the skin, colorectal cancer and lung cancer (in that order) while for males aged 75–79, the leading causes of cancer death were lung, prostate and colorectal cancer. For females aged 35–39, the leading causes of cancer death were breast, cervical and lung cancer, while colorectal, lung and breast cancer were the leading causes of cancer death for females aged 75–79.

The leading causes of death due to injury and poisoning were suicide and motor vehicle accidents for those aged 20 to 24 years, and accidental falls for those aged 75 years and older.

For cardiovascular diseases, the proportion of deaths caused by ischaemic diseases decreased as age increased. Ischaemic heart disease was responsible for 75% of cardiovascular deaths for those aged 45–49 years, decreasing to less than 50% for those aged 75–79 years. Meanwhile, stroke was responsible for 12% of cardiovascular death for those aged 45–49 years, 30% for those aged 50–54 years and about 25% for those aged 75–79 years.

Patterns of death in age group 0–14 years

1,133 male deaths representing 1.7% of all male deaths and 842 female deaths representing 1.4% of all female deaths in 1998

Deaths for the 0–14 age group are divided into two groups:

- persons less than 1year of age (706 males and 546 females),
- persons aged 1–14 years of age (427 males and 296 females).

Infants (aged less than 1 year)

Most deaths of newborn and infants are due to certain conditions originating in the perinatal period (from 22 completed weeks of pregnancy to 28 days following birth, even though death may occur later (AIHW 1999c), 319 males and 252 females), and due to congenital anomalies (186 males and 152 females). Male rates are greater than female rates in all categories (Figure 3.1; Table 3.2).

The most common of the conditions originating in the perinatal period are due to maternal complications of pregnancy, and complications of the placenta, cord and membranes.

The most common congenital abnormalities resulting in death are abnormalities of the respiratory system, nervous system, heart, musculoskeletal systems, and chromosomal abnormalities.

The other common causes of death in this age range include sudden infant death syndrome (SIDS) and unknown cause, and accidents and poisoning. Deaths due to SIDS decreased over the period 1987–1996, from 531 deaths to 213 deaths. Deaths due to SIDS for 1997 and 1998 were left out of this analysis because of a break in the time series caused by the introduction of autocoding for cause of death. However, the number of deaths for 1997 and 1998 showed a continuation of the downward trend.

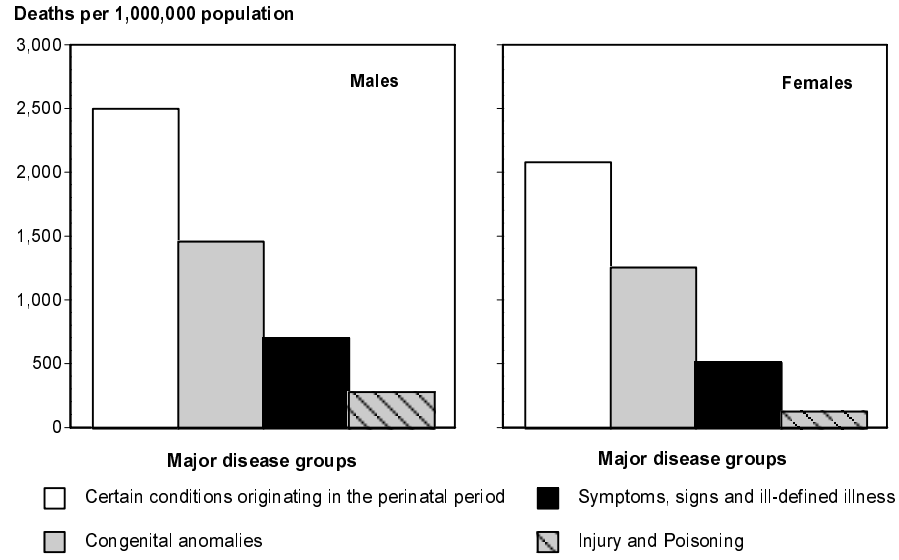


Figure 3.1: Major causes of death for infants (aged less than 1 year), 1998

Table 3.2: Leading causes of death: age group and ICD chapter by sex, 1998: infants (aged less than one year)

ICD chapter				Leading causes of death	
		Per cent of all deaths		Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
Infants	Certain conditions originating in the perinatal period	45	46	23% newborns affected by complications of placenta, cord and other membranes 22% newborns affected by maternal complications of pregnancy	29% newborns affected by complications of placenta, cord and other membranes 18% newborns affected by maternal complications of pregnancy
	Congenital anomalies	26	28	19% other congenital anomalies of the heart 12% chromosomal anomalies 11% other congenital musculoskeletal anomalies	17% other congenital anomalies of the heart 16% chromosomal anomalies 13% other congenital musculoskeletal anomalies
	Symptoms, signs and ill-defined conditions	13	11	93% sudden death, cause unknown	89% sudden death, cause unknown
	Injury and poisoning	5	3	36% accidental mechanical suffocation 22% accidental drowning and submersion	50% accidental mechanical suffocation 19% accidental drowning and submersion

Ages 1 to 14

Across the age range 1–14, the most common causes of death were from external causes of injuries and poisoning (accidental drowning and motor vehicle accidents), followed by cancer (leukaemia, mainly lymphoid, and cancer of the brain) (Figure 3.2; Table 3.3).

The pattern of death from injury and poisoning changed as the children aged. For the 1–4 age group, accidental drowning was the most common external cause of death, followed by motor vehicle traffic accidents. For children aged 5–9 and 10–14, death due to motor vehicle accidents was more common than accidental drowning.

Congenital abnormalities were also responsible for a large percentage of deaths. Of the 347 deaths (199 males and 148 females aged between one and four years), 43 deaths were due to congenital abnormalities (28 males and 15 females). These 43 deaths represented 14.1% of deaths in males aged 1–4 years and 10.1% of deaths in females. As age at death increased, the percentage of deaths due to congenital abnormalities decreased. The majority of congenital abnormalities causing death in this age group were related to anomalies of the heart and the nervous system.

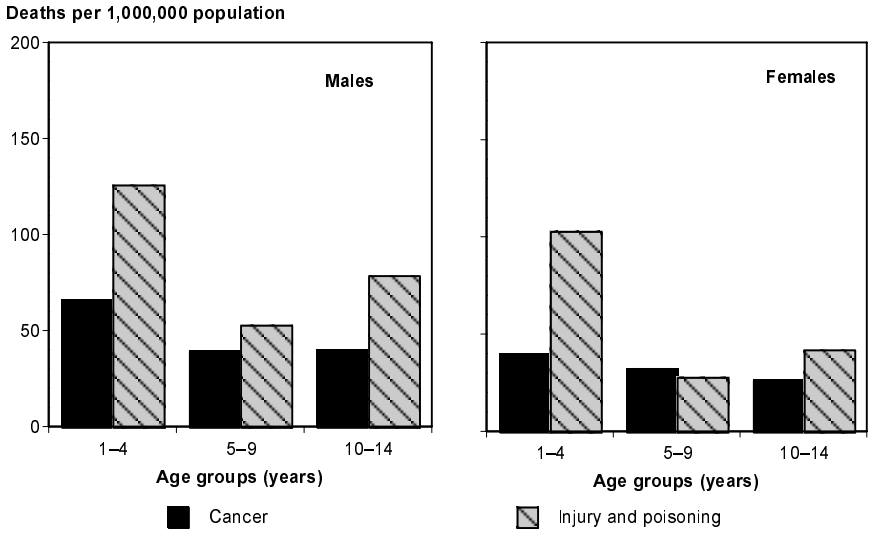


Figure 3.2: Major causes of death for ages 1–14, 1998

Table 3.3: Leading causes of death: age group and ICD chapter by sex, 1998: ages 1–14

	ICD chapter			Leading causes of death	
		Per cent of all deaths		Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
1–4	Injury and poisoning	33	35	31% accidental drowning 28% motor vehicle traffic accidents	30% accidental drowning 28% motor vehicle traffic accidents
	Cancer	18	14	40% brain cancer 34% leukaemia	45% brain cancer 30% leukaemia
	Congenital abnormalities	14	10	32% other congenital anomalies of nervous system (excluding anencephalus and spina bifida) 21% other congenital anomalies of heart (excluding bulbus cordis anomalies and anomalies of cardiac septal closure)	33% other congenital anomalies of heart (excluding bulbus cordis anomalies and anomalies of cardiac septal closure) 20% other congenital anomalies of nervous system (excluding anencephalus and spina bifida)
5–9	Injury and poisoning	35	30	56% motor vehicle traffic accidents 11% accidental drowning	56% motor vehicle traffic accidents 18% accidental drowning
	Cancer	27	34	33% leukaemia 19% brain cancer	52% leukaemia 29% brain cancer
10–14	Injury and poisoning	42	31	43% motor vehicle traffic accidents 4% accidental drowning	52% motor vehicle traffic accidents 12% accidental drowning
	Cancer	21	20	56% leukaemia 4% brain cancer	59% leukaemia 12% brain cancer

Patterns of death in age group 15–24 years

1,376 male deaths representing 2.1% of all male deaths and 495 female deaths representing 0.8% of all female deaths in 1998

Within this age range, male mortality rates were considerably higher than female rates. For example, the male mortality rates for suicide, motor vehicle accidents and other injuries (including poisoning) were more than three times higher than rates for females. As age increased, the male rates for injury and poisoning, suicide and motor vehicle accidents all increased (Figure 3.3; Table 3.4).

Motor vehicle traffic accidents and suicides were the leading causes of death for both males and females aged 15 to 24. For males, suicide became the most frequent cause of death for those aged 20 to 24.

Other common causes of death for both males and females were cancer (lymphoma and lymphoid leukaemia); endocrine, nutritional and metabolic diseases and immunity disorders; diseases of the nervous system; and diseases of the respiratory system.

Figure 3.3: Major causes of death for ages 15–24, 1998

Table 3.4: Leading causes of death: age group and ICD chapter by sex, 1998: ages 15–24

ICD chapter		Per cent of all deaths		Leading causes of death: Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
15–19	Injury and poisoning	74	55	44% motor vehicle traffic accidents 31% suicide	45% motor vehicle traffic accidents 27% suicide
	Cancer	6	13	45% leukaemia 14% brain cancer	43% leukaemia 7% brain cancer
	Mental disorders	4	6	99% drug dependence	85% drug dependence
20–24	Injury and poisoning	73	59	39% suicide 32% motor vehicle traffic accidents	39% motor vehicle traffic accidents 31% suicide
	Mental disorders	12	8	95% drug dependence	95% drug dependence
	Cancer	4	11	27% leukaemia 5% brain cancer	26% leukaemia 26% brain cancer

Patterns of death in age group 25–44 years

4,507 male deaths representing 6.7% of all male deaths and 2,016 female deaths representing 3.4% of all female deaths in 1998

Within this age range, male mortality rates were significantly higher than female rates. Injury and poisoning was the most common cause of death for males. For females, while the injury and poisoning mortality rate remained constant over the age range, death from cancer was the most common cause of death by the age of 35–39, with breast cancer being the most common cancer. From the age of 40, cancer and cardiovascular disease mortality rates increased in importance for both males and females (Figure 3.4; Table 3.5).

Other emerging cancers across this age range were cancer of the cervix and cancer of the digestive organs. While death rates from injury and poisoning were declining with age for males, the rate for females continued to increase until around age 40–44, when it started to decline.

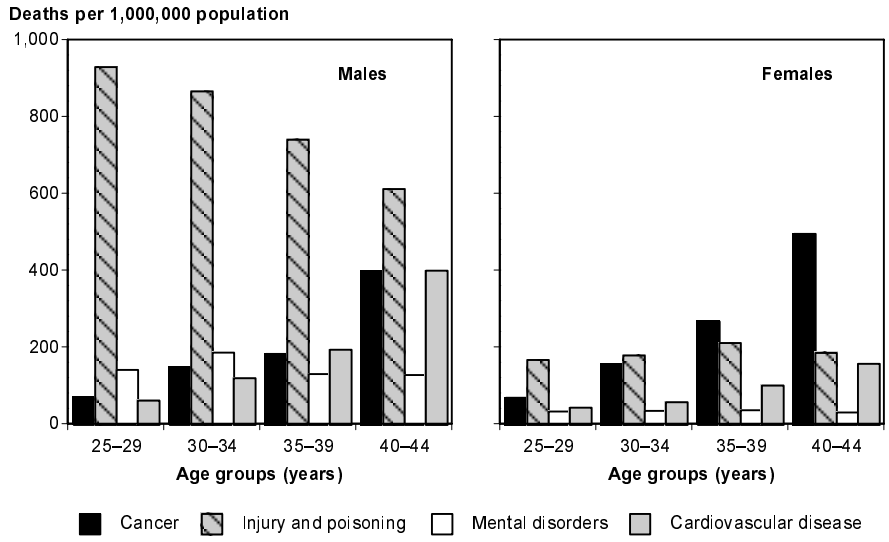


Figure 3.4: Major causes of death for ages 25–44, 1998

Table 3.5: Leading causes of death: age group and ICD chapter by sex, 1998: ages 25–44

ICD chapter		Per cent of all deaths		Leading causes of death	
				Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
25–29	Injury and poisoning	69	40	46% suicide 22% motor vehicle traffic accidents	46% suicide 21% motor vehicle traffic accidents
	Mental disorders	11	8	94% drug dependence	85% drug dependence
	Cancer	5	17	20% melanoma of the skin 10% colorectal cancer 2% lung cancer	14% breast cancer 12% cervical cancer 2% lung cancer
	Cardiovascular disease	5	10	37% ischaemic heart disease 11% cerebrovascular disease	19% ischaemic heart disease 19% cerebrovascular disease
30–34	Injury and poisoning	57	34	45% suicide 17% motor vehicle traffic accidents	42% suicide 27% motor vehicle traffic accidents
	Cancer	10	30	13% melanoma of the skin 10% colorectal cancer 2% lung cancer	25% breast cancer 5% cervical cancer 4% lung cancer
	Cardiovascular disease	8	11	50% ischaemic heart disease 18% cerebrovascular disease	24% cerebrovascular disease 19% ischaemic heart disease
	Mental disorders	12	7	92% drug dependence	88% drug dependence
35–39	Injury and poisoning	49	28	49% suicide 16% motor vehicle traffic accidents	48% suicide 24% motor vehicle traffic accidents
	Cancer	12	35	15% melanoma of the skin 14% colorectal cancer 10% lung cancer	34% breast cancer 10% cervical cancer 5% lung cancer
	Cardiovascular disease	13	13	66% ischaemic heart disease 12% cerebrovascular disease	36% cerebrovascular disease 29% ischaemic heart disease
	Mental disorders	9	5	81% drug dependence	64% drug dependence
40–44	Injury and poisoning	33	17	48% suicide 19% motor vehicle traffic accidents	52% suicide 20% motor vehicle traffic accidents
	Cancer	21	46	14% colorectal cancer 14% lung cancer 8% melanoma of the skin	37% breast cancer 8% lung cancer 5% cervical cancer
	Cardiovascular disease	21	15	64% ischaemic heart disease 15% cerebrovascular disease	37% ischaemic heart disease 31% cerebrovascular disease
	Mental disorders	7	3	72% drug dependence	74% drug dependence

Patterns of death in age group 45–64 years

11,387 male deaths representing 17.0% of all male deaths and 6,701 female deaths representing 11.1% of all female deaths in 1998

In this age range, mortality rates for motor vehicle accidents, suicide and other injuries were similar to rates for the previous age group (25–44). However, the mortality rates for cancer and cardiovascular disease for persons aged 45–64 years were about ten times higher than for persons in the 25–44 age group (Figure 3.5; Table 3.6).

Cancer rates increased within this age group (as they did for the previous age group), becoming the dominant cause of death for males and females. For men the most common cancer sites were lung and bowel while for females they were breast, lung and bowel.

The mortality rates for cardiovascular disease, consisting of ischaemic heart disease (heart attack) and cerebrovascular disease (stroke), also increased with age, making these conditions the second largest cause of death. As with the previous two age groups, injury and poisoning (particularly suicide and motor vehicle accidents) was a major cause of death in this age group, with rates at about 500 deaths per million population for males.

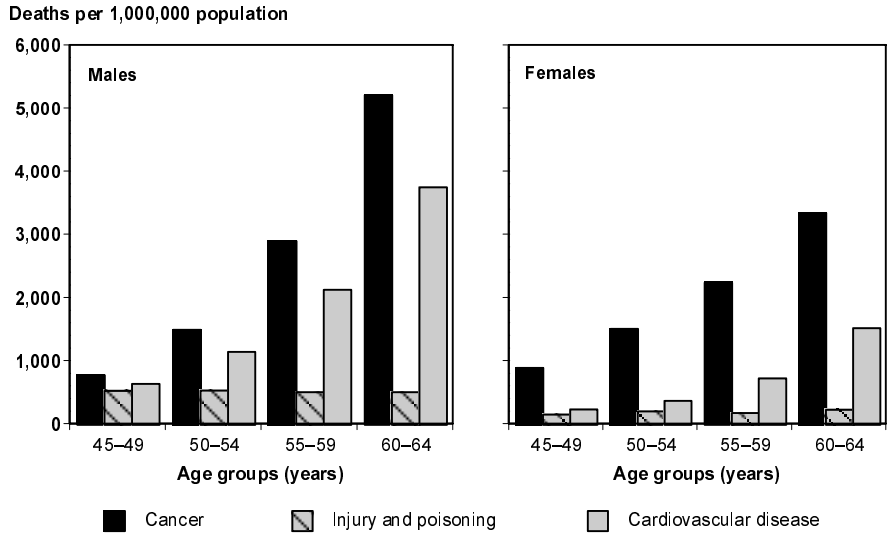


Figure 3.5: Major causes of death for ages 45–64, 1998

Table 3.6: Leading causes of death: age group and ICD chapter by sex, 1998: ages 45–64.

ICD chapter				Leading causes of death	
		Per cent of all deaths		Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
45–49	Cancer	32	55	19% lung cancer 15% colorectal cancer 2% prostate cancer	35% breast cancer 12% colorectal cancer 9% lung cancer
	Cardiovascular disease	26	15	68% ischaemic heart disease 15% cerebrovascular disease	43% ischaemic heart disease 29% cerebrovascular disease
	Injury and poisoning	22	10	48% suicide 19% motor vehicle traffic accidents	32% suicide 21% motor vehicle traffic accidents
50–54	Injury and poisoning	14	8	46% suicide 20% motor vehicle traffic accidents	32% suicide 26% motor vehicle traffic accidents
	Cancer	38	57	23% lung cancer 12% colorectal cancer 3% prostate cancer	31% breast cancer 13% lung cancer 11% colorectal cancer
	Cardiovascular disease	29	14	72% ischaemic heart disease 9% cerebrovascular disease	47% ischaemic heart disease 27% cerebrovascular disease
55–59	Cancer	43	57	26% lung cancer 16% colorectal cancer 4% prostate cancer	24% breast cancer 17% lung cancer 14% colorectal cancer
	Cardiovascular disease	31	18	74% ischaemic heart disease 13% cerebrovascular disease	50% ischaemic heart disease 22% cerebrovascular disease
	Injury and poisoning	8	5	38% suicide 22% motor vehicle traffic accidents	38% suicide 24% motor vehicle traffic accidents
60–64	Cancer	44	51	29% lung cancer 15% colorectal cancer 6% prostate cancer	24% breast cancer 17% lung cancer 14% colorectal cancer
	Cardiovascular disease	32	23	69% ischaemic heart disease 14% cerebrovascular disease	50% ischaemic heart disease 22% cerebrovascular disease
	Injury and poisoning	4	4	40% suicide 19% motor vehicle traffic accidents	38% suicide 24% motor vehicle traffic accidents

Patterns of death in age group 65–84 years

37,242 male deaths representing 55.5% of all male deaths and 28,839 female deaths representing 48.0% of all female deaths in 1998

In this age range, the mortality rate increased by eight times for males and about six times for females compared to the younger 45–64 age group. Cancer was the most common cause of death for those aged 65–69. However, by age 70–74 cardiovascular disease equalled the cancer rate and by age 80–84 mortality rates from cardiovascular disease were twice those of cancer for both men and women (Figure 3.6; Table 3.7).

Although the most common cancers for males were lung and colorectal, mortality rates for prostate cancer also increased in this age range.

Diseases of the respiratory system were also a major cause of death in this age range. Deaths rates from suicide, motor vehicle accidents and other injuries also increased, but were relatively small.

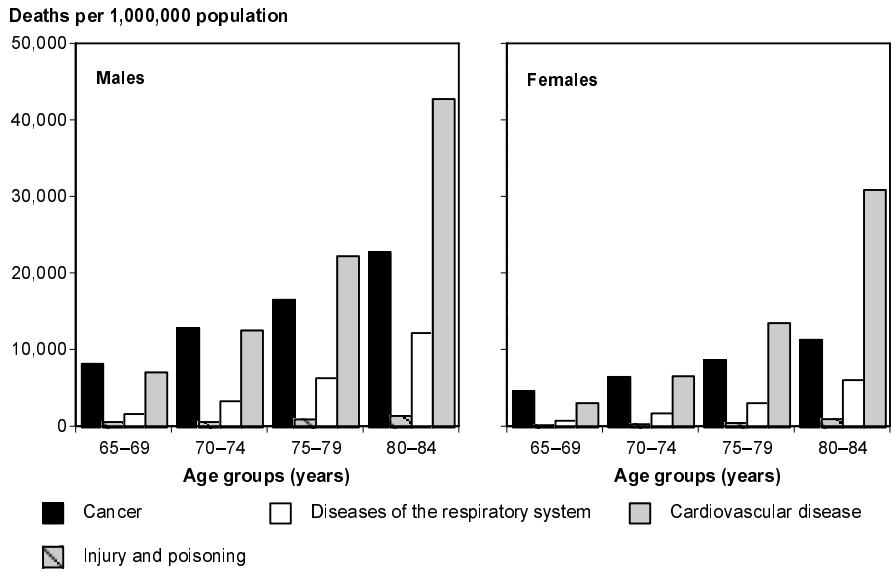


Figure 3.6: Major causes of death for ages 65–84, 1998

Table 3.7: Leading causes of death: age group and ICD chapter by sex, 1998: ages 65–84

ICD chapter		Per cent of all deaths		Leading causes of death	
				Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
65–69	Cancer	41	45	30% lung cancer 14% colorectal cancer 8% prostate cancer	18% lung cancer 16% colorectal cancer 15% breast cancer
	Cardiovascular disease	36	30	68% ischaemic heart disease 15% cerebrovascular disease	55% ischaemic heart disease 21% cerebrovascular disease
	Respiratory diseases	9	8	66% chronic obstructive pulmonary disease 13% pneumonia	65% chronic obstructive pulmonary disease 10% pneumonia
	Injury and poisoning	3	2	40% suicide 17% motor vehicle traffic accidents 12% accidental falls	24% suicide 24% motor vehicle traffic accidents 22% accidental falls
70–74	Cancer	38	36	29% lung cancer 13% colorectal cancer 12% prostate cancer	19% lung cancer 16% colorectal cancer 13% breast cancer
	Cardiovascular disease	38	37	64% ischaemic heart disease 17% cerebrovascular disease	54% ischaemic heart disease 25% cerebrovascular disease
	Respiratory diseases	10	10	69% chronic obstructive pulmonary disease 13% pneumonia	64% chronic obstructive pulmonary disease 13% pneumonia
	Injury and poisoning	2	2	25% suicide 24% motor vehicle traffic accidents 17% accidental falls	30% accidental falls 26% motor vehicle traffic accidents 17% suicide
75–79	Cardiovascular disease	42	43	61% ischaemic heart disease 20% cerebrovascular disease	52% ischaemic heart disease 26% cerebrovascular disease
	Cancer	31	28	25% lung cancer 16% prostate cancer 12% colorectal cancer	17% colorectal cancer 15% lung cancer 13% breast cancer
	Respiratory diseases	12	10	54% chronic obstructive pulmonary disease 28% pneumonia	44% chronic obstructive pulmonary disease 34% pneumonia
	Injury and poisoning	2	2	40% accidental falls 21% suicide 17% motor vehicle traffic accidents	46% accidental falls 21% motor vehicle traffic accidents 12% suicide
80–84	Cardiovascular disease	46	52	37% ischaemic heart disease 15% cerebrovascular disease	49% ischaemic heart disease 29% cerebrovascular disease
	Cancer	25	19	27% prostate cancer 17% lung cancer 12% colorectal cancer	15% colorectal cancer 12% lung cancer 11% breast cancer
	Respiratory diseases	13	10	46% chronic obstructive pulmonary disease 36% pneumonia	41% pneumonia 36% chronic obstructive pulmonary disease
	Injury and poisoning	2	2	45% accidental falls 21% suicide 12% motor vehicle traffic accidents	57% accidental falls 12% motor vehicle traffic accidents 8% suicide

Patterns of death in age group 85 years and over

11,421 male deaths representing 17.0% of all male deaths and 21,235 female deaths representing 35.3% of all female deaths in 1998

For persons aged 85 and over, cardiovascular disease was the main cause of death for both males and females. About half of the cardiovascular mortality rate was due to ischaemic heart disease, and cerebrovascular disease was responsible for about a quarter (Figure 3.7; Table 3.8).

For males, cancer was the second most common cause of death (mostly lung, bowel and prostate cancers), followed by diseases of the respiratory system. For women the second highest cause of death was diseases of the respiratory system, while the third most common was cancer, with breast cancer and cancer of lymphatic tissue the most common cancers.

Death from accidental falls and suicide were also significant causes of death for this age group.

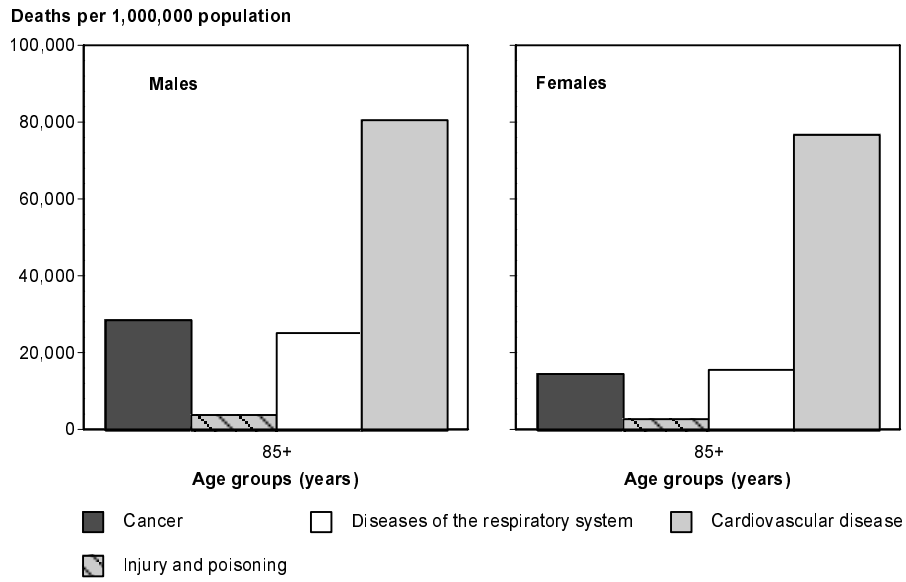


Figure 3.7: Major causes of death for ages 85 and over, 1998

Table 3.8: Leading causes of death: age group and ICD chapter by sex, 1998: 85 years and over

ICD chapter				Leading causes of death	
		Per cent of all deaths		Per cent of deaths in ICD chapter	
Age		Males	Females	Males	Females
85+	Cardiovascular disease	46	55	52% ischaemic heart disease 24% cerebrovascular disease	47% ischaemic heart disease 29% cerebrovascular disease
	Cancer	16	11	27% prostate cancer 17% lung cancer 12% colorectal cancer	19% colorectal cancer 13% breast cancer 7% lung cancer
	Respiratory diseases	14	11	46% were pneumonia 34% chronic obstructive pulmonary disease	62% pneumonia 16% chronic obstructive pulmonary disease
	Injury and poisoning	3	5	68% accidental falls 8% suicide	84% accidental falls 2% suicide

Part II Feature disease profiles

4 All causes

Age–sex distribution

There were 127,194 deaths (67,066 males and 60,128 females) in 1998. In the 12-year period 1987–1998 the mortality rate fell by 24.4% for males (from 10,054 to 7,603 deaths per million population), and by 19.4% for females (from 5,837 to 4,705 deaths per million population in 1987) (Figure 4.1; Table 4.1).

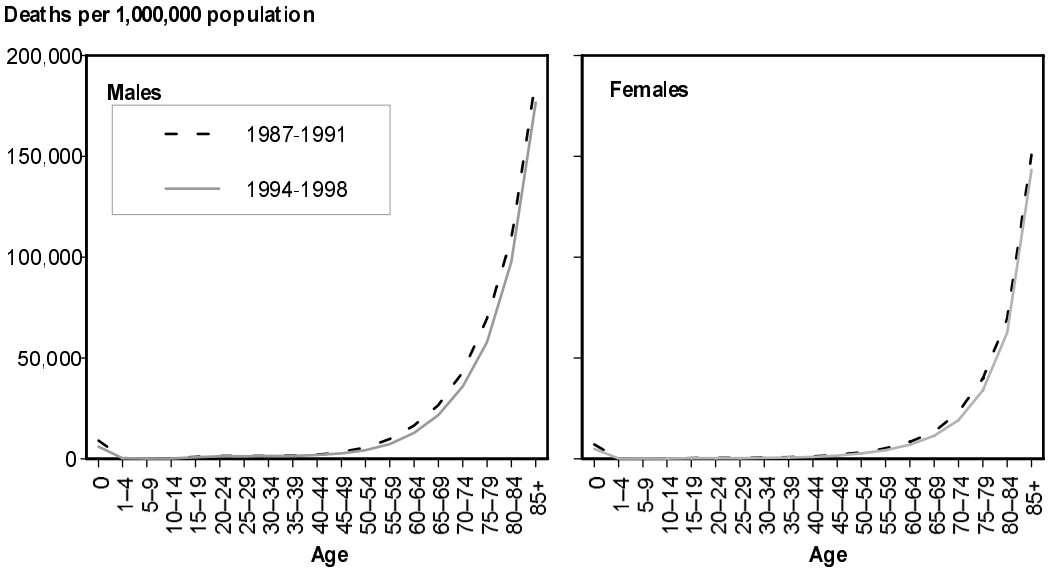


Figure 4.1: Age-specific mortality rates for all deaths, by sex, Australia, for the 5-year periods 1987–1991 and 1994–1998

While the risk of death increases with age, the relationship is not linear. In the first year of life, risk of death is about 15 times as high as for children aged 1–4. Between the ages of 15–35, male deaths outnumber female deaths three to one, largely because of the high numbers of males who die due to accidents and injuries. Mortality rates increase at an exponential rate from the age of 45. As females live longer than males, the ratio of female to male deaths is about two to one from age 85 (see Chapter 3).

Twelve-year trends 1987–1998

Over the 1987–1998 period there were significant decreases in age-specific mortality rates in most age groups, with overall mortality rates decreasing significantly by 2.3% per year for males and by 1.9% per year for females. There were significant decreases in infant mortality for both sexes. There were also significant decreases for most other age groups. The exceptions occurred for males and females aged 30–39 years, where the age-specific mortality rates here increased in the mid-1990s, and for males and females aged 10–19 years (Figure 4.2; Table 4.1).

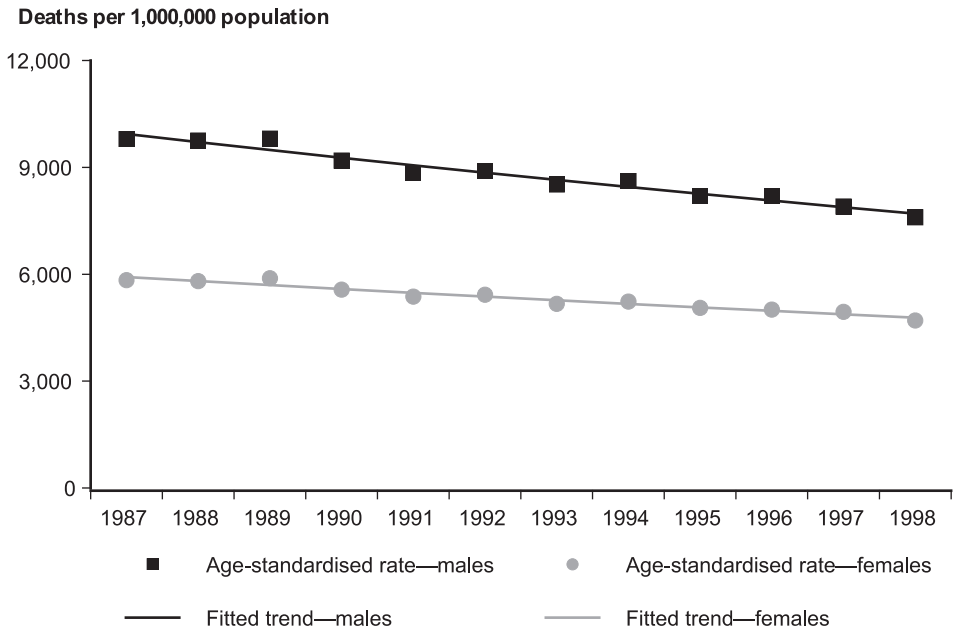


Figure 4.2: Age-standardised mortality rates and fitted trends for all deaths, Australia, 1987–1998

Geographic differences in mortality

Geographic analysis of age-standardised and age-specific mortality is affected by a number of overlapping factors including:

- socioeconomic status of the population (AIHW 2000a);
- migration of older persons from the southern States to Queensland, Western Australia and the Northern Territory (AIHW 2000a).
- exposure to occupational and environmental risk (AIHW 2000a);
- proportion of the population who are recent migrants—this population has lower rates of mortality and morbidity which tend to become closer to the Australian rates as their period of residence in Australia increases (AIHW 2000a);
- proportion of the population who are Aboriginal and Torres Strait Islanders—this population has higher rates of mortality (ABS & AIHW 1999); and
- proportion of the population living in rural and remote areas (AIHW 1998a).

The overlap of factors influences mortality rates for the State and Territories and geographic categories, both overall and for each disease group. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population.

State and Territory comparison

The mortality rates decreased across the two periods 1987–1991 and 1994–1998 for males and females in all States and Territories (Table 4.2). During the 1987–1991 period, compared with the national mortality rate:

- Mortality rates for males in New South Wales, Victoria, South Australia, Tasmania and the Northern Territory were significantly higher.
- Mortality rates for males in Western Australia and the Australian Capital Territory were significantly lower.
- Mortality rates for females in New South Wales, Victoria, South Australia, Tasmania and the Northern Territory were significantly higher.
- Mortality rates for females in Queensland, Western Australia and the Australian Capital Territory were significantly lower.

During the 1994–1998 period:

- Mortality rates for males in New South Wales, Victoria, South Australia, Tasmania and the Northern Territory were significantly higher.
- Mortality rates for males in Western Australia and the Australian Capital Territory were significantly lower.
- Mortality rates for females in Victoria, South Australia, Tasmania and the Northern Territory were significantly higher.
- The mortality rate for females in Western Australia was significantly lower.

Geographic category (by metropolitan, rural and remote area)

To compare rates by metropolitan, rural and remote area, it was necessary to aggregate to a 3-year period (1995–1997) because the small numbers of deaths led to instability of the rates. There were significant differences in mortality rates by area for the period 1995–1997, with rates significantly higher in remote areas.

- For males, the mortality rate in remote areas (9,248 deaths per million population) was 17% higher than in metropolitan areas (7,905) and 10% higher than in rural areas (8,418).
- For females, the mortality rate in remote areas (6,033 deaths per million population) was 23% higher than in metropolitan areas (4,924) and 18% higher than in rural areas (5,109) (Table 4.3).

In considering these figures it is important to note that Aboriginal and Torres Strait Islander people have substantially worse levels of health than other Australians, and form a greater proportion of the population living in remote areas (ABS & AIHW 1999). Consequently the higher mortality rates found in Aboriginal and Torres Strait Islander populations across all areas has the greatest effect on remote mortality rates (AIHW 1998a).

Aboriginal and Torres Strait Islander people

While 2% of the Australian population counted at the 1996 population census identified themselves as Aboriginal and Torres Straight Islanders, they did not represent 2% of the population in each State and Territory. The proportion was much greater in the Northern Territory (28.5% of the population) than in all other jurisdictions. Consequently, higher mortality rates for the Aboriginal and Torres Strait Islander population influence the mortality rates in State and Territories where the Aboriginal and Torres Strait Islander population as a proportion is relatively larger, particularly the Northern Territory. Mortality rates in remote and rural regions are more affected by the higher mortality rates for the Aboriginal and Torres Strait Islander population as:

- 20.7% of Australians living in remote regions are of Aboriginal or Torres Strait Islander origin;

- 2.8% of Australians living in rural regions are of Aboriginal of Torres Strait Islander origin; and
- 1.1% of Australians living in metropolitan regions are of Aboriginal or Torres Strait Islander origin (AIHW population data, based on ABS population estimates).

While greater numbers of Aboriginal and Torres Strait Islander people reside in Queensland and New South Wales, Aboriginal and Torres Strait Islander mortality data are only included in this report for the Northern Territory, Western Australia and South Australia. This is due to the poor rate of Aboriginal and Torres Strait Islander identification in the collection of data in the other States and Territories for the analysis period of this report (1995–1997).

When comparing mortality between the Aboriginal and Torres Strait Islander and the Australian populations, the different age structures of each population need to be taken into account. The two most common methods are direct age-standardisation (used throughout this report) and indirect age-standardisation. Indirect age-standardisation is used when the numbers of deaths are small, resulting in unstable values with the direct method, as is the case when analysing Aboriginal and Torres Strait Islander mortality patterns.

Indirect age-standardisation gives a ratio of the number of deaths observed in the population (in this case the Aboriginal and Torres Strait Islander population) to the number of deaths expected if the age-specific mortality rates in the Australian population are applied to the Aboriginal and Torres Strait Islander population. Both of these methods create an index that enables comparison between populations.

Direct age-standardised rates and indirect standardised mortality ratios (SMR) were calculated for the Aboriginal and Torres Strait Islander population for each of the disease profiles featured in this report. These are presented in Table 4.0 for comparison between the two methods.

Results

For the period 1995–1997, there were 2,652 deaths in Aboriginal and Torres Strait Islander peoples for the Northern Territory, Western Australia and South Australia (Table 4.0). The SMR for all-cause mortality for the Aboriginal and Torres Strait Islander population was 3.1 for males and 3.0 for females, i.e. Aboriginal and Torres Strait Islander mortality is three times higher than for the Australian population as a whole (1.0). Mortality rates were higher for Aboriginal and Torres Strait Islander males than females for all-cause mortality and some specific causes.

As is the case for the rest of the Australian population, risk of death increases with age for the Aboriginal and Torres Strait Islander population. However, for the Aboriginal and Torres Strait Islander population, risk of death increases at a much faster rate from an earlier age, particularly for males, peaking for age group 45–64 years for males and age 65 years and over for females. For the rest of the Australian population, risk of death peaks for age 65 years and over (AIHW & ABS 2002).

For many of the disease profiles, the SMR was higher for the Aboriginal and Torres Strait Islander population. The highest SMRs for Aboriginal and Torres Strait Islander males were for diabetes (9.3), homicide (8.2), motor vehicle traffic accidents (4.1), mental disorders (4.1) and cerebrovascular disease (3.2). The highest SMRs for Aboriginal and Torres Strait Islander females were for diabetes (15.1), homicide (6.2), asthma (4.6), chronic obstructive pulmonary disease (4.4) and mental disorders (3.5) (Table 4.0).

The higher SMR for Aboriginal and Torres Strait Islander peoples is reflected in shorter life expectancy at birth, about 20 years less than for the total Australian male and female

populations. For the period 1990–1996, life expectancy from birth was 56.9 years for Aboriginal and Torres Strait Islander males and 61.7 years for females (ABS & AIHW 1999) compared with 75.7 for the total Australian male population and 81.4 for the total Australian female population (see Life expectancy in Chapter 2).

Table 4.0: Age-standardised mortality rates (direct method) and standardised mortality ratios (indirect method) for the Aboriginal and Torres Strait Islander population and the Australian population: selected causes, 1995–1997

	Aboriginal and Torres Strait Islander		Aboriginal and Torres Strait Islander age-standardised rates (direct method)		Australian age-standardised rates (direct method)		Standardised mortality ratio (indirect method)	
	Number of deaths		per 1,000,000 population		per 1,000,000 population			
	Male	Female	Male	Female	Male	Female	Male	Female
All causes	1,546	1,106	18,403	12,657	7,991	5,284	3.1	3.0
Ischaemic heart disease	237	114	3,192	1,636	1,911	1,136	2.6	1.9
Cerebrovascular disease	88	70	1,659	1,040	630	629	3.2	2.1
Lung cancer	42	33	656	415	546	192	1.5	2.5
Prostate cancer	6	—	146	—	314	—	0.5	—
Breast cancer	—	14	—	199	—	253	—	0.7
Colorectal cancer	12	13	151	144	305	205	0.8	1.0
Chronic obstructive pulmonary disease	55	46	1,099	715	446	189	3.0	4.4
Asthma	6	13	79	165	34	39	2.4	4.6
Suicide	56	12	296	59	220	55	1.7	1.4
Motor vehicle traffic accidents	111	45	692	253	153	62	4.1	4.2
Homicide	34	15	195	77	24	13	8.2	6.2
Diabetes	79	112	1,107	1,440	173	127	9.3	15.1
Mental disorders	64	35	799	422	186	161	4.1	3.5
Dementia and related disorders	9	12	217	242	148	190	1.5	1.4

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

Country of birth

Migrants bring to Australia their own health characteristics. Because of the stringent health requirements for immigration, migrants generally enjoy better health than does the Australian-born population. However, their illness and disability levels generally increase with length of residency in Australia. Some migrant groups also have greater tendencies towards specific conditions (AIHW 2000a).

Mortality rates by country of birth for migrants were analysed for 1992–1994, as it was the most recent period comparable with international mortality rates. To allow the mortality rates to be directly compared to rates for the country where the migrants were born, the

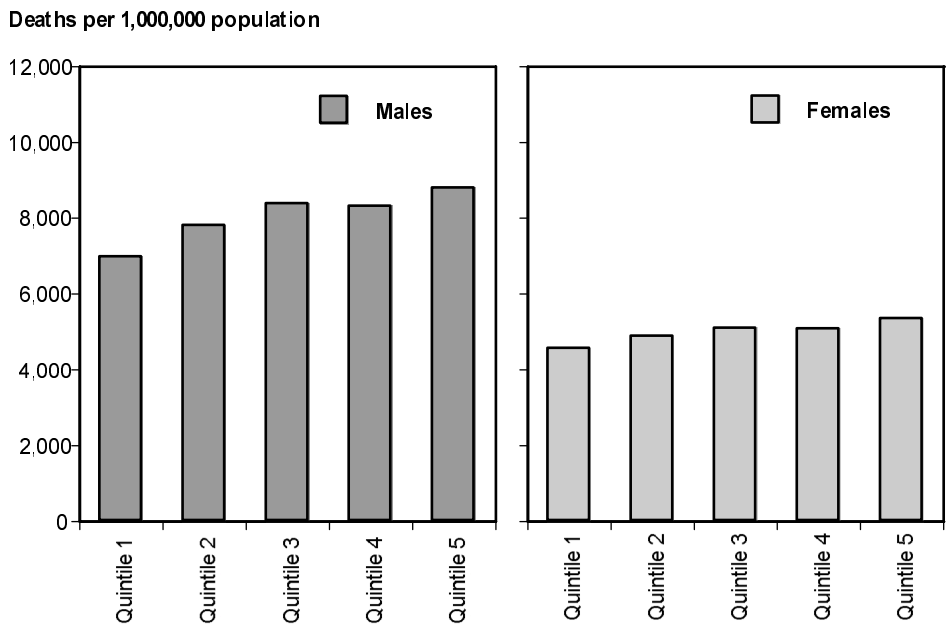
Australian rates by country of birth were age-standardised to the World Standard Population.

For the period 1992–1994, the world-standardised mortality rate for Australian males and females born in Australia was 5,922 deaths per million population for males and 3,499 deaths per million population for females (Table 4.6).

- Differences in mortality rates between countries of birth analysed for Australian males and females are only discussed where the difference is statistically significant.
- Of the 25 countries of birth analysed for Australian males, none had significantly higher mortality rates than Australian males born in Australia.
- For females, only Australian females born in Israel had significantly higher mortality rates than Australian females born in Australia.

Socioeconomic status

Mortality rates by socioeconomic status were analysed for the 3-year period 1995–1997. (See Appendix D for methodology used to determine socioeconomic status.) Socioeconomic status (SES) is an important factor in risk of death (AIHW 2000a), as there is a general inverse relationship between mortality rates and socioeconomic status. The mortality rate for males increased significantly as socioeconomic status decreased, using the SEIFA index of Relative Socioeconomic Disadvantage, with a difference of 26% between the highest and lowest groups. For females, the mortality rate increased by 17% as socioeconomic status decreased between the highest and lowest SEIFA groups (Figure 4.3, Table 4.4).



Note: The population has been divided into five segments: Quintile 1 represents the highest socioeconomic status, and Quintile 5 the lowest.

Figure 4.3: Age-standardised mortality rates by socioeconomic status and sex, Australia, 1995-1997

Table 4.1: Age-specific and age-standardised mortality rates for all causes of death per million population, Australia, 1987–1998

	Age																				ASMR
Year	0	1–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																					
1987	9,890	458	231	297	1,147	1,579	1,509	1,438	1,508	2,387	3,495	6,107	9,917	17,521	28,508	44,894	75,252	116,276	197,440	7,833	10,054
1988	9,761	455	227	302	1,130	1,582	1,482	1,406	1,495	2,251	3,386	5,964	10,051	17,243	27,202	44,943	72,357	110,888	188,940	7,888	9,754
1989	8,886	444	217	270	1,027	1,407	1,459	1,403	1,672	1,938	3,268	5,747	9,920	16,643	27,254	45,151	72,618	114,006	199,950	7,979	9,808
1990	9,290	499	232	213	942	1,380	1,394	1,396	1,472	2,119	3,128	5,361	9,547	16,038	26,186	41,195	67,485	104,833	183,852	7,596	9,191
1991	7,890	375	198	216	883	1,283	1,268	1,327	1,606	1,975	3,126	5,173	8,854	15,429	24,892	39,270	65,468	105,481	175,712	7,436	8,851
1992	8,109	418	195	198	807	1,194	1,282	1,352	1,465	2,005	2,978	5,084	8,649	15,194	25,042	39,748	66,517	104,479	182,275	7,585	8,893
1993	6,927	458	179	209	786	1,167	1,233	1,365	1,538	1,890	2,850	4,843	8,377	14,211	23,746	37,976	62,626	100,688	178,693	7,398	8,523
1994	6,553	377	171	219	814	1,153	1,217	1,317	1,576	1,964	2,849	4,638	8,000	13,956	23,797	38,251	64,411	101,764	186,840	7,590	8,618
1995	6,092	386	169	196	756	1,263	1,228	1,432	1,628	1,896	2,736	4,457	7,580	13,329	22,468	36,855	58,694	98,123	176,593	7,366	8,203
1996	6,438	383	172	219	826	1,222	1,233	1,414	1,548	1,958	2,686	4,408	7,267	13,102	21,778	36,171	58,321	100,742	181,291	7,487	8,203
1997	5,737	386	147	198	862	1,229	1,289	1,337	1,462	1,919	2,645	4,334	7,033	12,712	21,032	34,928	55,741	96,557	173,986	7,352	7,905
1998	5,542	375	150	188	750	1,258	1,346	1,517	1,525	1,878	2,486	3,982	6,846	11,793	19,974	33,529	53,630	92,851	167,228	7,196	7,603
Females																					
1987	7,471	327	175	144	429	483	488	546	801	1,254	2,091	3,518	5,479	8,577	13,893	23,948	40,956	72,208	152,170	6,593	5,837
1988	7,554	414	179	151	413	538	475	592	818	1,240	2,137	3,352	5,524	8,696	13,871	23,497	41,052	71,650	149,510	6,614	5,808
1989	7,132	394	171	151	379	475	452	574	756	1,265	2,062	3,292	5,297	8,694	13,754	24,171	40,818	72,925	159,929	6,800	5,889
1990	7,380	344	143	157	387	445	460	540	760	1,139	1,864	3,268	4,987	8,142	13,401	22,809	39,195	67,188	149,580	6,477	5,567
1991	6,239	300	144	149	368	448	535	542	766	1,106	1,870	3,074	4,840	7,968	13,048	21,866	37,969	64,870	143,510	6,354	5,373
1992	6,133	356	156	133	335	428	426	560	732	1,130	1,820	3,112	4,932	7,775	12,667	21,716	38,022	67,325	149,617	6,555	5,426
1993	5,349	320	138	159	343	402	367	539	815	1,080	1,730	2,774	4,692	7,628	12,191	20,795	36,434	64,051	141,334	6,372	5,171
1994	5,157	316	134	167	301	359	406	479	765	1,126	1,772	2,808	4,590	7,346	12,382	20,422	36,690	65,335	149,154	6,605	5,236
1995	5,117	298	148	179	346	416	420	566	693	1,092	1,671	2,803	4,369	7,119	11,934	19,683	35,193	63,011	142,594	6,486	5,057
1996	4,962	288	115	166	295	331	418	503	762	1,050	1,655	2,774	4,473	7,060	11,344	19,268	34,783	62,360	145,687	6,575	5,011
1997	4,860	239	134	127	351	421	441	603	746	1,078	1,675	2,717	4,319	6,846	11,344	19,171	32,472	62,436	144,630	6,616	4,948
1998	4,517	294	95	136	371	388	420	529	766	1,082	1,630	2,643	3,977	6,538	10,418	18,169	31,453	59,917	136,117	6,389	4,705

Note: ASMR = age-standardised mortality rate.

Table 4.2: Number of deaths and age-standardised mortality rates for all causes of death per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	116,801	83,031	53,797	26,066	29,398	9,860	2,836	2,506	324,295
1994–1998	118,308	84,253	59,308	28,716	30,304	9,994	3,244	2,559	336,707
				Deaths per million population					
1987–1991	9,708	9,608	9,371	8,237	10,102	10,158	8,326	13,371	9,466
1994–1998	8,181	8,175	8,056	7,679	8,402	8,870	7,115	11,030	8,088
				Confidence intervals (95%)					
1987–1991	9,651– 9,765	9,541– 9,675	9,290– 9,452	8,135– 8,339	9,984– 10,220	9,953– 10,363	7,975– 8,677	12,641– 14,101	9,432– 9,499
1994–1998	8,134– 8,228	8,119– 8,230	7,991– 8,122	7,590– 7,769	8,306– 8,497	8,695– 9,045	6,853– 7,377	10,478– 11,581	8,060– 8,115
Females									
				Deaths					
1987–1991	101,374	73,806	42,807	20,819	25,285	8,413	2,356	1,410	276,270
1994–1998	106,719	78,509	49,555	24,436	27,600	8,956	2,998	1,550	300,339
				Deaths per million population					
1987–1991	5,838	5,790	5,562	4,592	6,330	6,255	5,346	8,676	5,687
1994–1998	5,019	5,072	4,948	4,428	5,351	5,490	4,801	7,956	4,983
				Confidence intervals (95%)					
1987–1991	5,802– 5,874	5,748– 5,832	5,509– 5,615	4,528– 4,655	6,251– 6,408	6,120– 6,389	5,126– 5,567	8,118– 9,233	5,666– 5,709
1994–1998	4,988– 5,050	5,035– 5,108	4,903– 4,992	4,370– 4,486	5,287– 5,416	5,374– 5,607	4,627– 4,975	7,496– 8,416	4,964– 5,001

Table 4.3: Age-standardised mortality rates for all causes of death per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	7,905	7,863–7,948	4,924	4,896–4,951
Rural	8,418	8,351–8,486	5,109	5,063–5,155
Remote	9,248	8,987–9,509	6,033	5,824–6,242

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 4.4: Age-standardised mortality rates (ASMR) for all causes of death per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	6,967	6,893–7,041	4,550	4,502–4,598
2	7,790	7,709–7,870	4,869	4,816–4,923
3	8,367	8,286–8,448	5,076	5,023–5,130
4	8,301	8,221–8,382	5,066	5,012–5,120
5 Low SES	8,779	8,699–8,859	5,332	5,277–5,386

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 4.5: Age-standardised mortality rates per million population for all causes of death, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	ASMR (world)	95% CI	Country of birth	ASMR (world)	95% CI
Hungary	7,455	3,801–11,108	Israel	5,568	4,351–6,785
Israel	7,193	5,428–8,959	Poland	3,526	3,303–3,749
Finland	6,778	5,621–7,934	**Australia**	**3,499**	**3,478–3,521**
Poland	5,990	5,622–6,358	Hungary	3,471	3,059–3,883
Australia	**5,922**	**5,890–5,954**	New Zealand	3,230	3,033–3,427
USA	5,711	5,147–6,276	Germany	3,230	3,033–3,426
France	5,471	4,162–6,781	Switzerland	3,172	2,385–3,960
New Zealand	5,465	5,217–5,712	United Kingdom and Ireland	3,151	3,089–3,212
Germany	5,410	5,114–5,707	Finland	3,134	2,408–3,860
Austria	5,378	4,742–6,013	USA	3,071	2,649–3,493
Malta	5,309	4,881–5,736	Malta	3,029	2,723–3,336
United Kingdom and Ireland	5,210	5,116–5,304	Netherlands	2,916	2,684–3,147
Canada	5,102	4,397–5,807	France	2,832	2,308–3,355
Netherlands	4,847	4,579–5,116	Canada	2,695	2,200–3,190
Switzerland	4,782	3,851–5,712	Austria	2,570	2,183–2,957
Portugal	4,626	3,569–5,683	Italy	2,355	2,268–2,442
Italy	4,271	4,090–4,452	China	2,327	2,142–2,513
Mauritius	4,076	3,351–4,801	Japan	2,311	1,662–2,960
Greece	3,870	3,643–4,097	Mauritius	2,299	1,821–2,777
Singapore	3,855	2,951–4,760	Singapore	2,243	1,696–2,791
China	3,815	3,467–4,163	Portugal	2,222	1,610–2,834
Japan	3,344	2,322–4,367	Greece	2,207	2,064–2,351
Hong Kong and Macau	3,135	2,554–3,717	Korea	2,073	1,464–2,683
Chile	3,068	1,978–4,158	Chile	1,929	995–2,863
Korea	2,310	1,594–3,025	Hong Kong and Macau	1,609	1,252–1,965

Notes

1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

5 Ischaemic heart disease

Disease characteristics

Ischaemic heart disease, also known as coronary heart disease, has been at epidemic levels for much of the twentieth century in Australia and similar countries. Its two main presentations are heart attack and angina (chest pain).

In both heart attack and angina, one or more of the coronary arteries supplying the heart muscle have become narrowed inside by a blocking process that involves build-up of abnormal deposits in the blood vessel walls. In a heart attack, there is a sudden complete blockage when a blood clot forms at a narrowed part of an artery. In angina, there are bouts of temporary chest pain or discomfort when a narrowed coronary artery cannot meet extra demand by the heart during exercise or high emotion.

Prevention aims to reduce the known coronary risk factors, notably high blood cholesterol, cigarette smoking, high blood pressure, physical inactivity and being overweight. Emergency treatment for a heart attack includes cardio-pulmonary resuscitation (CPR) if necessary and 'clot-busting' drugs. Other common treatments are bypass graft surgery, angioplasty to unblock the arteries, and a range of drugs to protect the heart and reduce the demand on it.

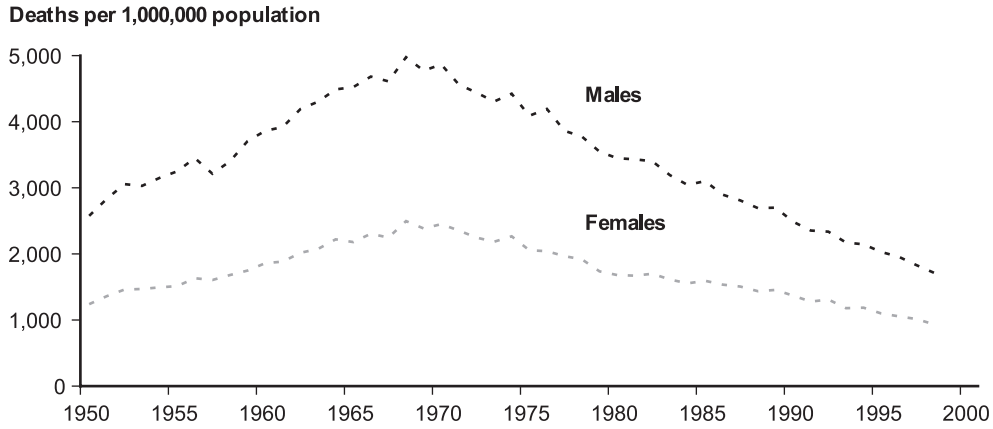
There are about 74,000 PYLL for males under the age of 75 each year because of ischaemic heart disease and 22,000 PYLL for females. This makes ischaemic heart disease the number two cause of premature death for males and number one cause for females.

Historic view

Ischaemic heart disease or heart attack is the leading cause of mortality in Australia, claiming 22% of all deaths in 1998. Long-term trend statistics for this disease do not exist. This is because it was not identified as a specific cause of death within the ICD classification until the introduction of ICD-8 in 1968. However, rates of the disease have been estimated from rates of known components of heart disease recorded from 1950, and show that ischaemic heart disease mortality rates climbed steadily from then to 1968 (d'Espaignet 1993).

In 1950 it was estimated that there were about 2,416 and 1,150 deaths per million population for males and females respectively due to ischaemic heart disease. The rates peaked for males and females in 1968 at 4,668 and 2,314 deaths per million population. Of the 33,381 deaths in that year, 20,342 were male and 13,039 were female. Since 1968, the rates have declined steadily, by 3.6% per year in males and 3.0% per year in females. The decline was steeper over the five years 1994 to 1998, with mortality rates declining annually by about 5.1% for males and 5.2% for females (Figure 5.1).

As medical understanding of ischaemic heart disease has increased, great improvements in the prevention and treatment of the disease have been made. The reduction in the prevalence of smoking, improvement in the types of fat in the diet, control of blood pressure and other advances in treatment are believed to have contributed strongly to the fall in mortality rates.



Note: Data for ischaemic heart disease before 1968 are estimated (AIHW 1999b).

Figure 5.1: Age-standardised mortality rates for ischaemic heart disease, Australia, 1950–1998

Age–sex distribution

The age distribution for mortality rates was consistent over the 1987–1998 period, with the risk of death becoming greater from about age 50 for males and age 60 for females. In 1998, the mortality rate for males was 1,730 deaths per million population, about 1.8 times the rate for females (942 deaths per million population). For males, 88% of deaths occurred from the age of 60 and 55% from age 75. For females, 97% occurred from age 60 and 80% from age 75 (Table 5.1).

Twelve-year trends 1987–1998

There has been a consistent and significant decrease in mortality rates due to ischaemic heart disease over the 1987–1998 period for both males (2.6% per year) and females (1.9%) (Figure 5.2). Age-specific mortality rates have decreased significantly over the 1987–1998 period for males in age groups 35–39 years and above, and females in age groups 40–44 years and above. Comparing age groups, the decreases in age-specific mortality rates over the 1987–1998 period have been greatest for males and females in age groups 40–44 to 75–79 years (Table 5.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The rates of ischaemic heart disease decreased between the periods 1987–1991 and 1994–1998 for males and females in all States and Territories (Table 5.2). The mortality rates for ischaemic heart disease also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national ischaemic heart disease mortality rate:

- Mortality rates for males in New South Wales, South Australia, and Tasmania were significantly higher.
- Mortality rates for males in Victoria, Western Australia, the Australian Capital Territory and the Northern Territory were significantly lower.
- Mortality rates for females in New South Wales and Queensland were significantly higher.
- Mortality rates for females in Victoria, Western Australia and the Australian Capital Territory were significantly lower.

During the 1994–1998 period:

- Mortality rates for males in Queensland, South Australia, and Tasmania were significantly higher.
- Mortality rates for males in Western Australia and the Australian Capital Territory were significantly lower.
- Mortality rates for females in New South Wales and Queensland were significantly higher.
- Mortality rates for females in Victoria, Western Australia and the Australian Capital Territory were significantly lower.

Geographic category (by metropolitan, rural and remote area)

Ischaemic heart disease mortality rates were significantly lower for males and females living in metropolitan areas (1,883 deaths per million for males and 1,040 for females) compared with males and females living in rural areas (2,055 for males and 1,094 for females) and males living in remote areas (2,053). Compared to mortality rates in metropolitan areas, the mortality rates were 9% higher for males in rural and remote areas, and 5% higher for females in rural areas (Table 5.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for ischaemic heart disease for Australian males born in Australia was 1,463 deaths per million population (Table 5.5).

- Mortality rates for Australian males born in Korea, Chile, Japan, Hong Kong and Macau, China, Singapore, Mauritius, Italy, Greece, the Netherlands and the United Kingdom and Ireland were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian males born in Israel and Poland were significantly higher than for Australian males born in Australia.

For the period 1992–1994, the world-standardised mortality rate for ischaemic heart disease for Australian females born in Australia was 824 deaths per million population (Table 5.5).

- Of the 25 countries of birth analysed for Australian females, none had significantly higher mortality rates for ischaemic heart disease than Australian females born in Australia.

International comparisons

The world-standardised Australian mortality rates for males and females for ischaemic heart disease were in the medium to high range, and similar to rates for countries of Germany, Austria and Singapore and the USA (see Tables C.2 & C.3 in Appendix C). Compared with Australia:

- The mortality rates were at least 50% higher in Hungary, Mauritius, United Kingdom and Ireland, and Finland for males and females.
- The mortality rates were less than half the Australian rate in Korea, Japan, China, Hong Kong and Macau, and France for males and females.

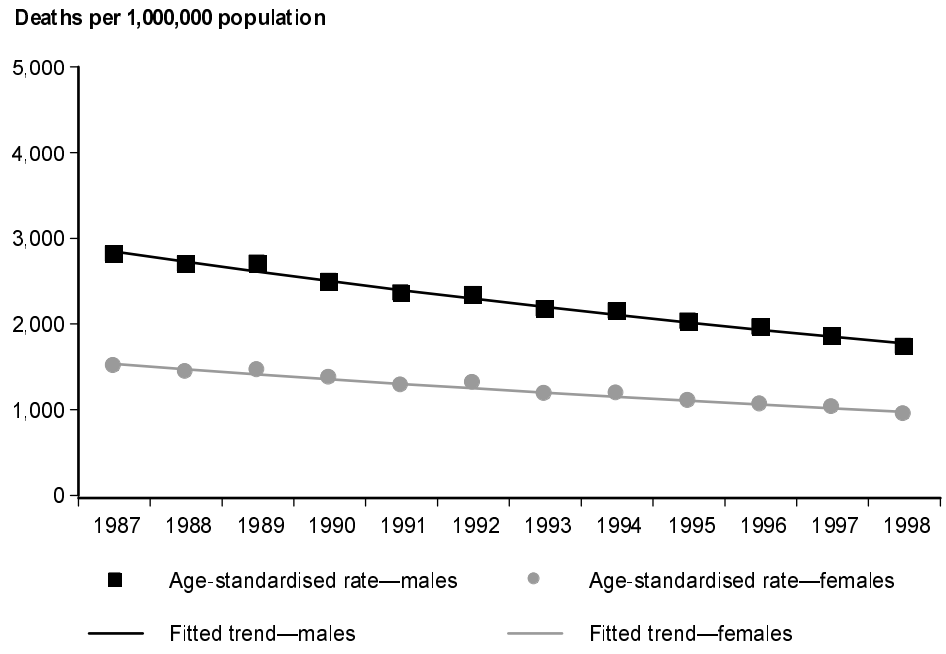
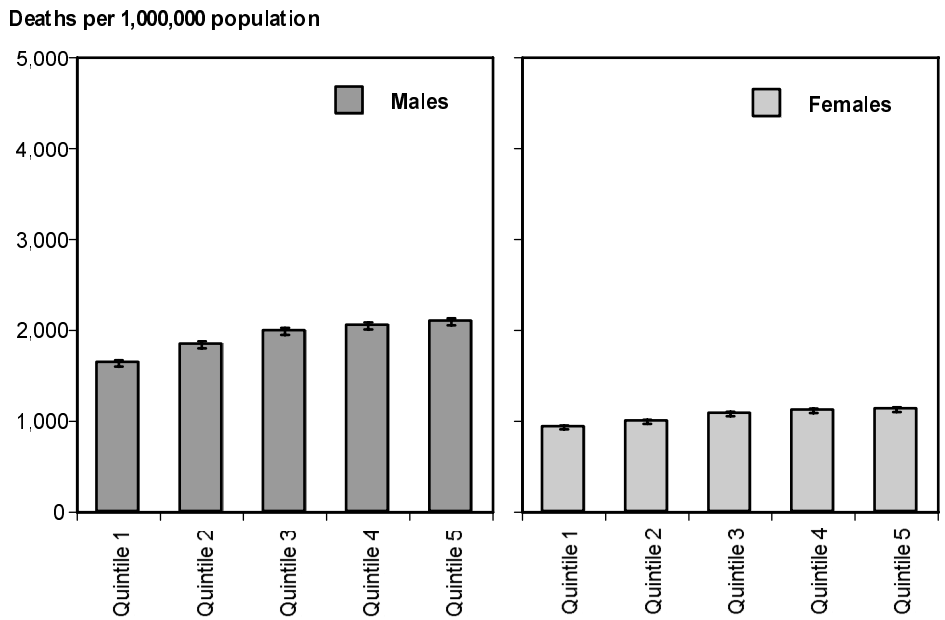


Figure 5.2: Age-standardised mortality rates and fitted trends for ischaemic heart disease, Australia, 1987–1998

Socioeconomic status

The risk of death from ischaemic heart disease was higher among males and females with a lower socioeconomic status than among those of higher status, using the SEIFA Index of Relative Socioeconomic Disadvantage (see Appendix D). In the period 1995–1997, the risk of death for males and females in the lowest of the five SEIFA groups (2,096 deaths per million population and 1,129 respectively) was significantly greater than for males and females in the highest SEIFA group (1,639 and 934 respectively) (Table 5.4; Figure 5.3).



Notes

1. The population has been divided into five segments: Quintile 1 represents the highest socioeconomic status, and Quintile 5 the lowest.
2. Bars on graphs represent 95% confidence intervals.

Figure 5.3: Age-standardised mortality rates for ischaemic heart disease by socioeconomic status and sex, Australia, 1995–1997

Table 5.1: Age-specific and age-standardised mortality rates for ischaemic heart disease per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	0	3	12	24	59	162	379	969	1,794	3,373	5,552	9,186	14,998	23,055	33,595	53,236	2,215	2,807
1988	0	0	0	0	7	25	62	189	448	892	1,658	3,099	5,231	9,070	14,403	22,273	31,537	51,181	2,150	2,693
1989	0	0	0	0	1	31	44	180	324	825	1,537	2,891	5,138	8,408	14,383	22,430	33,595	55,278	2,162	2,700
1990	0	0	0	6	10	25	49	140	358	705	1,406	2,840	4,573	8,025	12,727	20,862	31,173	50,498	2,019	2,487
1991	0	0	0	6	10	13	46	148	322	699	1,240	2,429	4,349	7,191	12,127	19,768	31,855	47,241	1,944	2,354
1992	0	0	0	0	7	13	56	124	314	657	1,280	2,266	4,227	7,001	11,834	19,869	30,262	50,585	1,957	2,334
1993	0	0	0	0	7	13	44	153	276	535	1,169	2,180	3,804	6,612	11,154	18,009	28,391	47,489	1,857	2,169
1994	0	0	0	5	5	21	56	127	246	553	1,116	1,833	3,471	6,509	10,367	18,196	28,972	49,774	1,858	2,141
1995	1	0	0	0	10	16	55	141	282	538	1,052	1,913	3,270	5,728	10,158	16,483	27,318	48,019	1,794	2,023
1996	0	0	0	3	6	23	50	107	282	530	987	1,662	3,230	5,473	9,504	15,502	27,906	47,296	1,766	1,955
1997	0	0	0	2	6	11	50	138	263	504	939	1,617	3,066	5,268	8,865	14,306	25,975	45,842	1,706	1,850
1998	0	0	0	1	0	23	60	130	257	443	841	1,585	2,628	4,886	8,193	13,742	24,840	42,536	1,628	1,730
Females																				
1987	0	0	0	1	2	3	17	27	88	199	451	942	1,757	3,812	7,343	13,476	22,613	42,554	1,731	1,504
1988	0	0	0	0	5	1	11	22	67	145	421	853	1,686	3,522	7,128	12,363	22,378	41,357	1,672	1,434
1989	0	0	0	0	2	4	15	29	60	178	383	762	1,646	3,290	6,967	12,636	22,704	44,483	1,722	1,454
1990	0	0	0	1	1	4	12	34	65	132	309	665	1,603	3,259	6,636	11,836	20,750	42,212	1,635	1,367
1991	0	0	0	0	0	6	13	12	59	121	264	652	1,375	2,867	5,945	11,352	19,620	40,899	1,565	1,279
1992	3	0	0	0	0	3	14	27	70	124	304	742	1,380	2,683	5,606	11,131	21,183	43,447	1,642	1,308
1993	0	0	2	0	1	4	19	23	66	103	256	601	1,296	2,460	5,274	10,038	18,175	39,591	1,514	1,178
1994	0	0	0	0	1	0	14	26	53	116	232	534	1,151	2,387	4,721	10,176	19,184	41,841	1,568	1,184
1995	2	0	0	0	1	1	12	31	58	101	252	450	1,079	2,134	4,539	9,045	17,445	39,611	1,485	1,095
1996	0	0	0	3	1	8	12	38	43	97	199	486	995	1,954	4,177	8,482	17,078	39,626	1,472	1,055
1997	0	0	0	0	1	4	18	37	36	110	185	455	1,010	1,890	4,141	7,671	16,836	39,066	1,463	1,024
1998	2	0	0	0	3	8	11	30	59	104	181	370	895	1,750	3,604	7,156	15,443	36,485	1,374	942

Note: ASMR = age-standardised mortality rate.

Table 5.2: Number of deaths and age-standardised mortality rates for ischaemic heart disease per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	32,189	21,481	14,907	6,984	8,584	2,695	616	340	87,787
1994–1998	28,231	19,308	14,720	6,490	7,467	2,350	720	348	79,625
				Deaths per million population					
1987–1991	2,702	2,522	2,652	2,448	2,715	2,778	1,925	2,196	2,602
1994–1998	1,964	1,892	2,036	1,822	1,972	2,088	1,679	1,803	1,933
				Confidence intervals (95%)					
1987–1991	2,671–2,732	2,487–2,556	2,608–2,695	2,390–2,507	2,656–2,773	2,671–2,884	1,758–2,093	1,895–2,497	2,585–2,620
1994–1998	1,941–1,988	1,865–1,919	2,003–2,069	1,777–1,867	1,927–2,017	2,003–2,173	1,550–1,808	1,570–2,037	1,920–1,947
Females									
				Deaths					
1987–1991	26,354	17,537	11,518	5,177	6,802	2,018	465	146	70,016
1994–1998	24,734	16,854	11,996	5,123	6,378	1,864	521	162	67,634
				Deaths per million population					
1987–1991	1,476	1,333	1,466	1,286	1,422	1,463	1,155	1,266	1,405
1994–1998	1,096	1,020	1,139	954	1,042	1,082	860	1,031	1,057
				Confidence intervals (95%)					
1987–1991	1,458–1,494	1,313–1,353	1,439–1,493	1,250–1,321	1,388–1,456	1,399–1,527	1,050–1,261	1,038–1,495	1,394–1,415
1994–1998	1,082–1,110	1,004–1,036	1,118–1,160	927–981	1,016–1,068	1,032–1,132	786–934	858–1,204	1,049–1,065

Table 5.3: Age-standardised mortality rates for ischaemic heart disease per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	1,883	1,856–1,863	1,040	1,028–1,052
Rural	2,055	2,015–2,021	1,094	1,074–1,115
Remote	2,053	1,912–2,125	1,107	1,015–1,199

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 5.4: Age-standardised mortality rates for ischaemic heart disease per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	1,639	1,603–1,675	934	913–954
2	1,841	1,802–1,881	996	973–1,020
3	1,991	1,951–2,031	1,082	1,058–1,106
4	2,049	2,009–2,089	1,116	1,091–1,140
5 Low SES	2,096	2,057–2,135	1,129	1,104–1,153

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 5.5: Age-standardised mortality rates per million population for ischaemic heart disease, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Israel	2,557	1,492–3,621	Israel	1,068	567–1,570
Poland	1,699	1,541–1,858	Poland	883	785–981
Hungary	1,601	1,396–1,805	**Australia**	**824**	**813–834**
Malta	1,590	1,388–1,793	Malta	784	649–919
New Zealand	1,475	1,347–1,604	Germany	675	606–744
Australia	**1,463**	**1,447–1,479**	Finland	665	349–981
Switzerland	1,460	939–1,981	United Kingdom and Ireland	649	629–670
Finland	1,417	932–1,902	Hungary	631	512–751
Canada	1,368	999–1,737	France	628	396–859
Germany	1,350	1,223–1,477	New Zealand	623	551–695
Austria	1,346	1,107–1,584	USA	616	432–801
United Kingdom and Ireland	1,265	1,232–1,297	Netherlands	593	516–671
Portugal	1,195	661–1,730	Switzerland	542	296–787
USA	1,189	935–1,443	Canada	515	301–730
France	1,145	740–1,551	Italy	480	444–516
Netherlands	1,120	1,013–1,227	Greece	465	403–527
Greece	993	901–1,086	Mauritius	456	269–643
Italy	959	906–1,012	Austria	453	338–568
Mauritius	957	615–1,299	Singapore	449	208–690
Singapore	890	461–1,320	Korea	424	128–720
China	681	575–787	China	398	330–466
Hong Kong and Macau	652	371–933	Chile	353	137–569
Japan	370	35–705	Japan	218	0–438
Chile	348	65–630	Portugal	174	1–346
Korea	299	27–571	Hong Kong and Macau	159	40–278

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

6 Cerebrovascular disease

Disease characteristics

Cerebrovascular disease (commonly known as stroke) occurs when an artery supplying blood to a part of the brain suddenly becomes blocked (85% of cases) or bleeds (15% of cases). The part of the brain where the blockage or bleed occurs can then become damaged, which in turn can impair the functions relying on that part. For instance, this can result in paralysis to one side of the body or an inability to communicate with speech. Death due to stroke occurs mainly in the elderly (aged 75 years and over). It is also a major cause of disability in those aged between 25 and 64 (Mathers et al. 1999).

About one-third of those who have had a stroke will die within 12 months. A further one-third become permanently disabled, with some degree of paralysis of one side of the body, difficulty in communicating, or a range of other problems that may affect their quality of life and their ability to function in society. It is estimated that stroke is the cause of 25% of all chronic disability in Australia (AIHW 1999b).

The most important risk factor for cerebrovascular disease is high blood pressure. Other risk factors include tobacco smoking, heavy alcohol consumption, being overweight and having insufficient physical activity. Transient ischaemic attack, atrial fibrillation, diabetes and history of heart attacks are also associated with an increased risk of stroke (AIHW 2002; AIHW 1999b).

It is estimated that stroke results in about 16,000 PYLL before the age of 75 for males each year, and about 13,000 for females, making cerebrovascular disease (ranked ninth on this measure) a major cause of premature death.

Historic view

Cerebrovascular disease is the second most common cause of death, claiming 10% of all deaths in 1998, with 593 and 535 deaths per million population for males and females respectively in 1998. This corresponds to 5,065 deaths in males and 7,547 deaths in females.

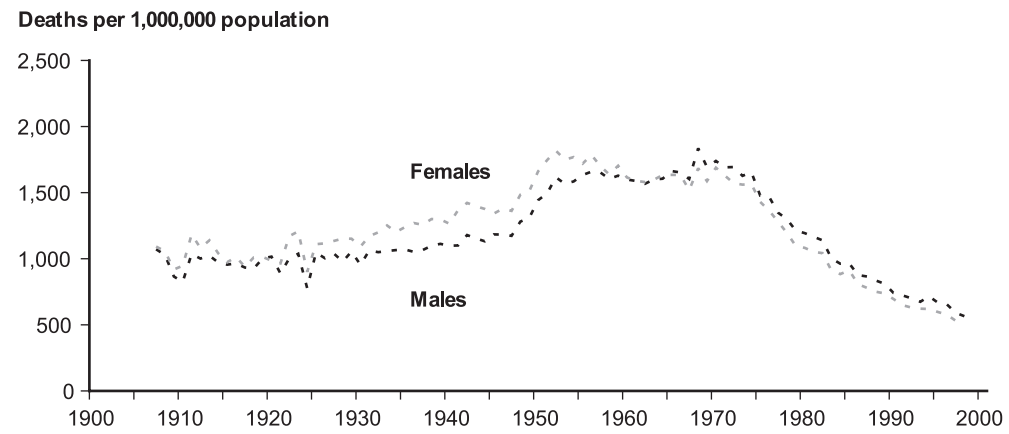


Figure 6.1: Age-standardised mortality rates for cerebrovascular disease, Australia, 1907–1998

In 1907 the rate for cerebrovascular disease was about 1,000 deaths per million population for both males and females. The number of deaths was 1,038 males and 863 females. While mortality rates for cerebrovascular disease climbed steeply over the first half of the century, they began to slow down between 1950 and 1970. Mortality rates peaked at 1,830 deaths per million population for males in the late 1960s and 1,820 for females in the early 1950s. Since 1970, mortality rates for stroke have declined annually by over 4.4% per year in males and 3.6% in females (Figure 6.1).

As with ischaemic heart disease, changes in lifestyle and improvements in the management of the disease are considered to have contributed to the decline in these mortality rates.

Age–sex distribution

The age distribution for mortality rates was consistent over the 1987–1998 period, with most deaths occurring after the age of 75.

- In 1998, the mortality rate for males (593 deaths per million population) was significantly higher than the rate for females (535).
- For males, 93% of deaths occurred from age 60 and 69% occurred from age 75.
- For females, 96% of deaths occurred from age 60 and 84% occurred from age 75 (Table 6.1; Figure 6.3).

Twelve-year trends 1987–1998

There has been a significant downward trend in cerebrovascular disease mortality rates over the 1987–1998 period, 0.9% annually for males and 1.0% for females. For males, there were significant decreases in age-specific rates over the 1987–1998 period for age groups 50–54 years and above, while for females there were significant decreases for age groups 45–49 years and above (Table 6.1; Figure 6.2).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The mortality rates from cerebrovascular disease decreased between the two periods (1987–1991 and 1994–1998) for males and females in all States and Territories, except in the Northern Territory where the rates increased for both males and females and the Australian Capital Territory where the rate increased for females (Table 6.2). The mortality rates for cerebrovascular disease also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national cerebrovascular disease mortality rate:

- Mortality rates for males in New South Wales and South Australia were significantly higher.
- Mortality rates for males in Victoria and Western Australia were significantly lower.
- Mortality rates for females in New South Wales and South Australia were significantly higher.
- Mortality rates for females in Victoria, Western Australia and the Australian Capital Territory were significantly lower.

During the 1994–98 period:

- Mortality rates for males in New South Wales, South Australia Tasmania, and the Northern Territory were significantly higher.
- The mortality rates for males in Western Australia was significantly lower.
- Mortality rates for females in New South Wales and South Australia were significantly higher.
- Mortality rates for females in Victoria and Western Australia were significantly lower.

Geographic category (by metropolitan, rural and remote area)

For the period 1995–1997, mortality rates did not vary significantly by geographic area (Table 6.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for cerebrovascular disease for Australian males and females born in Australia was 411 deaths per million population for males and 356 deaths per million for females (Table 6.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for cerebrovascular disease than Australian males and females born in Australia.
- Mortality rates for Australian males born in Greece, Italy and the United Kingdom and Ireland were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian females born in Japan, Chile, Hong Kong and Macau, Greece, Italy, Hungary and the United Kingdom and Ireland were significantly lower than for Australian females born in Australia.

It is interesting to note that Australian males born in China, Hungary, Italy and the United Kingdom and Ireland, and Australian females born in China, and the United Kingdom and Ireland had rates about half the rate of their country of origin.

International comparisons

The world-standardised Australian mortality rates were in the lower range for males and females, and similar to the rates for USA, Canada, Switzerland and France. Mortality rates in China and Hungary were about three times as high as Australian rates for males and females (see Tables C.2 & C.3 in Appendix C).

Socioeconomic status

There was a general inverse relationship between socioeconomic status and risk of death from cerebrovascular disease for the 1995–1997 period, using the SEIFA Index of Relative Socioeconomic Disadvantage (see Appendix D).

- The male mortality rate for the highest SEIFA group (599 deaths per million population) was significantly lower than the rates for males in the lower three of the five SEIFA groups (ranging between 653 and 680 deaths per million population).
- For females there were no significant differences (Table 6.4).

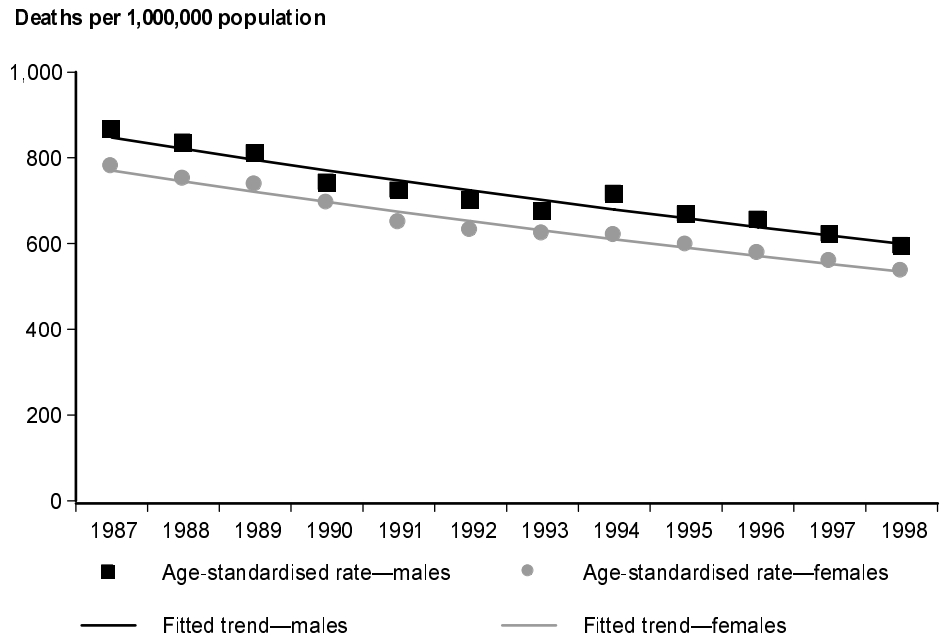


Figure 6.2: Age-standardised mortality rates and fitted trends for cerebrovascular disease, Australia, 1987–1998

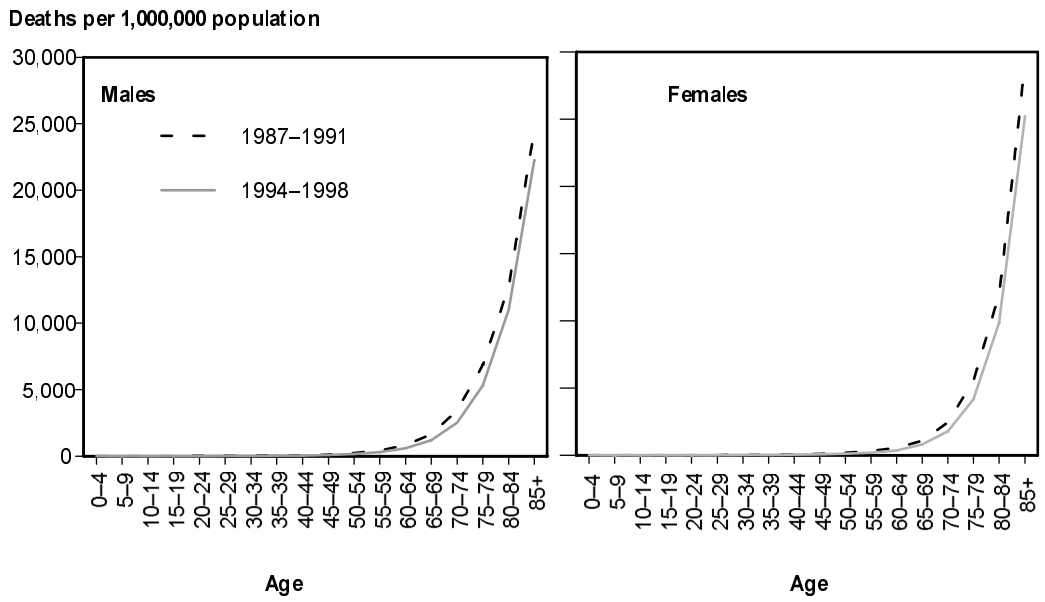


Figure 6.3: Age-specific mortality rates for cerebrovascular disease, by sex, Australia, 1987–1991 and 1994–1998

Table 6.1: Age-specific and age-standardised mortality rates for cerebrovascular disease per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	2	0	0	4	6	13	12	31	82	157	276	523	940	1,753	3,903	7,394	13,685	26,838	625	866
1988	2	0	3	6	18	20	18	36	77	95	208	370	872	1,755	3,686	7,396	13,837	25,419	610	835
1989	2	3	2	10	7	15	38	37	68	93	214	434	795	1,831	3,591	6,869	12,651	25,688	603	810
1990	2	0	3	6	17	20	17	29	72	131	252	390	837	1,450	3,194	6,574	11,637	22,903	563	741
1991	2	0	0	4	3	17	29	33	70	114	201	400	758	1,477	2,849	6,233	12,297	22,546	561	723
1992	6	5	3	1	7	7	21	36	66	107	166	355	651	1,465	2,847	6,442	11,634	21,670	558	701
1993	2	2	0	2	3	13	16	39	41	92	178	297	656	1,279	2,897	5,830	11,234	21,987	548	674
1994	2	5	6	9	4	10	23	35	49	97	143	345	698	1,245	2,763	6,320	11,954	24,361	592	715
1995	0	0	0	2	7	10	14	42	57	91	177	305	617	1,253	2,703	5,487	11,188	22,917	568	667
1996	2	0	3	5	7	8	18	36	55	110	164	293	562	1,248	2,503	5,279	11,270	22,885	571	655
1997	3	0	3	3	11	22	19	21	67	126	174	275	593	1,204	2,423	4,984	10,498	21,057	557	621
1998	3	0	2	5	3	7	22	25	65	101	114	286	548	1,105	2,311	4,662	10,280	20,669	543	593
Females																				
1987	0	0	2	0	6	18	20	29	50	147	174	349	616	1,136	2,766	5,954	13,419	30,804	920	779
1988	0	2	3	3	9	16	30	30	56	106	180	327	632	1,148	2,628	5,926	12,684	29,145	894	750
1989	0	0	3	1	5	13	15	23	77	105	188	352	550	1,167	2,539	5,513	12,144	30,036	893	737
1990	0	0	3	6	6	8	17	32	39	88	182	267	499	984	2,332	5,582	11,706	28,284	853	695
1991	2	2	0	0	12	10	15	35	52	74	208	268	473	985	2,048	5,122	10,274	27,293	814	649
1992	2	5	2	0	10	9	19	28	48	104	177	243	487	926	1,873	4,719	10,552	26,739	812	631
1993	0	0	0	2	10	6	18	32	37	94	145	210	392	819	1,993	4,786	11,118	25,885	825	622
1994	0	2	0	5	8	9	10	26	44	97	102	189	392	860	1,847	4,702	10,570	27,152	845	619
1995	2	2	3	2	1	10	16	28	45	78	116	185	359	841	1,957	4,409	10,132	25,958	834	597
1996	0	3	2	3	4	10	10	21	40	78	139	194	381	823	1,743	4,364	9,530	25,382	826	577
1997	3	2	2	7	3	12	28	31	43	81	122	206	310	787	1,712	3,845	9,658	24,665	820	558
1998	2	2	3	7	8	9	15	38	51	75	109	171	324	691	1,742	3,662	9,450	23,400	802	535

Note: ASMR = age-standardised mortality rate.

Table 6.2: Number of deaths and age-standardised mortality rates for cerebrovascular disease per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	9,555	5,900	4,069	1,910	2,364	732	177	80	24,786
1994–1998	9,477	6,183	4,408	2,113	2,432	793	229	137	25,774
				Deaths per million population					
1987–1991	873	743	777	651	888	808	688	662	792
1994–1998	686	626	633	575	710	725	616	840	648
				Confidence intervals (95%)					
1987–1991	855–891	724–762	753–802	621–681	852–925	748–868	579–798	481–843	782–802
1994–1998	672–700	610–641	614–651	550–600	682–739	674–776	533–699	671–1,009	640–656
Females									
				Deaths					
1987–1991	14,747	9,123	5,717	2,558	3,299	1,054	209	62	36,769
1994–1998	14,341	9,207	6,249	3,000	3,570	1,100	360	107	37,934
				Deaths per million population					
1987–1991	808	676	713	522	799	749	518	571	720
1994–1998	614	545	578	477	646	617	592	717	576
				Confidence intervals (95%)					
1987–1991	794–821	662–690	694–731	502–543	771–826	703–794	447–589	415–728	713–728
1994–1998	604–624	534–557	564–593	459–494	625–668	580–654	530–653	569–864	570–582

Table 6.3: Age-standardised mortality rates for cerebrovascular disease per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	641	629–654	576	567–585
Rural	659	640–678	576	562–591
Remote	606	535–678	563	499–627

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 6.4: Age-standardised mortality rates for cerebrovascular disease per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	599	577–621	564	548–579
2	621	598–645	567	550–585
3	653	630–676	578	560–595
4	658	635–681	568	550–585
5 Low SES	680	657–703	588	571–605

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 6.5: Age-standardised mortality rates per million population for cerebrovascular disease, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Portugal	615	194–1,036	Israel	734	318–1,149
Finland	594	265–922	Switzerland	443	210–676
USA	494	320–669	Portugal	435	169–700
Hungary	461	352–570	Mauritius	400	213–587
Poland	438	302–573	Finland	397	122–672
Australia	**411**	**403–419**	Poland	370	307–433
Germany	402	327–477	**Australia**	**356**	**350–362**
China	381	302–460	China	350	286–415
Malta	378	276–481	Singapore	349	107–591
Canada	378	177–578	USA	341	216–466
New Zealand	374	310–437	Korea	334	113–554
Switzerland	370	128–612	Canada	327	166–487
Netherlands	353	266–440	New Zealand	310	261–358
United Kingdom and Ireland	341	325–357	Germany	306	258–355
Singapore	327	93–561	Netherlands	301	248–355
Israel	325	0–692	United Kingdom and Ireland	296	283–309
Mauritius	322	97–547	Austria	286	198–373
Austria	313	199–427	Malta	283	200–366
Italy	311	281–341	France	273	115–430
Greece	290	238–342	Hungary	264	187–341
Hong Kong and Macau	285	105–464	Italy	251	225–277
Korea	254	34–474	Greece	218	177–258
Chile	248	0–525	Hong Kong and Macau	190	62–318
France	241	56–425	Chile	128	0–259
Japan	186	0–478	Japan	74	0–177

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

7 Lung cancer

Disease characteristics

Lung cancer is the most commonly diagnosed form of cancer in Australia and occurs in parts of the lung or the windpipe. Smoking is responsible for over 85% of lung cancer cases and for the high incidence of lung cancer from the 1940s onwards (Fauci et al. (eds) 1999). Some forms of lung cancer are also caused by exposure to air-borne particles (e.g. asbestos fibres). Lung cancer is usually detected as a result of a persistent cough, coughing up blood, breathlessness, or through spread to other parts of the body (e.g. bones, liver). A chest X-ray and tissue sample usually confirms the cancer. Survival after diagnosis from lung cancer is poor, with only about 10% of males and 12% of females diagnosed surviving 5 years or longer (AIHW & AACR 2001; Coates & Tracey 2000).

An estimated 1 in 22 males and 1 in 60 females will die from lung cancer before the age of 75. It is estimated that there are about 45,000 PYLL each year because of death from lung cancer before age 75, making it a major cause of premature death in Australia (ranked fifth on this measure).

Historic view

Lung cancer is the leading cause of cancer death for males and the third most common cause for females in Australia, with 532 male deaths and 186 female deaths per million population in 1998. This corresponded to 4,821 male deaths and 2,053 female deaths.

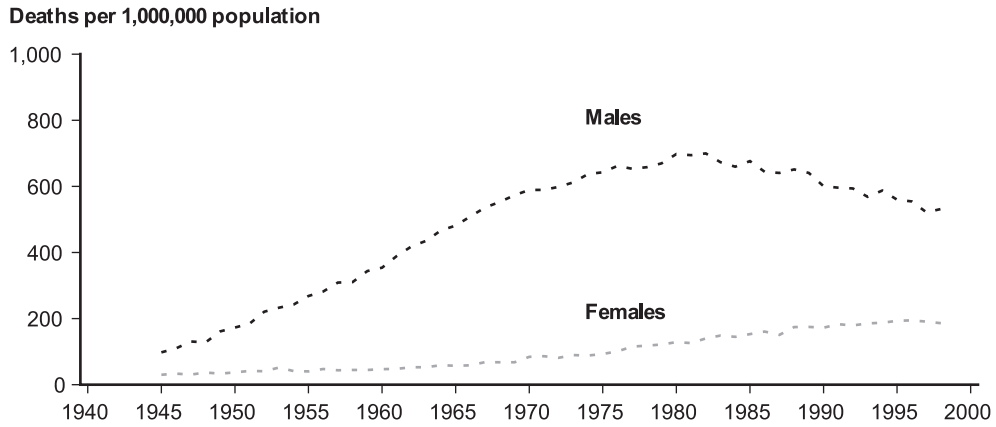


Figure 7.1: Age-standardised mortality rates for lung cancer, Australia, 1945–1998

The collection of data specific to lung cancer began in 1945 during the 5th revision of the ICD. In 1945 the lung cancer mortality rates for males and females were relatively low at 97 and 30 deaths per million population. The number of deaths was 316 males and 99 females. Since then the rate has grown rapidly for males, peaking at 700 deaths per million population in 1982. During the 1982 to 1998 period the rate decreased at about 2% each year and the rate of decline has continued to increase over the last 5 years to 3.5% (Figure 7.1). In

contrast, the rate for females has been increasing by more than 4% each year during the 1987–1996 period. The rate appears to have slowed during 1997–1998.

Lung cancer can take up to 20 years to develop, and, given this timelag, the overall trend in lung cancer mortality 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 (Waters & Bennett 1995). This decline in smoking has been more substantial in males than females (Hill et al. 1998) and it is expected to continue to lower lung cancer mortality rates for males. For females, the mortality rate is expected to increase as the smoking rates are increasing in younger females and are steady in older females.

Age–sex distribution

In 1998, the mortality rate from lung cancer for males (517 deaths per million population) was significantly greater than that for females (218) (Figure 7.1).

- In 1998, 86% of male lung cancer deaths occurred from the age of 60 onwards and 35% occurred from age 75.
- For females, 82% of deaths occurred from age 60 and over and 38% occurred from age 75.
- The risk of death from lung cancer flattens out for females from age 70, at about 1,300 deaths per million population, while for males it continues to climb because the prevalence of smoking for males rose before it did for females (a cohort effect) (Table 7.1).

Twelve-year trends 1987–1998

There has been a significant and consistent downward trend in lung cancer mortality rates in males since 1987 of about 1.9% each year, but a significant increase in females of 1.4% each year (Figure 7.2). A comparison of mortality rates (per million) between 1987–1991 and 1994–1998 shows a reduction from 625 to 550 in males and an increase from 171 to 190 in females. While there has been a general decline in mortality rates for males after the age of 35, the greatest fall in lung cancer mortality rates has been in males aged under 65 years. In contrast, the greatest increases of rates in females have been in those aged between 65 and 84 (Table 7.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The rates of lung cancer decreased between the periods 1987–1991 and 1994–1998 for males in all States and Territories except the Northern Territory (Table 7.2). The rates for females all increased except in South Australia, Tasmania and the Australian Capital Territory. The

mortality rate for lung cancer also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national lung cancer mortality rate:

- The mortality rate for males in Victoria was significantly higher.
- The mortality rate for males in Western Australia was significantly lower.
- Mortality rates for females in Tasmania and the Northern Territory were significantly higher.
- The mortality rate for females in Queensland was significantly lower.

During the 1992–98 period:

- Mortality rates for males in Victoria, Tasmania and the Northern Territory were significantly higher.
- The mortality rate for males in the Australian Capital Territory was significantly lower.
- Mortality rates for females in Victoria and the Northern Territory were significantly higher.
- The mortality rate for females in Queensland was significantly lower.

Geographic category (by metropolitan, rural and remote area)

Mortality rates were highest in remote areas although there were no significant differences by area for males. The mortality rate for females in remote areas (245 deaths per million population) was 26% higher than in metropolitan areas (194) and 32% higher than in rural areas (185) (Table 7.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for lung cancer for Australian males born in Australia was 396 deaths per million population (Table 7.5).

- Mortality rates for Australian males born in Korea, Hong Kong and Macau, Japan, Chile, Singapore, Mauritius, Greece, China and New Zealand were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian males born in Malta, the Netherlands and the United Kingdom and Ireland were significantly higher than for Australian males born in Australia.

For the period 1992–1994, the world-standardised mortality rate for lung cancer for Australian females born in Australia was 134 deaths per million population (Table 7.5).

- Mortality rates for Australian females born in Greece, Portugal, Korea, Malta and Italy were significantly lower than for Australian females born in Australia.
- The mortality rate for Australian females born in the United Kingdom and Ireland was significantly higher than for Australian females born in Australia.

The mortality rates for Australian males born in Hungary and Poland were about half the rate of their Hungarian and Polish counterparts living in Hungary and Poland, and Australian females born in Germany had rates about 1.5 times the mortality rate of their German counterparts in Germany.

International comparisons

Compared internationally, lung cancer mortality rates for Australian males and females were mid-range.

- Australian males had a rate similar to Finnish and Austrian males, and Australian females had a rate similar to Austrian Polish and Dutch females.
- Mortality rates were higher for males in Hungary, Poland and the Netherlands (1.5 to 2.0 times the rate for Australian males).
- Mortality rates for females were higher in the USA and Canada (about 1.5 to 2.0 times the Australian rate) (see Tables C.2 & C.3 in Appendix C).

Socioeconomic status

Socioeconomic status is an important factor in the prevalence of smoking in males and females. This factor is demonstrated in lung cancer mortality rates where there is a clear inverse relationship with socioeconomic status, using the SEIFA Index of Relative Socioeconomic Disadvantage (Table 7.4; Figure 7.3) (see Appendix D).

- The mortality rate was almost 55% higher for males in the lowest of the five SEIFA groups (about 619 deaths per million population) than for males in the highest SEIFA group (399).
- In females the relationship was not quite so strong, but the difference between the highest SEIFA and lowest SEIFA groups (about 25%) was nevertheless significant.

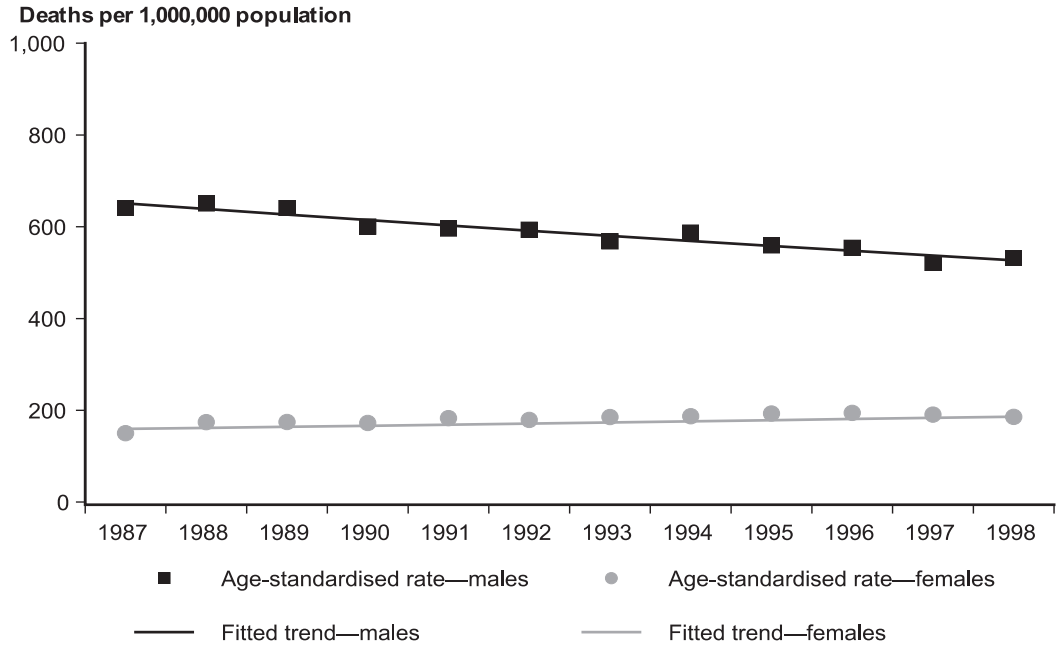
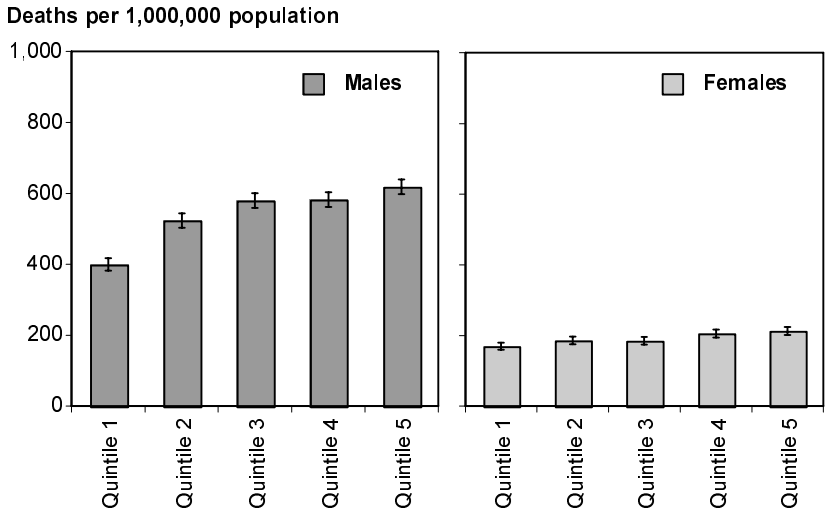


Figure 7.2: Age-standardised mortality rates and fitted trends for lung cancer, Australia, 1987–1998



Notes

1. The population has been divided into five segments: Quintile 1 represents the highest socioeconomic status, and Quintile 5 the lowest.
2. Bars on graphs represent 95% confidence intervals.

Figure 7.3: Age-standardised mortality rates for lung cancer by socioeconomic status and sex, Australia, 1995–1997

Table 7.1: Age-specific and age-standardised mortality rates for lung cancer per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	0	0	0	0	8	25	71	257	549	1,230	2,003	3,058	3,964	4,823	4,988	4,882	549	640
1988	0	0	0	0	0	1	3	30	75	254	536	1,175	2,102	2,888	4,100	5,301	5,069	4,910	561	651
1989	0	0	0	0	0	1	12	20	87	259	525	1,080	1,955	3,134	3,921	4,880	5,541	4,652	556	640
1990	0	0	0	0	1	1	3	12	70	216	454	1,066	1,879	2,852	3,598	4,698	5,299	4,667	525	600
1991	0	0	0	0	0	1	4	18	64	220	484	1,043	1,794	3,008	3,646	4,478	4,940	4,749	529	596
1992	0	0	0	0	1	4	7	19	64	182	491	1,042	1,844	2,954	3,804	4,375	4,991	4,266	535	594
1993	0	0	0	0	1	1	7	19	73	181	412	907	1,841	2,571	3,707	4,391	4,936	4,509	517	568
1994	0	0	0	2	0	0	4	23	68	154	434	909	1,700	2,794	4,018	4,661	4,658	5,124	541	587
1995	0	0	0	0	1	3	8	21	42	172	395	814	1,612	2,703	3,777	4,177	5,195	4,774	522	559
1996	0	0	0	0	0	0	3	18	49	148	444	762	1,600	2,640	3,618	4,527	5,016	4,610	524	554
1997	0	1	0	0	0	0	6	12	45	146	343	755	1,551	2,350	3,522	4,193	4,738	4,641	500	521
1998	0	0	0	1	3	1	3	17	54	147	347	744	1,488	2,492	3,706	4,224	4,715	4,729	517	532
Females																				
1987	0	0	0	0	0	3	3	27	47	102	234	270	529	683	883	960	913	730	159	150
1988	0	0	0	0	0	0	5	19	60	119	178	380	646	820	1,062	1,127	1,054	711	186	174
1989	0	0	0	0	0	3	6	12	65	116	200	410	621	779	1,185	968	1,091	698	186	175
1990	0	2	0	0	0	1	4	24	52	100	192	362	612	843	1,035	1,119	1,026	833	186	172
1991	0	0	0	0	1	3	6	14	45	119	232	374	657	837	1,137	1,255	1,073	818	199	183
1992	0	0	0	0	1	0	6	9	39	91	210	344	600	870	1,053	1,362	1,070	1,090	198	179
1993	0	0	2	0	0	1	3	16	42	112	235	357	576	903	1,150	1,317	1,181	977	206	185
1994	0	0	0	0	0	1	1	20	29	106	249	384	546	875	1,217	1,383	1,268	863	210	187
1995	0	0	0	0	1	0	4	10	48	102	252	306	611	909	1,220	1,431	1,351	1,079	220	193
1996	0	0	0	0	0	0	7	21	38	103	251	398	611	908	1,098	1,436	1,331	1,208	223	194
1997	0	0	0	0	1	0	3	11	46	111	218	381	568	927	1,179	1,369	1,341	1,060	221	191
1998	0	0	0	0	0	1	6	12	40	85	196	373	546	869	1,228	1,325	1,400	1,064	218	186

Note: ASMR = age-standardised mortality rate.

Table 7.2: Number of deaths and age-standardised mortality rates for lung cancer per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	8,095	6,016	3,768	1,914	2,009	672	188	117	22,778
1994–1998	8,150	6,138	4,252	2,038	2,063	721	179	164	23,705
				Deaths per million population					
1987–1991	624	655	620	564	660	647	543	740	625
1994–1998	540	573	560	523	560	611	376	903	550
				Confidence intervals (95%)					
1987–1991	611–638	638–672	600–640	538–590	631–690	597–696	457–629	581–898	617–633
1994–1998	529–552	559–587	544–577	500–546	536–585	566–656	318–434	742–1,063	543–557
Females									
				Deaths					
1987–1991	2,755	2,119	1,011	736	690	264	96	42	7,713
1994–1998	3,540	2,758	1,559	890	823	296	114	64	10,045
				Deaths per million population					
1987–1991	169	182	141	174	186	215	214	301	171
1994–1998	190	203	177	184	184	209	185	334	190
				Confidence intervals (95%)					
1987–1991	163–176	174–189	132–150	161–186	172–200	189–241	170–257	197–404	167–175
1994–1998	183–196	196–211	168–185	172–196	172–197	185–234	150–219	243–425	186–194

Table 7.3: Age-standardised mortality rates for lung cancer per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	544	533–555	194	188–200
Rural	542	525–558	185	176–194
Remote	601	534–667	245	201–289

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 7.4: Age-standardised mortality rates for lung cancer per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	399	382–417	170	160–180
2	523	503–544	186	175–197
3	580	559–601	185	174–196
4	583	562–604	206	195–217
5 Low SES	619	598–640	213	202–224

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 7.5: Age-standardised mortality rates per million population for lung cancer, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Israel	738	184–1,293	Japan	233	25–440
Malta	663	538–789	Canada	203	49–358
Netherlands	570	496–645	United Kingdom and Ireland	193	179–206
France	551	290–813	Hungary	185	113–257
United Kingdom and Ireland	458	438–478	USA	183	66–299
USA	437	290–584	Switzerland	157	0–316
Hungary	431	324–539	Austria	151	65–238
Finland	423	169–676	New Zealand	149	106–191
Canada	419	216–621	Germany	148	113–183
Poland	413	334–492	Finland	136	2–270
Australia	**396**	**388–404**	**Australia**	**134**	**129–139**
Italy	396	363–430	China	129	86–172
Germany	391	326–456	Netherlands	128	91–165
New Zealand	322	260–384	France	126	14–238
Austria	321	205–437	Hong Kong and Macau	107	12–201
China	293	224–363	Singapore	102	0–209
Greece	288	239–337	Mauritius	100	2–198
Portugal	244	45–443	Poland	94	56–131
Switzerland	241	27–455	Chile	62	0–150
Mauritius	224	67–381	Israel	47	0–140
Singapore	138	0–294	Italy	45	32–58
Chile	130	0–296	Malta	37	7–67
Japan	106	0–314	Korea	31	0–92
Hong Kong and Macau	92	3–181	Portugal	20	0–60
Korea	61	0–179	Greece	20	7–32

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

8 Prostate cancer in males

Disease characteristics

Prostate cancer is not common in males younger than 40 years of age. But as age increases, so does prostate cancer mortality, and from the age of 80 years, prostate cancer is the most common cause of cancer death in males. While prostate cancer becomes more common with age, there are many males who may live with prostate cancer for years, or die from other causes without the cancer ever having been detected.

In 1996, the Australian Health Technology Advisory Committee (AHTAC) undertook a review of the benefits, risks and costs of prostate cancer screening. AHTAC concluded that an effective screening program was not yet possible, and recommended further research be undertaken into prostate cancer and the advancing technologies available for its screening, diagnosis and treatment.

In 1998, prostate cancer was responsible for about 6,000 PYLL before the age of 75 years. Prostate cancer is more common in older males, and is therefore not considered a leading cause of premature death. For instance, when compared with colorectal cancer mortality, prostate cancer has a similar number of deaths for males but about a third of the associated PYLL.

Historic view

Since 1921 (when national collection began for prostate cancer mortality data), the death rate for prostate cancer as been increasing slowly. The early 1990s saw a rise in the death rate for prostate cancer. Some of this increase may be attributed to greater efforts in detecting the cancer through PSA (prostate specific antigen) testing. Over the past 5 years to 1998, the rate has been decreasing by 4.2% per annum.

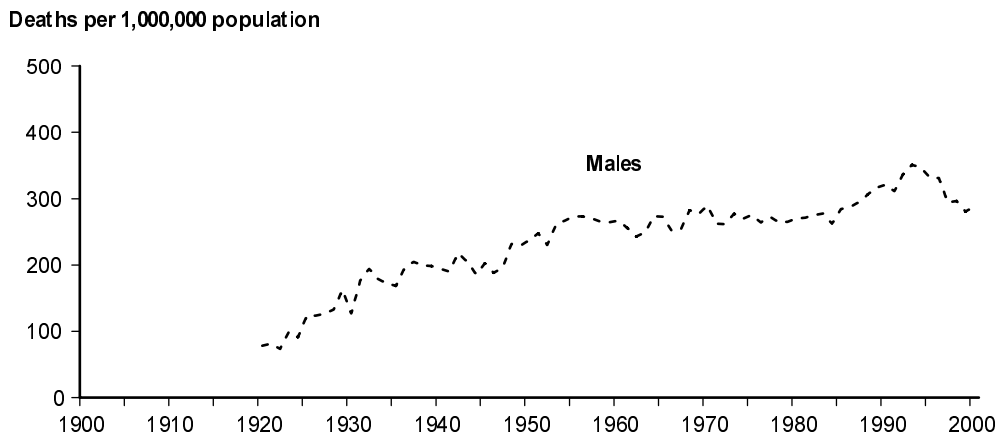


Figure 8.1: Age-standardised mortality rates for prostate cancer, Australia, 1921–1998

Age distribution

In 1998, there were 2,556 deaths due to prostate cancer—3.8% of all male deaths. The mortality rate for prostate cancer was 296 deaths per million. Prostate cancer mortality increases with age and, in 1998, 83% of prostate cancer deaths occurred in males aged 70 years and older, and 44% occurred in males aged 80 years and older (Table 8.1).

Twelve-year trends 1987–1998

For the period 1987–1998, prostate cancer mortality rates increased significantly, by 2.3% per year. There were no statistically significant trends in age-specific mortality rates.

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

Between the periods 1987–1991 and 1994–1998, prostate cancer mortality increased in Victoria. There were no statistically significant changes in the other States and Territories between the two periods.

During the 1987–1991 period, there were no statistically significant differences for any of the States and Territories compared with the national prostate cancer mortality rate.

During the 1994–1998 period, mortality rates were significantly higher in Victoria and Tasmania when compared with the national prostate cancer mortality rate, and significantly lower in the Northern Territory.

Geographic category (by metropolitan, rural and remote area)

The mortality rates for prostate cancer did not vary statistically significantly between geographic areas: the rate was highest for males living in rural areas (319 deaths per million population) and lowest for those living in metropolitan areas (298) (Table 8.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for prostate cancer for Australian males born in Australia was 216 deaths per million population (Table 8.5).

Socioeconomic status

There were no statistically significant differences in prostate cancer mortality, using the SEIFA Index of Relative Socioeconomic Disadvantage (see Appendix D) (Table 8.4).

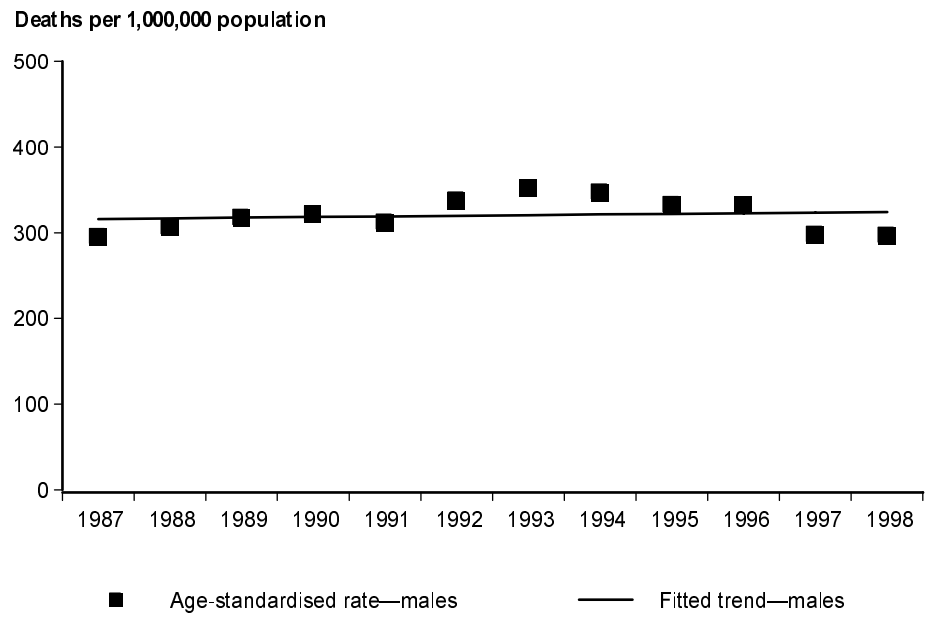


Figure 8.2: Age-standardised mortality rates and fitted trend for prostate cancer, Australia, 1987–1998

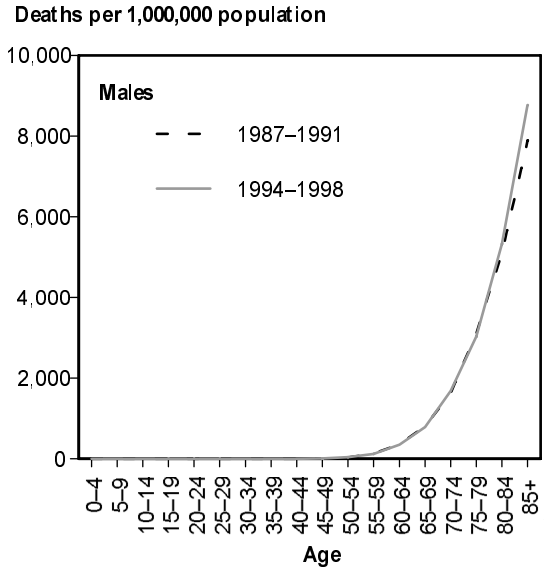


Figure 8.3: Age-specific mortality rates for prostate cancer, Australia, 1987–1991 and 1995–1997

Table 8.1: Age-specific and age-standardised mortality rates for prostate cancer per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
1987	0	0	0	0	0	0	0	0	2	11	21	124	363	800	1,447	2,869	4,988	7,641	215	295
1988	0	0	0	0	0	0	0	0	2	13	28	136	349	770	1,707	3,136	5,042	7,391	228	306
1989	0	0	0	0	0	0	0	0	3	8	42	143	392	785	1,583	3,318	5,281	7,854	240	317
1990	0	0	0	0	0	0	0	0	2	6	29	95	332	825	1,827	3,177	5,150	8,517	246	321
1991	0	0	0	0	0	0	0	0	2	13	30	150	352	840	1,589	3,107	5,118	7,960	245	311
1992	0	0	0	0	1	0	0	1	2	9	43	147	347	932	1,906	2,999	5,659	8,808	272	337
1993	0	0	0	0	0	0	0	0	0	10	39	149	346	946	1,776	3,509	5,665	9,533	289	351
1994	0	0	0	0	0	0	0	0	0	11	34	124	372	830	1,835	3,454	5,632	9,516	291	347
1995	0	0	0	0	0	0	0	0	5	11	40	113	413	829	1,752	3,133	5,438	9,037	286	332
1996	0	0	0	0	0	0	0	0	1	15	35	133	328	836	1,691	3,185	5,309	9,552	292	331
1997	0	0	0	3	0	0	0	0	3	6	36	119	303	750	1,542	2,798	4,925	8,319	268	297
1998	0	0	0	0	0	0	1	0	3	14	44	120	315	695	1,603	2,685	5,386	7,691	274	296

Note: ASMR = age-standardised mortality rate.

Table 8.2: Number of deaths and age-standardised mortality rates for prostate cancer per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					Deaths				
1987–1991	3,534	2,551	1,658	787	920	299	74	25	9,848
1994–1998	4,407	3,430	2,282	1,012	1,159	415	121	28	12,853
					Deaths per million population				
1987–1991	316	318	310	294	306	331	295	295	310
1994–1998	313	344	324	295	309	374	302	220	320
					Confidence intervals (95%)				
1987–1991	306–327	306–331	295–325	273–315	285–326	292–369	222–367	165–425	304–317
1994–1998	304–322	332–355	311–337	277–314	291–327	337–410	246–358	131–310	314–325

Table 8.3: Age-standardised mortality rates for prostate cancer per million population, by geographic area, 1995–1997

	Males	
Geographic area	ASMR	95% confidence interval
Metropolitan	298	289–306
Rural	319	306–332
Remote	313	262–363

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 8.4: Age-standardised mortality rates for prostate cancer per million population, by socioeconomic status, 1995–1997

	Males	
SEIFA quintile	ASMR	95% confidence interval
1 High SES	318.6	303–334
2	311.0	295–327
3	309.4	294–325
4	333.7	317–350
5 Low SES	321.9	306–337

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 8.5: Age-standardised mortality rates per million population for prostate cancer, by birthplace, 1992–1994

Country of birth	ASMR (world)	95% CI
Finland	332	83–582
Chile	235	0–511
Israel	233	0–556
United Kingdom & Ireland	228	215–241
Australia	**216**	**210–222**
Canada	206	65–347
Hong Kong & Macau	205	41–368
New Zealand	203	156–250
Germany	199	147–251
Mauritius	193	31–354
Austria	191	103–279
USA	183	99–267
France	167	16–317
Switzerland	165	3–327
Italy	165	143–187
Hungary	162	103–221
Poland	153	117–189
Netherlands	151	114–189
Greece	136	100–172
Malta	129	73–186
Japan	110	0–327
China	97	56–138
Singapore	46	0–136
Portugal	23	0–67
Korea	0	0–0

Notes

1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

9 Breast cancer in females

Disease characteristics

Breast cancer is the most commonly diagnosed cancer in Australian females after non-melanocytic skin cancer. Most breast cancers originate in the cells that line the lobules (small lobes of the breast that produce milk) and the ducts that carry the milk from the lobules (AIHW 1998b).

Breast cancers can often be felt as lumps, but most of detected lumps are not breast cancers. If the growth does prove to be a cancer, the most important factor for prognosis is the size at the time of diagnosis as smaller growths signal a lower probability of the cancer having spread to the lymph nodes and therefore a higher chance of cure.

Known risk factors account for only one-third of all breast cancers. The most important risk factors are age over 50 years; significant family history of breast cancer (first degree relative with breast cancer occurring before the age of 50 years of age or more than one relative on the same side of the family affected); and a previous history of certain benign breast diseases.

Other risk factors include: larger body size; late age for first-born child; no births; early age at onset of menstruation and late age at menopause; long-term use of hormone replacement therapy and exposure of breast tissue to ionising radiation (especially before the age of 20 years) (DHAC & AIHW 1998a).

Mammographic screening is important in detecting small breast cancers, and BreastScreen Australia (the National Breast Cancer Screening Program) currently recommends that females over the age of 50 be screened once every 2 years.

For the period 1992–1997, the proportion of those with breast cancer that survived for at least one years after diagnosis was 96%, and 84% survived for at least five years. An estimated 1 in 48 women will die of breast cancer before age 75. Females diagnosed with breast cancer while aged in their 40s had a better survival rate than those in any other age group, and females in their 80s and 90s had the worst survival rate (AIHW, AACR & NHMRC 1998). It is estimated that there are about 30,000 PYLL before the age of 75 each year, making breast cancer the leading cause of premature death for females in Australia.

Historic view

In 1998, there were 2,568 deaths of females due to breast cancer (232 deaths per million population). In 1907 the mortality rate for breast cancer was 189 deaths per million population with 193 deaths. This rate increased to 302 deaths per million population by 1943, and there were minor fluctuations in the rates between 1943 and 1985. Since 1985 the overall rate has declined by 1.0% per annum, and the fall has been more pronounced since 1993, with the mortality rate falling by 3.0% per year (Figure 9.1). The mortality rate for breast cancer is expected to continue declining over the next 10 to 20 years because of public health initiatives such as screening followed by appropriate medical intervention.

It is important to note that breast cancer mortality rates are decreasing despite increasing incidence rates. While part of the sharp increase in incidence between 1992–1994

corresponds to the introduction of the national screening program in 1991, there is evidence of an increase in the underlying incidence rate as well (AIHW 2000b).

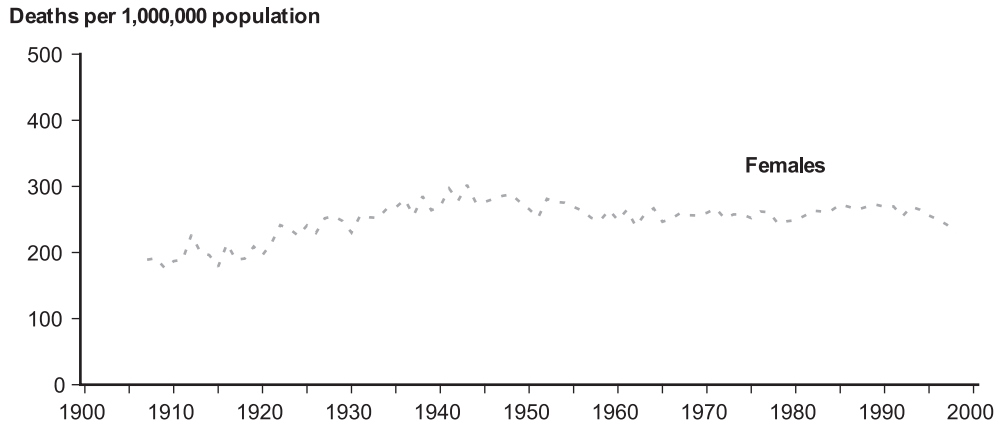


Figure 9.1: Age-standardised mortality rates for female breast cancer, Australia, 1907–1998

Age distribution

Breast cancer is the most common cause of cancer death for women, comprising 17% of all female cancer deaths in 1998. Four per cent of deaths in women are due to breast cancer. The risk of death from breast cancer begins to increase more markedly from about age 40, with 63% of deaths occurring after the age of 60 and 33% occurring after age 75 (Table 9.1).

Twelve-year trends 1987–1998

For the period 1987–1993, mortality rates fluctuated slightly, but since 1993 there has been a slight but consistent decline. The mortality rate for females in 1998 was 232 deaths per million population (Table 9.1, Figure 9.2). Over the 1987–1998 period, mortality rates decreased significantly by 6.1% per year.

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

Breast cancer mortality rates decreased in all States and Territories except Western Australia between the two periods (1987–1991 and 1994–1998) (Table 9.2). The mortality rates for breast cancer in females showed some variation among the States and Territories. During the 1987–1991 period, compared with the national breast cancer mortality rates:

- The mortality rate due to breast cancer was significantly higher in Victoria.
- Mortality rates due to breast cancer were significantly lower in Queensland and Western Australia.

During the 1994–1998 period:

- The mortality rate was significantly higher in Victoria.
- The mortality rate was significantly lower in the Northern Territory.

Geographic category (by metropolitan, rural and remote area)

The mortality rates from breast cancer did not vary significantly between geographic areas: the rate was highest for females living in metropolitan areas (252 deaths per million population) and lowest for those living in remote areas (231) (Table 9.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for breast cancer for Australian females born in Australia was 204 deaths per million population (Table 9.5).

- The mortality rates for Australian females born in Korea, Japan, China, Singapore and Greece were significantly lower than for Australian females born in Australia.
- The mortality rate for Australian females born in the United Kingdom and Ireland was significantly higher than for Australian females born in Australia.

International comparisons

The Australian mortality rate for breast cancer in females is 141 deaths per million population and similar to those for the USA, Austria, Canada, Germany, Switzerland, France and Italy. The Netherlands and the United Kingdom and Ireland have rates 1.3 times the Australian rate for females, while Greece and Poland have rates about 0.8 times the Australian rate for females (see Tables C.2 & C.3 in Appendix C).

Socioeconomic status

In contrast to patterns for most diseases, breast cancer mortality rates were greatest in the higher socioeconomic status groups, using the SEIFA Index of Relative Socioeconomic Disadvantage (see Appendix D), although the difference between the groups was not statistically significant (Table 9.4).

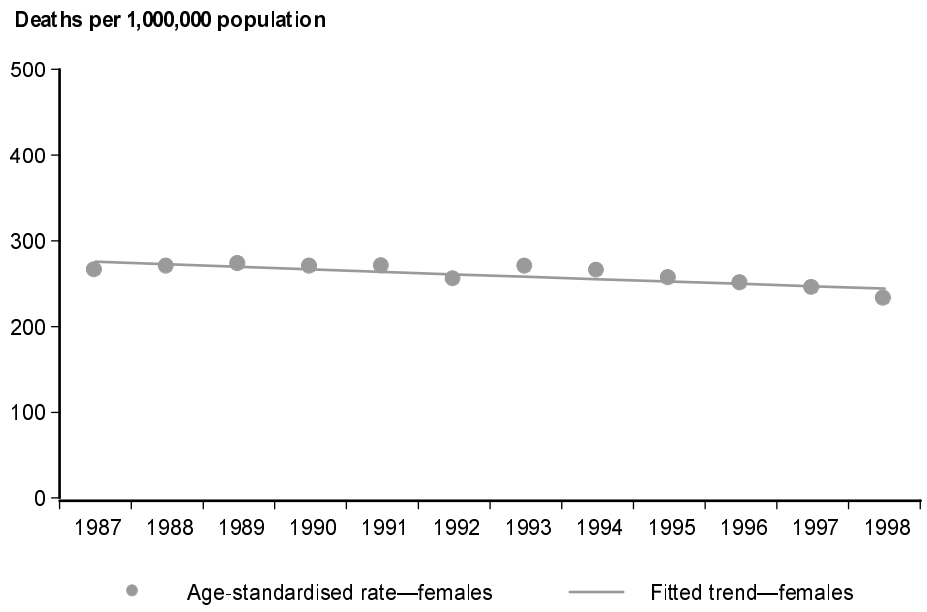
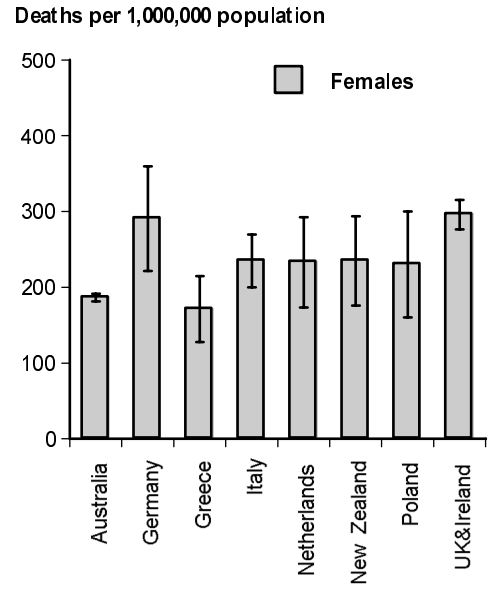


Figure 9.2: Age-standardised mortality rates and fitted trend for female breast cancer, Australia, 1987–1998



Note: Bars on graphs represent 95% confidence intervals.

Figure 9.3: Age-standardised mortality rates for female breast cancer by country of birth and sex, Australia, 1992–1994

Table 9.1: Age-specific and age-standardised mortality rates for female breast cancer per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
1987	0	0	0	0	3	15	48	123	235	313	571	678	747	819	981	1,182	1,365	2,274	277	265
1988	0	0	0	0	0	7	41	106	214	356	546	668	803	899	957	1,258	1,457	2,274	283	269
1989	0	0	0	0	2	10	52	105	235	379	555	612	791	884	963	1,238	1,562	2,354	288	272
1990	0	0	0	0	0	8	39	97	246	357	581	610	777	961	972	1,174	1,500	2,112	286	269
1991	0	0	0	0	3	17	37	122	239	360	574	647	711	888	1,102	1,126	1,479	2,127	290	270
1992	0	0	0	0	1	6	47	120	217	371	509	609	660	788	1,002	1,131	1,433	2,179	278	254
1993	0	2	0	0	0	3	55	109	182	360	530	684	784	906	886	1,322	1,655	2,241	298	269
1994	0	0	0	0	1	3	26	128	216	361	539	659	748	835	990	1,229	1,525	2,172	296	265
1995	0	0	0	0	1	7	36	81	183	342	475	640	765	912	910	1,230	1,531	2,129	290	256
1996	0	0	0	0	0	13	40	126	205	302	472	601	737	832	923	1,169	1,455	1,970	285	250
1997	0	0	0	0	1	8	52	115	197	333	512	573	665	821	923	1,118	1,388	1,788	282	244
1998	0	0	0	0	3	10	40	92	184	320	469	536	699	727	821	1,135	1,308	1,942	273	232

Note: ASMR = age-standardised mortality rate.

Table 9.2: Number of deaths and age-standardised mortality rates for female breast cancer per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					Deaths				
1987–1991	4,279	3,422	1,720	983	1,082	328	152	33	11,999
1994–1998	4,441	3,635	2,144	1,133	1,207	326	181	36	13,051
					Deaths per million population				
1987–1991	270	296	241	241	288	266	305	206	269
1994–1998	243	274	237	243	260	230	278	177	248
					Confidence intervals (95%)				
1987–1991	262–278	286–306	229–252	226–257	271–305	237–295	255–355	125–286	264–274
1994–1998	235–250	265–283	227–247	228–257	245–275	204–255	237–320	112–242	244–252

Table 9.3: Age-standardised mortality rates for female breast cancer per million population, by geographic area, 1995–1997

Geographic area	Females	
	ASMR	95% confidence interval
Metropolitan	252	246–259
Rural	246	235–256
Remote	231	190–271

Note: ASMR = age-standardised mortality rate
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 9.4: Age-standardised mortality rates for female breast cancer per million population, by socioeconomic status, 1995–1997

	Females	
SEIFA quintile	ASMR	95% confidence interval
1 High SES	259	246–271
2	272	258–285
3	244	232–257
4	235	222–247
5 Low SES	240	228–252

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 9.5: Age-standardised mortality rates per million population for female breast cancer, Australians by birthplace, 1992–1994

Country of birth	ASMR (world)	95% CI
Israel	359	29–688
Hungary	281	166–396
Mauritius	236	93–378
France	233	78–389
Germany	228	181–274
United Kingdom and Ireland	227	212–243
Australia	**204**	**198–210**
Portugal	201	26–375
USA	191	83–299
Italy	184	156–213
Switzerland	183	3–363
Malta	180	114–246
New Zealand	178	134–222
Netherlands	175	132–219
Poland	171	115–228
Finland	155	2–309
Canada	148	12–285
Greece	142	108–176
Austria	138	62–213
Chile	134	12–256
Hong Kong and Macau	108	16–200
China	85	45–125
Singapore	77	0–173
Japan	59	0–147
Korea	57	0–137

Notes

1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

10 Colorectal cancer

Disease characteristics

Colorectal or bowel cancer starts in the large intestine or the rectum. It is usually detected through the presence of blood in faeces, bowel obstruction or the detection of secondary tumours in other organs. A colonoscopy or sigmoidoscopy with a biopsy usually confirms the cancer. Once colorectal cancer is confirmed it is usually treated by removing the affected part of the bowel, followed by radiotherapy or chemotherapy depending on the extent of the disease.

Although some colorectal cancers are hereditary, the main risk factor for colorectal cancer is a diet high in meat and fat, and low in fruits, vegetables and grains.

The Bowel Cancer Screening Taskforce of the Commonwealth Department of Health and Aging is currently running the Bowel Cancer Screening Pilot Program, with a screening program being planned to begin in 2002.

An estimated 1 in 43 males and 1 in 71 females will die from colorectal cancer before the age of 75. The 5-year survival rate for colorectal cancer is about 55% in Australia (AIHW & AACR 2000). This compares favourably with the rates for England and Wales (39% in 1990), Europe (45% in 1989) and USA (61% in 1990) (Coleman et al. 1999). Colorectal cancer was responsible for about 19,000 PYLL for males and about 14,000 PYLL for females in 1998. It was ranked seventh on this measure for males and sixth for females.

Historic view

Colorectal cancer is the second most common cause of cancer deaths and is responsible for 4% of all deaths, with rates of 288 and 198 per million population for males and females respectively in 1998. This corresponds to 2,605 male deaths and 2,311 female deaths.

Recording of colorectal cancer began in 1921 after the third revision of the ICD. In 1921, colorectal mortality rates were 201 deaths per million population for males and 222 for females. The numbers of deaths were 303 males and 311 females.

Colorectal cancer mortality rates fluctuated over the following decades, beginning with an initial increase in rates between the 1920s and 1940s for males and females. After the early 1940s and the initial increase, differences between the male and female patterns in mortality rates began to appear. For males, the initial increase was followed by a decrease in rates between the early 1940s (321 deaths per million population) and early 1960s (259), before another increase between the early 1960s and late 1980s (323). Since the late 1980s, colorectal cancer mortality rates have been decreasing. For females the initial increase in mortality rates was followed by a general decrease from the early 1940s (310 deaths per million population) that is still continuing (Figure 10.1).

The overall decrease in colorectal cancer mortality rates has resulted from a combination of factors:

- identifying families at higher risk due to inherited genetic characteristics (e.g. familial adenomatous polyposis);
- improved diet;

- more timely diagnosis (faecal occult blood tests and colonoscopy); and
- improved clinical management (Ireland & Giles 1993).

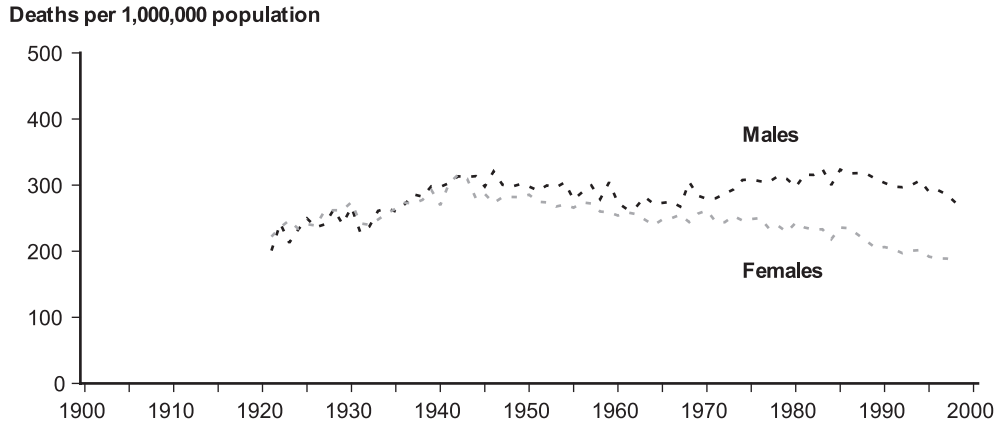


Figure 10.1: Age-standardised mortality rates for colorectal cancer, Australia, 1921–1998

Age–sex distribution

In 1998, 82% of male deaths occurred from the age of 60 and 38% occurred from age 75. For females, 84% of deaths occurred from age 60 onwards and 50% occurred from age 75. The age distribution for risk of colorectal cancer death has been consistent over the 1987–1998 period with deaths from colorectal cancer occurring in later life (Table 10.1).

Twelve-year trends 1987–1998

Over the 1987–1998 period, there has been a small but significant downward trend in colorectal cancer mortality rates in males of about 1.1% per year, while for females no significant decrease in mortality rates was detected (Figure 10.2). However, there were significant declines in colorectal cancer rates for some age groups, males and females aged 45–54 years—the ages at which screening trials have been targeted, males and females aged 75 years and older, and males aged 60–64 years (Table 10.1).

Geographical differences in mortality

As discussed in Chapter 4, regional differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The rates of colorectal cancer decreased between the periods 1987–1991 and 1994–1998 for males and females in all States and Territories except for males in Western Australia, and

females in Tasmania and the Northern Territory (Table 10.2). The mortality rate for colorectal cancer also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national colorectal cancer mortality rate:

- The mortality rate for males in Victoria was significantly higher.
- The mortality rate for males in Western Australia was significantly lower.
- Mortality rates for females in Victoria and South Australia were significantly higher.
- Mortality rates for females in New South Wales and Western Australia were significantly lower.

During the 1994–1998 period:

- Mortality rates for males in Victoria and Tasmania were significantly higher.
- Mortality rates for females in Victoria, South Australia and Tasmania were significantly higher.
- Mortality rates for females in New South Wales and Western Australia were significantly lower.

Geographic category (by metropolitan, rural and remote area)

For 1995–1997, the mortality rate was highest for males in rural areas, although the differences among the geographical areas were not statistically significant. For females, there were significant differences between all areas, with the mortality rate highest in rural areas (219 deaths per million population) followed by those in metropolitan (194) and remote areas (150) (Table 10.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for colorectal cancer for Australian males and females born in Australia was 246 deaths per million population for males and 177 deaths per million population for females (Table 10.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for colorectal cancer than Australian males and females born in Australia.

Socioeconomic status

For the period 1995–1997 there were no clear trends in colorectal cancer mortality rates by socioeconomic status for either males or females. Mortality rates across the five SEIFA groups varied by less than 8% for males and females, using the SEIFA Index of Relative Socioeconomic Disadvantage (Table 10.4) (see Appendix D).

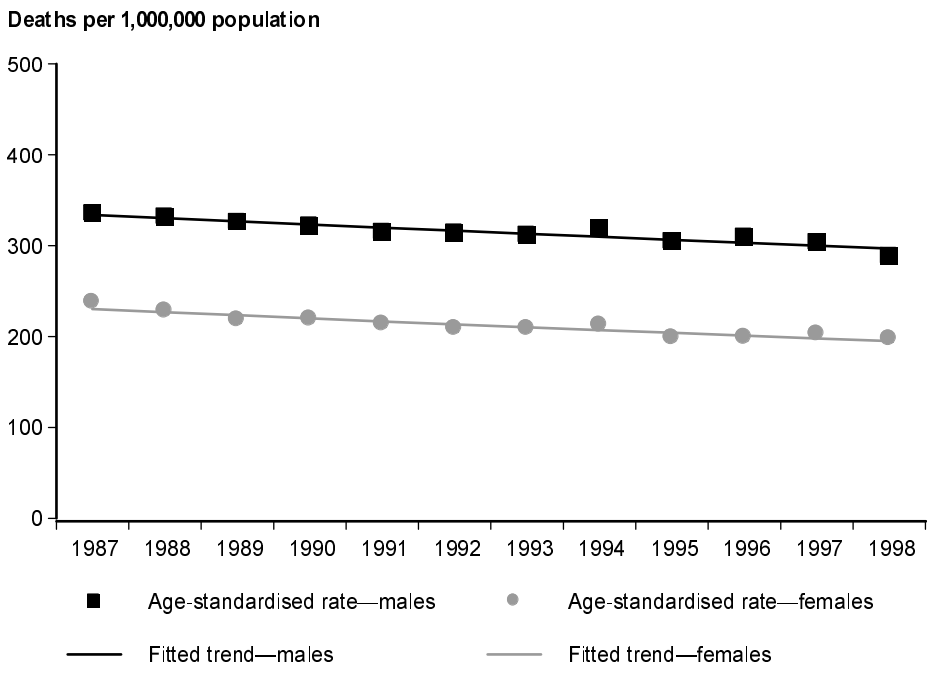
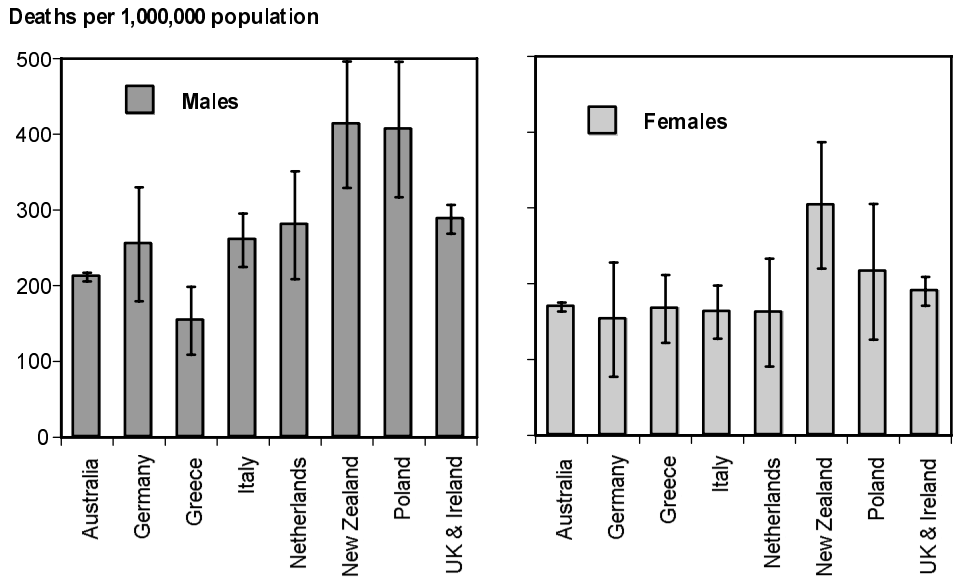


Figure 10.2: Age-standardised mortality rates and fitted trends for colorectal cancer, Australia, 1987–1998



Note: Bars on graphs represent 95% confidence intervals.

Figure 10.3: Age-standardised mortality rates for colorectal cancer by country of birth and sex, Australia, 1995–1997

Table 10.1: Age-specific and age-standardised mortality rates for colorectal cancer per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	0	0	1	6	14	22	52	177	346	507	971	1,194	1,747	2,535	3,396	4,303	278	335
1988	0	0	2	1	3	3	14	20	54	148	343	549	972	1,095	1,754	2,514	3,483	4,223	278	332
1989	0	0	0	0	0	3	9	26	68	143	293	533	921	1,225	1,626	2,243	3,503	4,627	274	326
1990	0	0	0	1	0	8	9	21	67	133	250	496	856	1,332	1,785	2,504	3,120	3,873	276	322
1991	0	0	0	1	0	4	13	24	70	133	327	504	856	1,187	1,685	2,346	3,151	3,890	274	315
1992	0	0	0	0	0	1	11	18	55	125	332	543	811	1,188	1,634	2,302	3,112	4,435	276	314
1993	0	0	0	0	0	6	11	22	55	133	261	521	866	1,231	1,524	2,431	2,897	4,429	278	312
1994	0	0	2	0	4	6	10	19	68	114	270	609	895	1,381	1,710	2,211	2,953	3,810	292	319
1995	0	0	0	0	1	1	8	20	51	126	254	482	840	1,214	1,733	2,147	2,992	4,087	282	305
1996	0	0	0	0	0	6	8	17	49	99	263	481	882	1,357	1,822	2,105	2,966	3,814	291	310
1997	0	1	0	0	3	4	9	19	50	114	246	499	894	1,189	1,779	2,282	2,681	3,804	291	304
1998	0	0	2	0	3	7	16	26	56	117	186	476	786	1,130	1,667	1,980	3,129	3,550	280	288
Females																				
1987	0	0	0	0	0	16	12	27	63	128	296	406	559	810	1,168	1,579	2,448	3,591	261	238
1988	0	0	0	0	0	0	3	30	61	142	254	440	546	805	1,140	1,729	2,108	3,016	251	228
1989	0	0	0	1	5	4	13	22	49	129	247	360	564	747	1,099	1,583	1,951	3,333	243	219
1990	0	0	0	0	6	3	12	21	53	111	284	356	558	786	1,134	1,495	1,952	3,314	245	219
1991	0	0	0	2	1	4	14	18	53	107	242	321	503	831	1,035	1,552	2,097	3,181	243	214
1992	0	0	0	0	0	4	8	25	61	134	217	355	501	717	1,101	1,371	2,120	3,087	240	209
1993	0	0	0	2	4	4	7	26	54	99	205	375	534	706	1,090	1,448	1,996	3,209	244	209
1994	0	0	0	0	0	6	11	14	49	97	172	407	588	801	1,084	1,396	1,890	3,451	252	213
1995	0	0	0	0	3	1	10	25	57	78	193	341	485	751	988	1,440	1,920	2,963	238	199
1996	0	0	0	0	1	7	15	19	43	105	197	336	516	682	1,046	1,403	1,959	2,903	242	199
1997	0	0	2	0	3	6	11	19	36	92	202	387	529	750	1,046	1,303	1,992	3,062	250	203
1998	0	0	0	3	2	1	10	18	52	109	172	307	510	744	1,044	1,508	1,706	2,855	246	198

Note: ASMR = age-standardised mortality rate.

Table 10.2: Number of deaths and age-standardised mortality rates for colorectal cancer per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	4,006	3,267	1,857	889	1,031	354	120	31	11,555
1994–1998	4,364	3,557	2,248	1,133	1,149	406	158	47	13,063
				Deaths per million population					
1987–1991	320	364	311	269	349	350	338	269	326
1994–1998	292	334	299	293	308	345	318	234	305
				Confidence intervals (95%)					
1987–1991	310–330	351–377	297–326	251–287	327–371	313–387	272–405	157–381	320–332
1994–1998	283–301	323–345	287–312	276–310	290–326	311–379	266–369	153–315	299–310
Females									
				Deaths					
1987–1991	3,465	3,038	1,609	855	1,017	324	108	28	10,444
1994–1998	3,721	3,169	1,869	938	1,055	385	120	34	11,292
				Deaths per million population					
1987–1991	207	249	217	195	266	248	247	189	223
1994–1998	189	221	201	183	222	255	193	212	202
				Confidence intervals (95%)					
1987–1991	200–214	240–258	206–227	182–208	249–282	221–275	200–294	111–268	219–228
1994–1998	183–195	213–229	191–210	171–195	209–236	229–281	158–228	134–290	198–206

Table 10.3: Age-standardised mortality rates for colorectal cancer per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	301	293–309	194	188–200
Rural	318	305–331	219	209–228
Remote	291	243–338	150	117–184

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 10.4: Age-standardised mortality rates for colorectal cancer per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	294	279–309	197	186–207
2	305	289–321	201	190–212
3	320	304–335	197	186–208
4	310	294–325	205	194–216
5 Low SES	302	288–317	203	192–214

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 10.5: Age-standardised mortality rates per million population for colorectal cancer, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
New Zealand	288	231–345	New Zealand	215	166–264
Israel	283	0–621	**Australia**	**177**	**171–182**
Poland	273	201–346	Canada	170	43–296
France	250	59–440	France	154	29–279
Hong Kong and Macau	247	75–420	Poland	139	95–183
Australia	**246**	**239–252**	USA	139	37–240
USA	246	123–368	United Kingdom and Ireland	127	116–138
Austria	230	132–328	Greece	115	83–148
Finland	220	42–397	Hungary	112	56–168
United Kingdom and Ireland	190	177–203	Netherlands	111	77–145
Netherlands	184	140–229	Italy	110	91–128
Italy	174	152–197	Austria	105	4–205
Singapore	172	2–341	China	104	62–146
Hungary	163	99–227	Malta	104	55–152
Germany	160	116–204	Singapore	102	0–209
Chile	156	0–357	Germany	97	70–124
China	154	103–204	Hong Kong and Macau	95	4–186
Malta	143	86–200	Israel	94	0–225
Greece	111	82–140	Portugal	79	0–190
Canada	99	0–201	Finland	78	0–185
Mauritius	95	0–202	Chile	76	0–170
Switzerland	76	0–182	Switzerland	61	0–146
Korea	66	0–197	Japan	57	0–168
Portugal	51	0–149	Mauritius	29	0–70
Japan	31	0–93	Korea	19	0–58

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

11 Chronic obstructive pulmonary disease

Disease characteristics

Chronic obstructive pulmonary disease (COPD), also referred to as chronic obstructive airways disease or chronic obstructive lung disease, is a term used to the describe different but related diseases, chronic bronchitis and emphysema. COPD is a progressive and irreversibly disabling disorder marked by difficulty in breathing. Emphysema is a long-term lung disease where over-expansion or destruction of the lung tissues blocks oxygen intake, leading to shortness of breath and other problems. Bronchitis is inflammation of the mucous membrane of the main air passages.

As for lung cancer, tobacco smoking is the main cause of COPD. It is estimated that there were almost 300,000 Australians with COPD in 1996, and more than 20,000 new cases occurring every year, a large proportion of these being males (AIHW 2000a). It is also estimated that there are about 16,000 PYLL before the age of 75 each year, making this a major cause of premature death for males and females.

Historic trend

The collection of information on emphysema began in 1907 while the collection of information on chronic bronchitis began in 1922.

Due to the link with smoking it is not surprising that mortality rates for COPD have followed a pattern similar to that for deaths from lung cancer in both males and females. COPD mortality rates decreased between 1922 (when this time series began) and 1937 for males. After stabilising during the 1940s, mortality rates in males increased steadily from the early 1950s, peaking in 1970 at 776 deaths per million population. Between 1970 and 1998, the male mortality rate declined again, by 1.9% per year, and since 1993 the decline has been 4.2% per year. Between 1970 and 1998 the rate had more than halved to 402 deaths per million population. COPD mortality rates for females also decreased from 1922, and continued to decrease until the early 1950s. From 1961 onwards the female mortality rate began to increase at almost 4.5% per year, and unlike the rate for males, it has continued to increase, peaking at 195 deaths per million population in 1996. It is interesting to note that for females the COPD mortality rate in 1998 (171 deaths per million population) is similar to that in 1924 (168 deaths per million population). In 1998 there were 3,500 male deaths and 2,075 females deaths due to COPD (Figure 11.1).

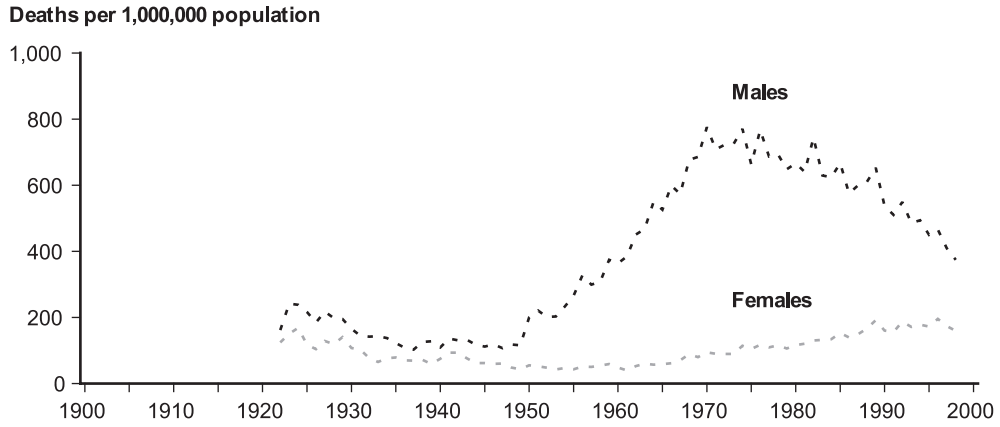


Figure 11.1: Age-standardised mortality rates for chronic obstructive pulmonary disease, Australia, 1922–1998

Age–sex distribution

The age distribution for mortality rates due to COPD has been consistent over the 1987–1998 period, with most deaths occurring after the age of 75.

- In 1998, the overall risk of death was significantly higher in males (402 deaths per million population) than females (171).
- Age-specific rates for males aged 80 years or more were about three times that of females in the same age groups.
- In 1998, 96% of male deaths occurred from the age of 60 and 59% occurred from age 75.
- For females, 95% of deaths occurred from age 60 and 60% occurred from age 75 (Table 11.1).

Twelve-year trends 1987–1998

The more recent trends in mortality rates from COPD parallel those for lung cancer, with decreases in rates for males and increases in rates for females. The downward trend for males has been at 1.7% per year and the upward trend for females has been 2.6% per year (Figure 11.2). For males, there were significant decreases in age-specific mortality rates for those aged 45 years and older. For females, age-specific mortality rates increased significantly for females aged 70 years and older (Table 11.1).

Geographic differences in mortality

As discussed in Chapter 4, regional differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population.

State and Territory comparison

Mortality rates for COPD decreased between the two periods (1987–1991 and 1994–1998) for males, while for females the mortality rates increased in all States and Territories except in Western Australia and the Northern Territory. The mortality rates for COPD also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national COPD mortality rate:

- Mortality rates for males in Victoria, Tasmania and the Northern Territory were significantly higher.
- The mortality rate for males in Western Australia was significantly lower.
- Mortality rates for females in New South Wales, Victoria, Tasmania and the Northern Territory were significantly higher.
- Mortality rates for females in Queensland, Western Australia and South Australia were significantly lower.

During the 1994–1998 period:

- Mortality rates for males in Victoria, Tasmania and the Northern Territory were significantly higher.
- Mortality rates for males in Western Australia and the Australian Capital Territory were significantly lower.
- Mortality rates for females in Tasmania and the Northern Territory were significantly higher.
- Mortality rates for females in Queensland and Western Australia were significantly lower.

Geographic category (by metropolitan, rural and remote area)

For the period 1995–1997, males and females living in remote areas had significantly higher COPD mortality rates (600 and 308 deaths per million population, respectively) than males and females living in metropolitan (427 and 183) and rural areas (496 and 181).

The mortality rate for males in remote areas was 41% higher than for males in metropolitan areas and 21% higher than for males living in rural areas.

There was little difference in mortality rates between females living in metropolitan areas and those living in rural areas, while for females living in remote areas the mortality rate was 68% higher than the rate for metropolitan areas (Table 11.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for COPD for Australian males and females born in Australia was 340 deaths per million population for males and 148 deaths per million population for females (Table 11.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for COPD than Australian males and females born in Australia.

Socioeconomic status

For the period 1995–1997, there was an inverse relationship between socioeconomic status and death due to COPD. The much higher proportion of people in lower socioeconomic groups who smoke, compared with those in the higher socioeconomic groups, is the main reason for this inverse relationship (Winstanley et al. 1995) (Table 11.4; Figure 11.3) (see Appendix D).

- The mortality rate for male was significantly lower for those in the highest SEIFA Index group (328 per million), using the SEIFA Index of Relative Socioeconomic Disadvantage, compared with the remaining lower SEIFA Index groups (ranging from 437 to 514 per million).
- The mortality rate for females were also significantly lower for those in the highest SEIFA group (148 per million). The differences between the remaining lower SEIFA groups were not as marked as with males (ranging from 179 to 217 deaths per million population).

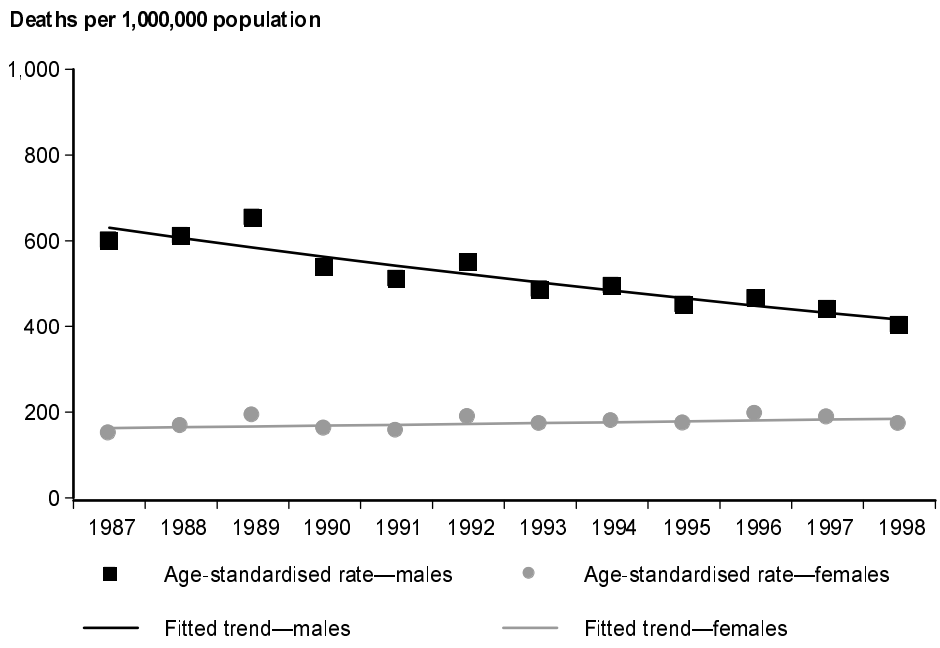
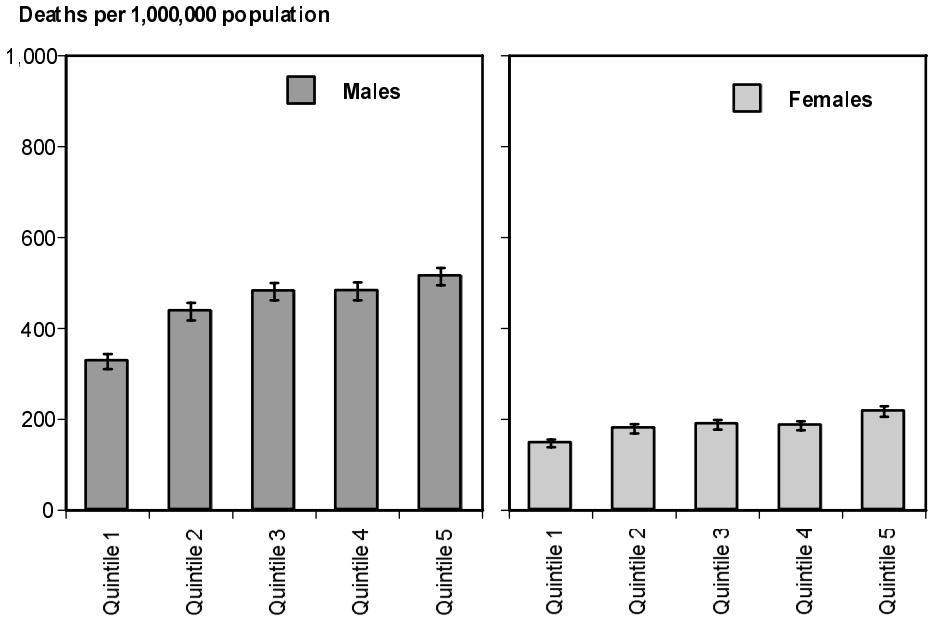


Figure 11.2: Age-standardised mortality rates and fitted trends for chronic obstructive pulmonary disease, Australia, 1987–1998



Notes

1. The population has been divided into five segments: Quintile 1 represents the highest socioeconomic status, and Quintile 5 the lowest.
2. Bars on graphs represent 95% confidence intervals.

Figure 11.3: Age-standardised mortality rates for chronic obstructive pulmonary disease by socioeconomic status and sex, Australia, 1995–1997

Table 11.1: Age-specific and age-standardised mortality rates for chronic obstructive pulmonary disease per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	2	0	1	0	0	5	16	25	104	337	824	1,721	3,434	5,898	9,095	13,598	449	599
1988	2	0	0	0	1	1	2	5	7	33	107	330	856	1,745	3,296	5,874	9,772	14,016	461	610
1989	0	0	0	0	0	1	0	2	8	33	123	342	844	1,753	3,888	6,255	9,901	15,633	500	652
1990	0	0	0	0	1	0	0	8	3	26	83	275	737	1,517	3,070	5,034	8,629	12,510	419	538
1991	3	0	0	0	0	3	0	0	8	13	101	242	698	1,584	2,972	5,076	7,226	11,759	409	510
1992	0	0	0	0	0	0	0	1	6	16	78	225	711	1,619	2,980	5,590	8,386	13,095	447	549
1993	0	0	0	2	0	0	1	0	5	30	103	250	679	1,498	2,610	4,734	7,232	11,420	407	486
1994	2	0	0	0	1	0	0	0	3	21	67	239	631	1,459	2,858	4,820	7,063	12,256	421	494
1995	0	0	0	0	1	0	0	1	8	25	54	224	577	1,292	2,626	4,313	7,105	10,358	393	450
1996	0	0	0	0	0	0	0	3	6	14	75	179	605	1,286	2,633	4,243	7,501	11,774	414	465
1997	0	0	2	2	0	0	0	4	6	17	60	201	579	1,377	2,743	4,095	6,650	9,830	403	440
1998	0	0	0	0	0	1	0	3	2	11	60	186	548	1,203	2,508	3,700	6,066	9,352	376	402
Females																				
1987	0	0	0	0	0	0	0	0	9	14	65	155	334	547	1,037	1,272	1,745	2,264	166	149
1988	0	0	0	0	0	0	0	5	16	28	79	201	354	665	1,047	1,375	1,999	2,415	186	166
1989	2	0	0	0	0	0	1	2	8	26	80	227	418	744	1,204	1,755	2,175	2,810	216	191
1990	2	0	0	0	1	0	1	0	8	17	67	148	343	625	1,068	1,509	1,715	2,452	182	160
1991	2	0	0	0	1	0	1	3	5	28	36	151	338	567	971	1,481	1,871	2,463	181	156
1992	0	0	0	0	0	0	3	0	2	9	80	186	367	776	1,258	1,794	1,948	2,862	219	187
1993	0	0	0	0	1	0	0	1	11	35	32	138	342	653	1,209	1,735	1,857	2,438	204	171
1994	0	0	0	0	0	0	1	0	5	15	62	171	325	717	1,138	1,633	2,213	2,847	217	178
1995	0	0	0	0	0	0	0	0	1	11	42	142	362	692	1,115	1,542	2,210	2,717	212	172
1996	3	0	0	0	1	1	0	1	6	16	64	182	348	696	1,327	1,743	2,435	3,390	246	195
1997	2	0	0	2	0	0	0	0	3	12	58	182	329	758	1,143	1,682	2,391	3,180	238	187
1998	0	0	0	0	2	1	0	4	5	17	58	122	311	595	1,222	1,493	2,384	2,660	221	171

Note: ASMR = age-standardised mortality rate.

Table 11.2: Number of deaths and age-standardised mortality rates for chronic obstructive pulmonary disease per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
					Deaths				
1987–1991	6,723	4,951	3,191	1,373	1,564	664	129	146	18,739
1994–1998	6,495	4,769	3,183	833	1,510	643	142	122	18,259
					Deaths per million population				
1987–1991	589	612	577	461	581	708	490	1,349	580
1994–1998	455	476	443	222	437	572	353	871	449
					Confidence intervals (95%)				
1987–1991	575–604	595–629	556–597	436–486	551–610	653–763	400–581	1,088–1,611	572–589
1994–1998	444–466	463–490	428–459	207–237	415–459	527–616	293–413	700–1,042	442–455
Females									
					Deaths				
1987–1991	3,077	2,200	1,080	516	547	266	74	81	7,841
1994–1998	3,873	2,862	1,532	456	805	382	115	84	10,420
					Deaths per million population				
1987–1991	179	177	144	113	140	204	182	636	165
1994–1998	189	190	163	84	167	247	197	568	181
					Confidence intervals (95%)				
1987–1991	173–185	169–184	135–153	103–122	128–152	180–229	141–224	485–786	161–168
1994–1998	183–195	183–198	155–171	76–92	155–179	222–273	161–233	439–696	177–184

Table 11.3: Age-standardised mortality rates for chronic obstructive pulmonary disease per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	427	417–437	183	178–189
Rural	496	480–513	181	172–189
Remote	600	530–670	308	258–357

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 11.4: Age-standardised mortality rates for chronic obstructive pulmonary disease per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	328	311–344	148	139–156
2	437	418–457	179	169–190
3	481	462–501	189	178–199
4	482	462–501	186	176–197
5 Low SES	514	495–534	217	206–228

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 11.5: Age-standardised mortality rates per million population for chronic obstructive pulmonary disease, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Australia	**340**	**332–347**	Israel	273	0–584
USA	319	170–469	New Zealand	162	119–204
New Zealand	315	255–374	**Australia**	**148**	**143–153**
Portugal	304	0–621	United Kingdom and Ireland	135	124–145
United Kingdom and Ireland	301	286–316	Korea	115	0–283
Canada	268	111–424	USA	100	23–176
Netherlands	256	204–308	Chile	93	0–200
Switzerland	229	25–433	Germany	80	56–104
Austria	213	114–312	Malta	78	36–120
France	187	32–343	France	75	0–162
Germany	187	137–238	Netherlands	70	46–94
Malta	187	117–257	Portugal	69	0–165
Italy	177	154–201	Hungary	66	24–108
Singapore	177	0–388	China	64	34–94
Finland	167	0–334	Poland	59	34–84
China	151	101–200	Finland	39	0–116
Poland	147	104–191	Canada	37	0–110
Hungary	137	78–196	Singapore	37	0–109
Greece	112	80–144	Austria	31	0–62
Mauritius	109	0–259	Italy	26	18–35
Israel	104	0–308	Hong Kong and Macau	23	0–68
Hong Kong and Macau	69	0–147	Mauritius	22	0–64
Korea	58	0–172	Greece	12	3–21
Chile	0	—	Japan	0	—
Japan	0	—	Switzerland	0	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

12 Asthma

Disease characteristics

Asthma is an inflammatory disease of the air passages that makes them prone to narrow too easily and too much in response to many 'triggers'. The triggers include exercise, pollens, the house dust-mite, cold weather, throat and chest infections, tobacco smoke and other factors. The airway narrowing causes attacks of shortness of breath because it is difficult to move air in and out of the lungs. Other symptoms include wheezing, chest tightness and cough.

Asthma is a common and growing problem in Australia and worldwide. In Australia, it is estimated that one in four primary school children, one in seven teenagers and one in ten adults have asthma (DHAC 2000b). The condition is more common among those with 'allergic' features at an early age (e.g. hay fever, eczema), those with an asthmatic parent, those who have had severe chest illness in infancy and those infants whose mothers smoked during pregnancy.

Although asthma is not a major cause of death it is a prime cause of disability and of hospitalisation, especially among those of school age and younger. Despite evidence that the condition may be growing more severe in Australia, mortality rates have fallen markedly in the past decade. This suggests that treatment is improving, at least for severe attacks.

Asthma patients are treated by avoiding trigger factors, checking their lung function regularly, using regular 'preventer' medication through an inhaler and using a 'reliever' inhaler if necessary.

It is estimated that each year there are about 7,000 PYLL before the age of 75 due to death from asthma.

Historic view

The collection of asthma mortality statistics commenced in 1907. During the 1907–1998 period the definition of asthma changed within the ICD system. During the 3rd to the 5th revisions the mortality rate from asthma was less than a third of that for the surrounding periods. Before these revisions the mortality rate fell from 90 and 57 deaths per million population for males and females respectively in 1907 to 43 and 29 deaths in 1928. It remained at about this level until the 6th revision of the ICD in 1949, when it jumped markedly to 85 and 50 deaths per million population for males and females respectively in 1951. The rate declined from the 1950s until 1980, reaching a low of 26 deaths per million population for both males and females. The rates doubled again by 1986 to 58 deaths per million population for both males and females, after which it fell to 32 and 36 deaths per million population for males and females respectively, by 1998 (Figure 12.1). There were 284 male deaths and 415 female deaths in 1998, one half of one per cent of all deaths.

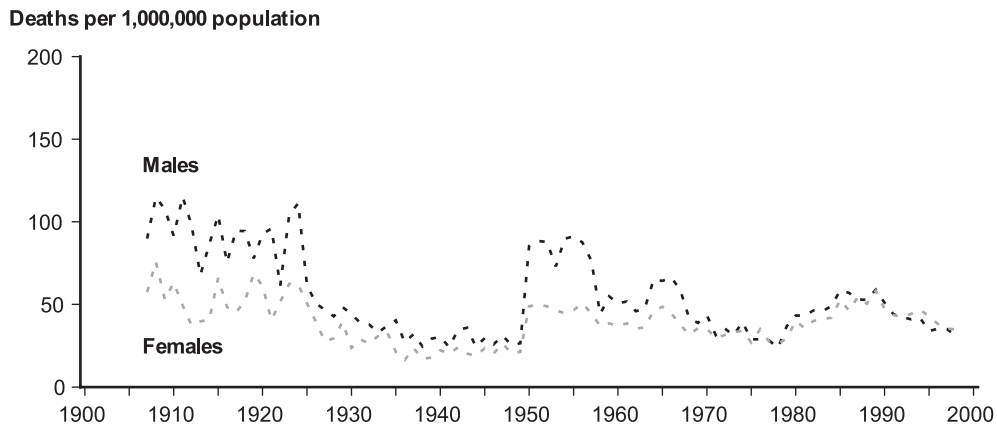


Figure 12.1: Age-standardised mortality rates for asthma, Australia, 1907–1998

Note: Change in ICD classification resulted in fewer deaths coded as due to asthma between 1928 and 1949.

Age–sex distribution

In 1998, 77% of male deaths occurred from the age of 60 and 38% occurred from age 75. For females, 75% of deaths occurred from age 60 and 49% from age 75.

The number of females dying from asthma was far greater than the number of males for the period 1987–1998, mostly due to the higher numbers of females living into older ages compared with males, when the risk of asthma death increases.

In 1998 the rate of death was similar for males and females (32 and 36 deaths per million population) (Table 12.1).

Twelve-year trends 1987–1998

Mortality rates from asthma decreased significantly over the 1987–1998 period (Figure 12.2). The mortality rate for males decreased by 4.3% each year with significant decreases in males aged 40–44 and males aged 50–79 years. For females, the overall decrease was also significant, 2.1% each year, with significant decreases for those aged 15–19, 35–74 and 85 years and older (Table 12.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The rates of asthma deaths decreased between the periods 1987–1991 and 1994–1998 for males and females in all States and Territories except for females in Tasmania and the Northern Territory (Table 12.2). The mortality rates for asthma also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national asthma mortality rate:

- The mortality rate for males in Victoria was significantly higher.
- The mortality rate for males in Western Australia was significantly lower.
- The mortality rate for females in Victoria was significantly higher.
- Mortality rates for females in Western Australia, South Australia and Tasmania were significantly lower.

During the 1994–98 period:

- The mortality rate for males in Victoria was significantly higher.
- Mortality rates for males in Western Australia and the Australian Capital Territory were significantly lower.
- The mortality rate for females in the Northern Territory was significantly higher.
- The mortality rate for females in Western Australia was significantly lower.

Geographic category (by metropolitan, rural and remote area)

While the mortality rate for males was higher in remote areas, there were no significant differences by area in the 3 years 1995–1997.

For females, the mortality rate was significantly higher (about 28% higher) in rural areas (46 deaths per million population) than in metropolitan areas (36 deaths per million population) (Table 12.3; Figure 12.3). Possible factors influencing the differences in regional rates include differences in exposure to allergens (increasing the number of asthma attacks) and the distance from acute medical care facilities (increasing the possibility that an asthma attack will prove fatal).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for asthma for Australian males and females born in Australia was 31 deaths per million population for males and 32 deaths per million population for females (Table 12.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for asthma than Australian males and females born in Australia.
- Mortality rates for Australian males born in Hungary, Germany, Greece, New Zealand, the Netherlands and Italy were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian females born in Austria, Poland, the Netherlands and Italy were significantly lower than for Australian females born in Australia.

Socioeconomic status

In the 3 years 1995–1997, the mortality rate from asthma was inversely related to socioeconomic status for males, while for females an inverse relationship was not evident. Using the SEIFA Index of Relative Socioeconomic Disadvantage, of the five SEIFA groups the mortality rate for:

- Males in the highest socioeconomic group (28 deaths per million population) was significantly lower than for the two lowest socioeconomic groups, at 38 and 41.
- Females in the highest socioeconomic group (29 deaths per million population) had a significantly lower mortality rate compared with those in the lowest three socioeconomic groups.

Females in the middle socioeconomic group had the highest mortality rate with 47 deaths per million persons, significantly higher than in the other SES groups (Table 12.4) (see Appendix D).

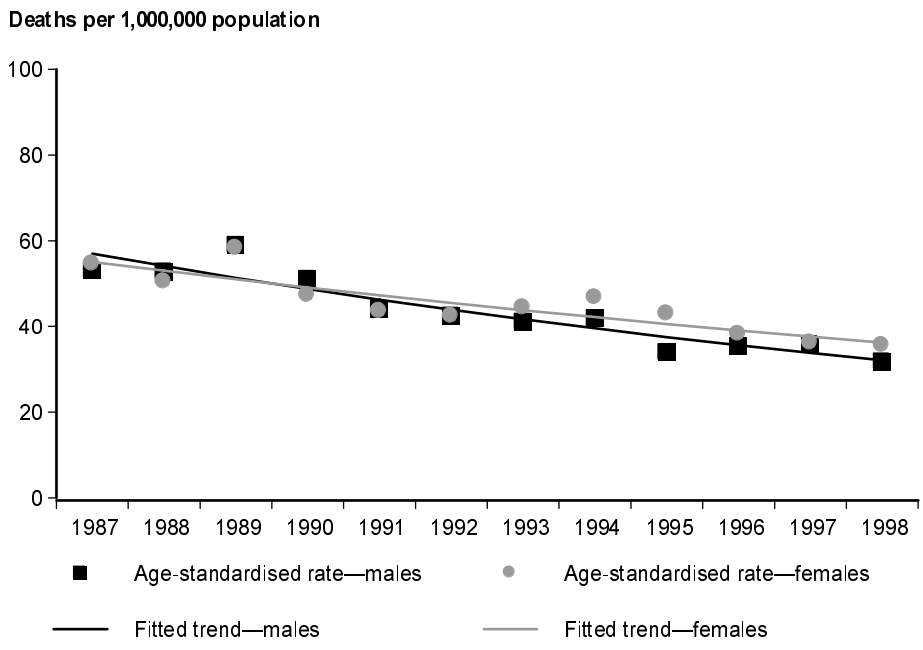
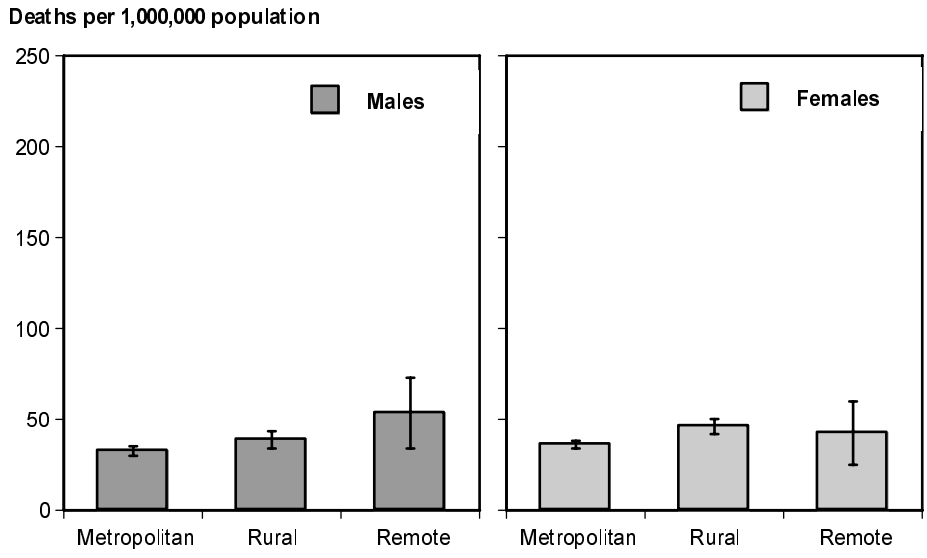


Figure 12.2: Age-standardised mortality rates and fitted trends for asthma, Australia, 1987–1998



Note: Bars on graphs represent 95% confidence intervals.

Figure 12.3: Age-standardised mortality rates for asthma, by geographic area and sex, Australia, 1995–1997

Table 12.1: Age-specific and age-standardised mortality rates for asthma per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	2	8	8	13	21	13	20	13	23	20	55	97	127	183	263	283	369	469	47	53
1988	0	3	9	13	19	20	12	19	20	28	41	80	144	161	240	293	434	554	46	53
1989	2	3	14	12	21	20	9	12	23	31	39	110	107	182	330	421	493	475	52	59
1990	2	8	9	13	13	11	10	14	25	30	48	60	125	182	216	259	483	601	45	51
1991	2	2	9	10	10	11	8	9	20	25	28	44	109	162	201	327	272	588	39	44
1992	5	2	3	10	4	10	10	10	15	21	45	64	105	111	205	327	373	422	38	42
1993	5	5	6	18	14	4	8	9	12	22	33	68	78	124	156	263	429	516	37	41
1994	3	3	3	9	4	9	10	3	8	13	27	58	82	114	190	220	457	976	37	42
1995	1	3	8	9	6	6	7	10	6	11	18	39	76	113	193	224	331	405	31	34
1996	5	4	4	9	10	3	4	7	7	11	29	45	48	116	163	239	368	630	33	35
1997	3	2	9	6	10	4	7	11	15	13	31	42	59	124	113	279	329	590	34	36
1998	0	5	8	9	3	7	7	1	6	12	19	34	64	125	153	183	380	433	30	32
Females																				
1987	2	5	5	27	15	15	17	22	35	43	79	82	149	164	251	246	307	432	58	55
1988	3	5	10	13	15	7	11	20	23	64	53	91	122	128	221	287	318	511	54	50
1989	0	3	7	20	15	11	12	33	23	46	62	89	159	192	245	303	426	581	63	58
1990	2	0	7	15	19	13	16	17	23	23	62	72	103	135	200	299	294	568	52	47
1991	2	2	10	12	16	9	13	12	19	22	36	75	105	157	181	266	303	464	48	43
1992	2	2	5	6	1	6	6	4	19	26	52	44	47	156	226	349	357	605	49	42
1993	3	0	8	16	7	9	10	7	22	31	37	67	95	124	227	239	417	574	51	44
1994	0	0	10	13	6	13	14	13	14	20	38	60	78	135	233	299	407	808	55	47
1995	6	2	11	6	4	6	7	8	9	21	27	63	76	167	173	278	441	692	51	43
1996	0	0	6	6	9	3	4	8	13	27	36	44	76	124	135	271	362	699	47	38
1997	5	2	2	8	5	7	11	4	22	13	15	63	56	122	134	227	354	677	45	36
1998	3	2	2	10	9	15	10	11	6	17	39	54	69	85	158	198	346	569	44	36

Note: ASMR = age-standardised mortality rate.

Table 12.2: Number of deaths and age-standardised mortality rates for asthma per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	715	572	284	123	142	44	14	14	1,908
1994–1998	532	445	236	95	137	38	9	13	1,506
				Deaths per million population					
1987–1991	55	62	46	36	46	42	33	49	52
1994–1998	36	43	31	25	37	33	15	44	36
				Confidence intervals (95%)					
1987–1991	51–59	57–67	41–52	30–42	38–54	30–55	12–54	22–76	50–54
1994–1998	33–39	39–47	27–35	20–30	31–44	23–44	5–26	17–71	34–37
Females									
				Deaths					
1987–1991	892	671	361	158	154	32	19	14	2,301
1994–1998	833	600	369	154	176	54	20	19	2,227
				Deaths per million population					
1987–1991	55	57	50	38	40	26	39	76	51
1994–1998	43	42	39	31	36	37	32	94	40
				Confidence intervals (95%)					
1987–1991	51–59	53–61	45–55	32–44	33–46	17–35	21–57	26–126	49–53
1994–1998	40–45	38–45	35–43	26–36	31–42	27–47	18–45	45–143	38–41

Table 12.3: Age-standardised mortality rates for asthma per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	33	30–35	36	34–39
Rural	39	34–43	46	42–51
Remote	53	34–73	42	25–60

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 12.4: Age-standardised mortality rates for asthma per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	28	23–32	29	25–33
2	33	28–39	34	30–39
3	34	29–39	47	42–53
4	38	33–43	40	35–45
5 Low SES	41	35–46	43	38–48

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 12.5: Age-standardised mortality rates per million population for asthma, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Japan	110	0–327	Switzerland	193	0–525
France	82	0–198	Finland	72	0–173
Finland	56	0–164	Japan	72	0–189
Canada	53	0–126	New Zealand	51	27–74
USA	43	0–102	Hungary	47	10–83
United Kingdom and Ireland	33	25–41	Korea	45	0–132
Australia	**31**	**29–34**	Canada	40	0–105
Mauritius	30	0–88	Singapore	34	0–101
Malta	26	0–54	**Australia**	**32**	**30–35**
China	23	4–42	United Kingdom and Ireland	30	25–35
Austria	18	0–43	Hong Kong and Macau	23	0–68
Italy	15	9–21	China	22	6–37
Hong Kong and Macau	14	0–43	Greece	21	8–34
Poland	14	0–29	Germany	20	9–32
Netherlands	14	0–28	Italy	20	12–28
New Zealand	14	3–25	Portugal	19	0–56
Greece	13	2–24	Malta	17	0–36
Germany	10	0–21	Netherlands	16	5–28
Hungary	6	0–16	Poland	10	1–19
Chile	—	—	Austria	4	0–13
Israel	—	—	Chile	—	—
Korea	—	—	France	—	—
Portugal	—	—	Israel	—	—
Singapore	—	—	Mauritius	—	—
Switzerland	—	—	USA	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

13 Suicide

Characteristics

In 1998, suicide was the cause of 2,682 deaths (2,150 males and 532 females). By comparison, about 75% more males and 5% more females suicided than were killed in motor vehicle accidents. Suicide is much more common among males than females. Suicide and self-inflicted injury is the leading contributor to the burden of injury for males, contributing about 30%, while for females the leading contributor is road traffic accidents (26%) (Mathers et al. 1999).

People with a mental disorder are ten times more at risk of dying from suicide than is the general population (DHAC & AIHW 1998b).

Risk factors include:

- being a young man;
- psychiatric difficulties (including depression, substance abuse, conduct problems, psychosis, past or present suicidal thoughts, threats or attempts of suicide);
- poor social adjustment (including academic failure, social isolation, legal problems, interpersonal conflict);
- previous attempted suicide;
- family or environmental problems (interpersonal loss, abuse or neglect, family history of psychiatric disorder or suicide, cultural conflict, unemployment or financial problems, exposure to suicide);
- poorer physical health (decline in health status) (NHMRC 1997; Gunnell & Frankel 1994).

In 1998, 44% (1,184 deaths) of suicides were by hanging, 20% (528 deaths) were poisoning by motor vehicle exhaust gas, 13% (336 deaths) were poisoning by solid and liquid substances (including drugs and medicaments), and 9% (234 deaths) were by firearms.

It is estimated for the past 5 years there have been about 92,000 PYLL before the age of 75 each year (ranked first for males and fourth for females on this measure). This makes suicide one of the most serious causes of premature death in Australia.

Historic view

The collection of suicide statistics began in 1907 when the rates were 244 and 50 deaths per million population for males and females respectively. The numbers of deaths were 385 and 76 respectively. Overall, the rates of suicide have been remarkably constant over the 20th century, with some fluctuations, notably a peak during the 1930 depression and a marked decrease in male suicides during the World Wars (Figure 13.1).

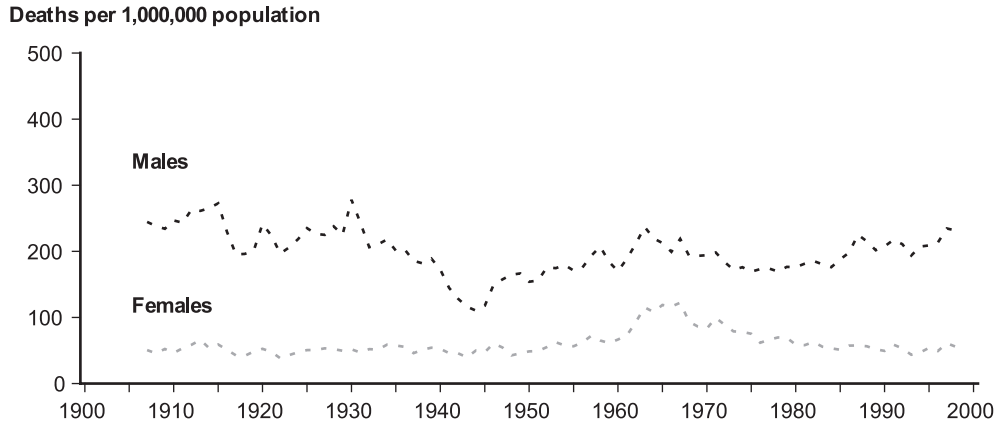


Figure 13.1: Age-standardised mortality rates for suicide, Australia, 1907–1998

Age–sex distribution

In 1998, 2% of all deaths were due to suicide. Of these 2,682 deaths, 2,150 were male and 532 were female. The age distribution for suicide rates has been relatively consistent over the 1987–1998 period (Table 13.1; Figure 13.3).

- In 1998, the rate for males (231 deaths per million population) was about four times as high as that for females (56).
- Risk of suicide begins from age 10–14, increasing significantly from the age of 15.
- Mortality rates were highest between the ages 20–44, with 75% of male suicides and 68% of female suicides in 1998 committed by people younger than 50 years of age.
- Six per cent of male suicides occurred in those aged less than 20 (almost all of these occurred between ages 15–19), and 61% occurred between ages 20–45. This compares to 14% of male suicides in ages 60 and older, and 5% in ages 75 and older.
- For females, 7% of suicides occurred before age 20 (almost all of these occurred between ages 15–19), and 55% between ages 20 to 45, compared to 19% of suicides in ages 60 and older, and 7% in ages 75 and older.

Twelve-year trends 1987–1998

The number of male suicides consistently outnumbered female suicides by four to one for the whole period. Changes in suicide rates have been marginal, although statistically significant for males. For males there has been a slight increase of about 0.5% per year (Figure 13.2). The increase in mortality rate is due in part to significant increases in suicide rates for males aged between 20–39 years. The increase was countered to some extent by significant decreases between the ages 55–59 and 70–79. Although there has been no significant trend for total females over the period, there was a significant increase in rates for females aged 35–39 and a significant decrease for females aged 60–69 (Table 13.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The national suicide rate increased for males and decreased for females between the periods 1987–1991 and 1994–1998 (Table 10.2). The suicide rates also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national suicide rate:

- Suicide rates for males in Queensland, Western Australia, Tasmania and the Northern Territory were significantly higher.
- The suicide rate for males in New South Wales was significantly lower.
- The suicide rate for females in the Northern Territory was significantly lower.

During the 1994–1998 period:

- Suicide rates for males in Queensland, Western Australia and the Northern Territory were significantly higher.
- Suicide rates for males in Victoria and South Australia were significantly lower.
- The suicide rate for females in South Australia was significantly lower.

Geographic category (by metropolitan, rural and remote area)

In the 3-year period 1995–1997, suicide rates were significantly different between geographic regions, with rates 46% higher for males in remote areas (298 deaths per million population) and 24% higher for males living in rural areas (253), compared to the mortality rate for males in metropolitan areas (204).

There were no significant differences by region for females. It is interesting that while males were most at risk of suicide if living in remote areas, females were least at risk (Table 13.3).

Country of birth

For the period 1992–1994, the world-standardised suicide rate for Australian males and females born in Australia was 393 deaths per million population for males and 59 deaths per million population for females (Table 13.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher suicide rates than Australian males and females born in Australia.

International comparisons

- The world-standardised rate for Australian males was about mid-range and similar to Poland, New Zealand, Canada, Mauritius, Germany, Japan and the USA.

- The rate for Australian females was mid- to low-range and similar to Canada and Poland.
- Rates for males were among the highest in Hungary and Finland (about twice the Australian rate).
- Greek and Italian rates for males were among the lowest (about half the Australian rate).
- Suicide rates for females were highest in China, Hungary and Finland (two to four times the Australian rate).
- Suicide rates for females were lowest in Italy and Greece (about half the Australian rate).

See Tables C.2 & C.3 in Appendix C.

Socioeconomic status

In the 3-year period 1995–1997, there was a general inverse trend for mortality rates by socioeconomic status for males, using the SEIFA Index of Relative Socioeconomic Disadvantage (Table 13.4) (see Appendix D). The suicide rate was significantly higher (52% higher) for males in the lowest socioeconomic group (260 deaths per million population) compared with males in the highest socioeconomic group (171).

For females there were no significant differences between the five socioeconomic groups.

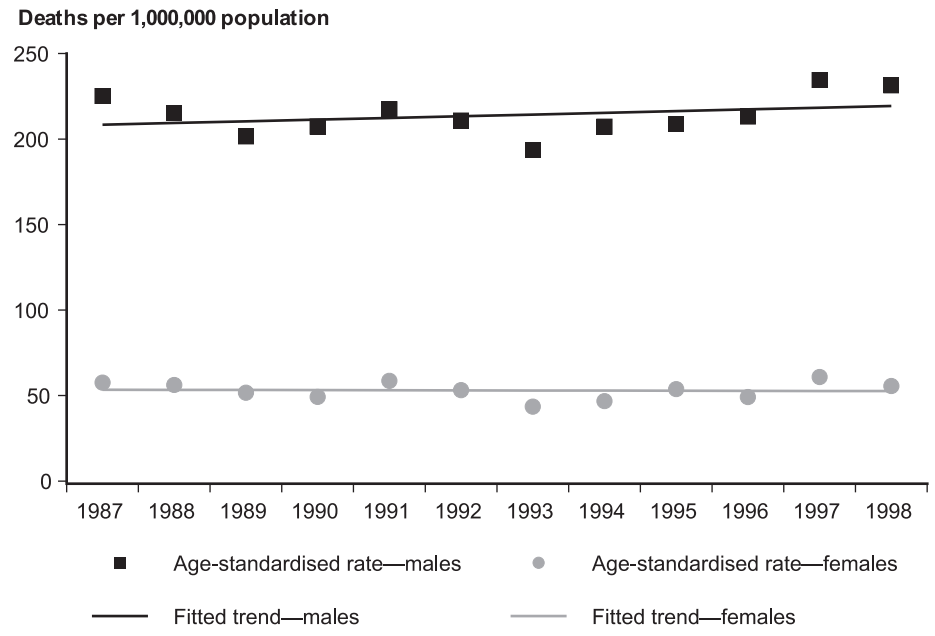


Figure 13.2: Age-standardised mortality rates and fitted trends for suicide, Australia, 1987–1998

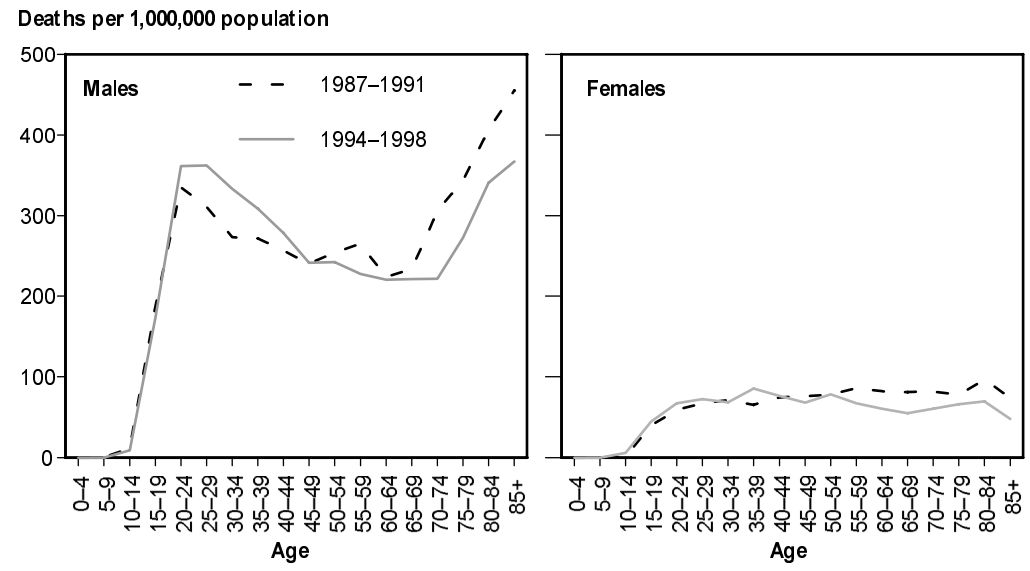


Figure 13.3: Age-specific mortality rates for suicide, by sex, Australia, 1987–1991 and 1994–1998

Table 13.1: Age-specific and age-standardised mortality rates for suicide per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	18	172	319	310	265	269	292	246	312	344	245	233	357	392	568	469	218	225
1988	0	0	9	210	352	298	267	239	283	254	234	224	252	243	324	412	312	528	210	215
1989	0	0	13	184	297	323	276	247	200	243	234	259	197	231	325	347	298	425	198	202
1990	0	0	9	178	365	328	253	261	248	209	221	267	228	252	275	252	359	505	204	207
1991	0	0	9	190	344	293	304	342	264	251	274	229	196	212	249	327	498	362	214	217
1992	0	0	8	184	349	326	282	268	230	278	233	214	248	255	297	290	283	401	209	211
1993	0	0	6	167	320	292	282	222	205	259	204	219	240	224	243	233	365	437	192	193
1994	0	0	5	186	345	300	284	250	273	243	253	231	231	229	246	276	335	413	206	207
1995	0	0	8	151	348	341	327	309	243	242	234	266	195	188	200	230	331	405	208	209
1996	0	0	10	174	334	332	318	322	265	231	222	222	249	202	246	290	397	299	212	213
1997	0	0	12	184	423	404	346	292	314	236	253	226	225	229	245	358	341	406	233	235
1998	0	0	9	172	359	426	394	366	295	255	249	197	203	260	171	209	300	322	231	231
Females																				
1987	0	0	2	62	58	64	57	74	77	85	87	101	73	98	90	91	81	31	57	58
1988	0	0	2	38	52	62	82	79	70	83	82	72	103	70	78	73	147	100	56	56
1989	0	0	2	19	50	69	68	54	81	61	82	80	89	105	83	70	67	87	52	52
1990	0	0	0	50	39	59	81	53	65	71	65	67	57	77	81	77	100	76	50	49
1991	0	0	3	32	94	80	67	68	80	80	75	112	89	57	78	80	89	73	59	59
1992	0	0	3	48	65	61	80	66	78	61	68	76	66	68	72	100	53	78	54	53
1993	0	0	2	30	51	56	55	77	42	75	65	51	50	56	63	70	88	25	44	44
1994	0	0	5	27	56	63	57	79	67	64	66	60	67	39	57	70	72	71	48	47
1995	0	0	0	47	78	71	68	70	81	78	86	78	53	65	43	56	87	30	55	54
1996	0	0	11	42	44	69	65	89	66	78	76	52	53	42	70	57	45	35	50	49
1997	0	0	11	52	89	81	78	86	84	70	95	76	66	71	67	82	61	60	62	61
1998	0	0	2	55	71	76	75	103	83	51	68	70	62	57	64	63	83	45	57	56

Note: ASMR = age-standardised mortality rate.

Table 13.2: Number of deaths and age-standardised mortality rates for suicide per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	2,774	2,173	1,669	830	781	276	136	104	8,742
1994–1998	3,300	2,203	2,100	978	815	257	140	136	9,928
				Deaths per million population					
1987–1991	197	210	244	235	205	252	208	276	213
1994–1998	216	196	255	271	185	226	188	285	219
				Confidence intervals (95%)					
1987–1991	189–204	201–219	232–256	219–251	191–220	223–282	169–246	210–343	209–218
1994–1998	208–223	187–204	244–266	254–288	172–198	198–254	156–221	232–338	215–223
Females									
				Deaths					
1987–1991	728	624	416	193	238	60	39	13	2,311
1994–1998	858	623	503	217	180	53	40	21	2,494
				Deaths per million population					
1987–1991	49	57	60	54	62	52	58	31	55
1994–1998	53	53	60	59	40	43	50	61	53
				Confidence intervals (95%)					
1987–1991	46–53	53–62	54–66	46–61	54–70	39–65	39–77	14–48	52–57
1994–1998	50–57	49–57	55–65	51–66	34–46	31–54	34–66	28–94	51–55

Table 13.3: Age-standardised mortality rates for suicide per million population, by geographic areas, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	204	198–211	56	53–59
Rural	253	241–265	53	47–58
Remote	298	259–337	44	29–60

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 13.4: Age-standardised mortality rates for suicide per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	171	160–182	52	46–58
2	216	203–228	57	51–63
3	221	209–234	58	52–64
4	225	212–237	50	44–56
5 Low SES	260	246–273	56	50–63

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 13.5: Age-standardised mortality rates per million population for suicide, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Poland	427	265–589	France	144	18–271
Finland	417	0–979	Israel	120	0–354
Austria	409	115–703	Austria	100	0–203
Australia	**393**	**385–402**	Poland	93	33–153
France	291	125–457	Canada	93	6–179
Germany	284	201–366	Korea	85	10–160
USA	227	134–321	Malta	80	0–217
Portugal	219	37–400	Japan	63	1–126
New Zealand	218	177–259	Hungary	60	8–112
Canada	203	64–342	Mauritius	60	0–129
Netherlands	181	93–270	**Australia**	**59**	**56–62**
United Kingdom and Ireland	178	157–199	Portugal	58	0–124
Hungary	170	88–252	Germany	55	21–88
Mauritius	165	15–316	New Zealand	53	32–75
Switzerland	99	0–237	United Kingdom and Ireland	51	40–62
Greece	97	28–165	Netherlands	50	14–87
Italy	88	48–129	China	47	18–77
China	86	48–124	USA	40	0–81
Singapore	77	0–155	Finland	33	0–98
Malta	76	35–118	Greece	26	11–41
Japan	67	0–144	Italy	22	10–33
Chile	64	0–127	Hong Kong and Macau	14	0–30
Hong Kong and Macau	63	18–108	Singapore	13	0–38
Korea	15	0–43	Chile	—	—
Israel	—	—	Switzerland	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

14 Motor vehicle traffic accidents

Characteristics

In the context of this report a motor vehicle traffic accident is any motor vehicle accident occurring on a public road (i.e. originating, terminating or involving a vehicle partially or fully on the road). Motor vehicle traffic accidents exclude accidents involving motor vehicles being used in recreational or sporting activities off a public road, accidents occurring entirely off a public road, and accidents involving motor vehicles and aircraft in the same collision (WHO 1977).

Most deaths due to motor vehicle accidents are preventable, given safe roads, safe cars and safe driving practices. Risk factors include speeding, increased blood alcohol levels, tiredness, poor road standards and winding country roads. Road safety initiatives have been established in Australia and have been very successful in reducing the number of motor vehicle deaths. This is particularly pertinent as the number of persons driving has increased.

Road traffic accidents are one of the largest contributors to the burden of injury. They are the highest contributing factor for females (about 26%), while for males they contribute about 30%, the second highest contributor after suicide (Mathers et al. 1999).

Motor vehicle traffic accidents are the second largest cause of death due to external injury. It is estimated that there are about 64,000 PYLL before the age of 75 each year, ranked third for males and fifth for females on this measure.

Historic view

Statistics on motor vehicle deaths began in 1925. Statistics collected at the time reflected motor vehicle accidents that occurred on the road and the off road. In 1925 the rates were 157 and 40 deaths per million population for males and females respectively. These rates climbed steadily to a high of 490 and 171 deaths per million population in 1970 (except during World War II when they fell). Since then the rates have fallen to 134 and 53 deaths per million population for males and females respectively, emphasising the success of the road safety campaigns and improvements in motor vehicles and road infrastructure.

Age–sex distribution

In 1998, 1.3% of all deaths were due to motor vehicle traffic accidents. Of these 1,731 deaths, 1,224 were of males and 507 were of females (Table 14.1).

- The number of males who died from motor vehicle traffic accidents was about 2.5 times the number of females, for the whole period.
- In 1998, half of the male deaths (51%) were between ages 15–34 while 16% of male deaths occurred after age 60 and 6% occurred from age 75.
- For females, 35% of deaths were between ages 15–34, 30% of deaths occurred after age 60 and 14% occurred from age 75.
- In 1998, the mortality rate for males were 134 deaths per million population, and risk of death became significantly greater between ages 15 and 34, and age 70 and over.

- The mortality rate for females was 53 deaths per million population. The age distribution was less pronounced for women with risk of death becoming significantly greater between the ages 15 and 24, and 70 and over.

Twelve-year trends 1987–1998

Motor vehicle traffic accident mortality rates decreased significantly over the 1987–1998 period. For males, the rates decreased by 6.1% per year, with significant decreases for all ages (Figure 14.1). Mortality rates for females decreased by 5.8% per year, with significant decreases for all age groups except 35–39 and 85 and over (Table 14.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors. Population density, standard of roads and age of the vehicle fleet vary among geographic regions and have important effects on motor vehicle accident risk. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

Mortality rates due to motor vehicle traffic accidents decreased between the two periods 1987–1991 and 1994–1998 for males and females in all States and Territories except for females in Western Australia (Table 14.2). The mortality rates due to motor vehicle accidents also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national motor vehicle traffic accidents mortality rate:

- Mortality rates for males in Victoria and the Northern Territory were significantly higher.
- The mortality rate for males in New South Wales was significantly lower.
- The mortality rate for females in the Northern Territory was significantly higher.
- The mortality rate for females in Western Australia was significantly lower.

During the 1994–1998 period:

- Mortality rates for males in Queensland, Western Australia and the Northern Territory were significantly higher.
- Mortality rates for males in New South Wales, Victoria, South Australia and the Australian Capital Territory were significantly lower.
- Mortality rates for females in Queensland, Western Australia and the Northern Territory were significantly higher.

Geographic category (by metropolitan, rural and remote area)

During 1995–1997, motor vehicle traffic accident mortality rates were significantly higher in rural and remote areas (Table 14.3; Figure 14.2). Note that region refers to usual place of residence, not place of death; see Appendix D.

- The mortality rate for males in metropolitan areas was 122 deaths per million population; rates were 82% higher in rural areas (222) and 135% higher in remote areas (287).
- The mortality rate for females in metropolitan areas was 50 deaths per million population; they were 79% higher in rural areas (89) and 178% higher in remote areas (139).
- Females living in remote areas had a mortality rate comparable to males living in metropolitan areas.

Country of birth

For the period 1992–1994, the world-standardised mortality rate for motor vehicle traffic accidents for Australian males born in Australia was 151 deaths per million population (Table 14.5).

- Mortality rates for Australian males born in Korea, Chile, Mauritius, Malta and France were significantly lower than for Australian males born in Australia.
- The mortality rate for Australian males born in Japan was significantly higher than for Australian males born in Australia.

For the period 1992–1994, the world-standardised mortality rate for motor vehicle traffic accidents for Australian females born in Australia was 62 deaths per million population (Table 14.5).

- The mortality rates for Australian females born in Hungary, Italy, Malta and Singapore were significantly lower than for Australian females born in Australia.
- The mortality rate for Australian females born in the United States of America was significantly higher than for Australian females born in Australia.

International comparison

Compared internationally, the 1987–1998 Australian motor vehicle traffic accident mortality rates for males are middle to low in range and similar to Canada and Germany.

Australian rates for females are about mid-range, and are similar to rates for Canada, Austria and Germany. See Table C.2 & C.3 in Appendix C.

Socioeconomic status

Overall, risk of death from motor vehicle traffic accidents during 1987–1998 was inversely related to socioeconomic status for males, using the SEIFA Index of Relative Socioeconomic Disadvantage. Males in the lowest of the five SEIFA groups had a mortality rate (196 deaths per million population) significantly higher (123%) than that for males in the highest SEIFA group (88) (Table 14.4) (see Appendix D).

There was a similar but less strong inverse relationship for females. The mortality rate for females in the lowest socioeconomic group (75 deaths per million population) was significantly higher (79%) than for the highest socioeconomic group (42 deaths per million population).

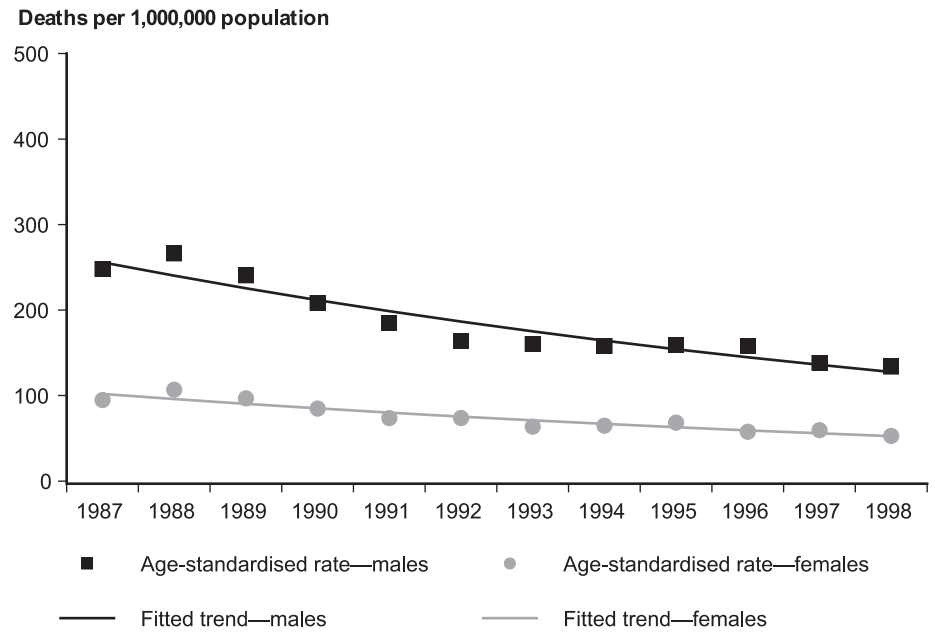
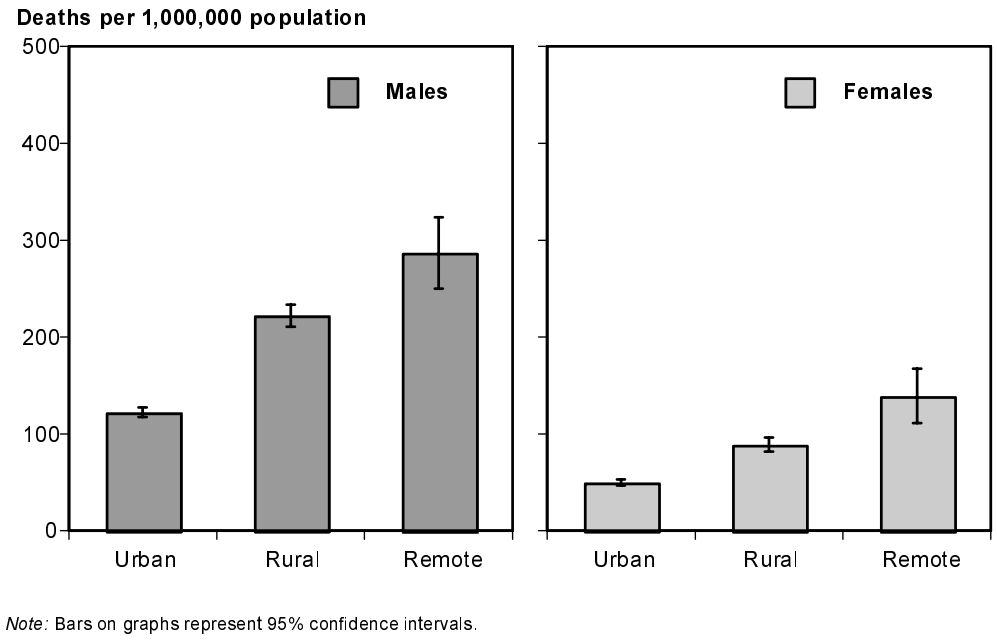


Figure 14.1: Age-standardised mortality rates and fitted trends for motor vehicle traffic accidents, Australia, 1987–1998



Note: Bars on graphs represent 95% confidence intervals.

Figure 14.2: Age-standardised mortality rates for motor vehicle traffic accidents, by geographic area and sex, Australia, 1995–1997

Table 14.1: Age-specific and age-standardised mortality rates for motor vehicle traffic accidents per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	67	65	84	496	593	342	239	220	158	163	172	150	160	161	324	392	540	690	246	248
1988	65	69	83	500	603	435	292	175	176	184	183	160	241	188	324	468	488	633	264	266
1989	49	55	80	439	548	368	288	226	160	151	145	170	148	228	240	401	558	400	238	241
1990	54	77	63	382	459	319	219	126	151	143	157	139	166	178	229	395	470	481	206	209
1991	41	51	61	352	407	287	198	122	122	118	131	144	139	175	249	270	462	339	182	185
1992	43	55	53	286	337	255	205	145	127	93	119	136	102	163	138	222	362	380	162	164
1993	45	29	42	303	358	251	167	149	104	141	112	91	103	118	136	312	386	298	157	160
1994	32	23	50	292	320	242	147	147	129	112	103	114	121	174	182	263	406	394	154	158
1995	30	42	36	280	367	230	159	174	95	110	97	128	124	164	137	265	331	546	155	159
1996	50	31	55	278	358	203	179	144	151	101	95	107	116	116	156	284	255	514	154	158
1997	42	24	42	288	283	184	180	125	99	94	91	81	117	131	142	179	304	281	135	138
1998	32	29	34	245	291	202	148	117	116	99	107	114	98	108	164	170	182	307	131	134
Females																				
1987	50	50	44	184	173	89	62	61	47	88	62	109	98	111	168	166	275	175	97	95
1988	40	61	36	168	198	113	83	65	65	80	98	113	100	140	179	287	341	160	109	107
1989	43	53	35	181	179	86	69	71	79	64	85	100	111	105	154	196	224	165	98	97
1990	33	55	35	145	143	72	52	58	55	71	82	58	130	118	151	217	223	114	86	85
1991	24	24	20	123	116	100	79	47	34	54	68	61	70	125	135	204	172	109	75	74
1992	27	29	28	116	129	77	52	56	48	46	68	96	74	125	157	179	132	112	75	74
1993	29	32	29	101	101	46	73	70	46	40	35	43	78	87	125	178	120	57	64	64
1994	28	35	29	111	92	65	39	60	38	44	66	70	73	113	120	140	144	118	66	65
1995	24	22	36	120	102	67	60	52	58	62	67	43	87	88	108	146	180	134	70	68
1996	22	28	27	91	78	58	53	48	44	41	42	74	67	65	95	144	159	155	59	58
1997	24	17	19	90	114	69	56	45	48	53	50	48	80	63	125	86	117	114	60	60
1998	29	15	22	92	90	35	48	51	33	34	56	44	78	57	97	112	128	115	54	53

Note: ASMR = age-standardised mortality rate.

Table 14.2: Number of deaths and age-standardised mortality rates for motor vehicle traffic accidents per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	3,030	2,560	1,552	828	862	273	133	254	9,491
1994–1998	2,006	1,500	1,337	784	553	153	87	209	6,631
				Deaths per million population					
1987–1991	214	245	222	235	223	246	191	637	229
1994–1998	134	136	164	221	130	137	117	470	149
				Confidence intervals (95%)					
1987–1991	206–221	235–254	211–233	219–251	208–238	217–275	156–226	534–739	225–234
1994–1998	128–140	129–143	155–172	205–236	119–140	115–159	91–143	394–547	146–153
Females									
				Deaths					
1987–1991	1,264	1,111	687	271	311	128	55	80	3,907
1994–1998	898	635	584	288	246	79	39	64	2,833
				Deaths per million population					
1987–1991	85	100	97	75	80	110	83	208	91
1994–1998	56	54	70	78	56	65	52	142	61
				Confidence intervals (95%)					
1987–1991	81–90	94–106	90–104	66–84	71–89	90–129	60–106	154–262	88–94
1994–1998	52–59	50–58	64–75	69–87	49–63	50–79	36–69	106–179	58–63

Table 14.3: Age-standardised mortality rates for motor vehicle traffic accidents per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	122	117–127	50	47–53
Rural	222	211–234	89	82–96
Remote	287	250–324	139	111–167

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 14.4: Age-standardised mortality rates for motor vehicle traffic accidents per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	88	80–96	42	37–47
2	134	124–143	56	50–63
3	166	155–177	66	59–73
4	166	155–177	62	55–69
5 Low SES	196	184–208	75	68–82

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 14.5: Age-standardised mortality rates per million population for motor vehicle traffic accidents, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Japan	614	253–975	Switzerland	266	0–620
Hungary	322	0–645	USA	186	78–295
China	279	30–527	Austria	119	0–343
Israel	202	0–481	Japan	114	10–218
New Zealand	196	155–236	Hong Kong and Macau	112	41–184
Austria	169	10–328	Korea	102	0–207
Singapore	165	50–281	Portugal	79	0–201
Finland	159	0–319	Netherlands	79	0–179
United Kingdom and Ireland	156	119–192	Finland	72	0–214
Greece	153	37–269	United Kingdom and Ireland	69	36–102
Australia	**151**	**146–156**	China	67	6–129
USA	148	55–241	**Australia**	**62**	**58–65**
Canada	138	26–250	Canada	62	0–125
Switzerland	137	2–272	New Zealand	59	35–83
Portugal	130	0–289	Germany	58	19–97
Hong Kong and Macau	117	38–196	Poland	48	15–82
Italy	110	14–206	Greece	46	16–76
Poland	110	31–189	Mauritius	39	0–94
Germany	94	42–147	Chile	32	0–76
Netherlands	92	0–186	France	31	0–90
France	54	0–130	Singapore	24	0–57
Malta	53	19–87	Malta	18	0–38
Mauritius	52	0–125	Italy	16	8–24
Chile	50	0–108	Hungary	15	0–44
Korea	19	0–55	Israel	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

15 Homicide

Characteristics

Homicides are fatal outcomes from intentional injuries inflicted by another person. Homicide rates provide an indicator of the nature and extent of interpersonal violence in the population. They are not distributed evenly throughout the population, taking a greater toll on males, the young, and Aboriginal and Torres Strait Islander people, particularly in rural and remote areas.

An examination of a decade of homicide in Australia by the Australian Institute of Criminology found for the period 1989–1999 (Mouzos 2000):

Offenders

- Of the 3,481 offenders of homicide, 87.2% were male and 12.8% were female.
- Male offenders were more likely to be single, whereas female offenders were more likely to be married or living in a de facto relationship at the time of the incident.
- Just over seven out of ten male offenders and just under nine out of ten female offenders were not employed at the time of the incident.
- Approximately 6% of homicide offenders in Australia committed suicide during or following the homicide incident.
- When women kill a male intimate partner, they typically kill someone with whom they have experienced a long history of violent conflict.
- Biological parents, usually the mother, were responsible for a majority of child killings in Australia. Very rarely were children killed by a stranger.

Victims

- Eight out of ten homicides occurred between people who were known to one another.
- Females were likely to be killed by an intimate partner, whereas males were more likely to be killed by a friend or acquaintance.
- Females were more likely to be killed as a result of a domestic altercation, although this proportion has declined in recent years.
- Males were more likely to be killed following an alcohol-related argument.
- About 10% of homicide incidents occurred in the course of a robbery and almost 4% occurred in the course of sexual assault.
- Approximately 9% of all homicide victims were aged under 15.
- The homicide of an elderly person is a relatively rare occurrence, with elderly victims accounting for approximately 7% of all homicide victims during 1989–1999.

Historic view

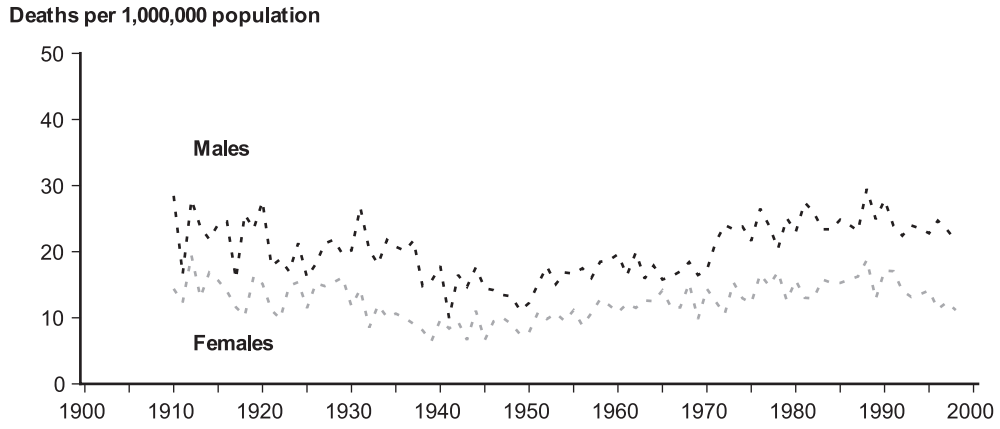


Figure 15.1: Age-standardised mortality rates for homicide, Australia, 1910–1998

The collection of homicide statistics began in 1910. No clear trend in homicide rates emerges. Rates for males and females in 1910 were around 30 and 20 deaths per million population. These rates declined to 10 and 6 deaths per million population males and females respectively in 1939. The rates climbed again to 29 and 19 deaths per million population in 1988 after which they fell to 21 and 11 deaths by 1998 (Figure 15.1). It is estimated that there are about 8,000 PYLL before age 75 for males and about 4,000 PYLL for females.

Age–sex distribution

In 1998, 0.25% of all deaths was due to homicides. Of these 298 deaths, 197 were of males and 101 were of females. The age distribution for mortality rates was relatively consistent over the 12-year period.

In 1998:

- The mortality rate for males was 21 deaths per million population compared with 11 for females.
- While children aged between 5 and 14 had relatively low age-specific rates, children aged 0–4 years had age-specific rates comparable with those of adult age groups.
- Forty-nine per cent of homicides of males occurred between ages 20–39, while for females 40% occurred in this age group.
- Eighty-four per cent of all homicides occurred before the age of 55.
- While homicide was more likely in younger age groups, a higher proportion of female homicides compared to male homicides occurred after the age of 60 (Table 15.1).

Twelve-year trends 1987–1998

Over the period 1987–1998, the homicide rate declined significantly by 1.5% per annum for males. For females the decrease was not statistically significant. While the age-specific rates showed no significant decreases for males over the period 1987–1998, there were significant decreases in female age-specific rates for ages 25–34 and 45–49 (Table 15.1; Figure 15.2).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and the proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The homicide rates showed some variation among the States and Territories (Table 15.2). During the 1987–1991 period, compared with the national homicide rate:

- The homicide rate for males in the Northern Territory was significantly higher.
- Homicide rates for males in South Australia, Tasmania and the Australian Capital Territory were significantly lower.
- The homicide rate for females in the Northern Territory was significantly higher.
- The homicide rate for females in South Australia was significantly lower.

During the 1994–1998 period:

- The homicide rate for males in the Northern Territory was significantly higher.
- Homicide rates for males in Victoria, South Australia and the Australian Capital Territory were significantly lower.
- Homicide rates for females in the Northern Territory and Western Australia were significantly higher.
- The homicide rate for females in Victoria was significantly lower.

Geographic category (by metropolitan, rural and remote area)

During 1995–1997, homicide rates were significantly higher for males and females living in remote areas (Table 15.3).

The rate for males living in remote areas (71 deaths per million population) was more than three times the rates for males living in metropolitan areas and rural areas (22 and 20 respectively).

Females living in remote areas (44 deaths per million population) had a rate about 3.5 times the rate for females living in metropolitan areas (12). The rate for remote areas was about 4.5 times the rate for females living in rural areas (10 deaths per million population).

Country of birth

For the period 1992–1994, the world-standardised mortality rates for homicide for Australian males and females born in Australia were 22 deaths per million population for males and 13 deaths per million population for females (Table 15.5).

- Australian males born in the Netherlands, Greece, Hungary and Italy had significantly lower homicide rates than Australian males born in Australia.

- Australian females born in Poland, Italy, the Netherlands, and Greece had significantly lower homicide rates than Australian females born in Australia.

Socioeconomic status

For the period 1995–1997, the homicide rate for males in the lowest of the five socioeconomic groups (37 deaths per million population) was significantly higher than for all other groups, and three times the mortality rate for males in the highest SEIFA group (11).

The homicide rate for females was significantly greater for the lowest SEIFA group (18 deaths per million population) than for the highest SEIFA group (8) (Table 15.4; Figure 15.3) (see Appendix D).

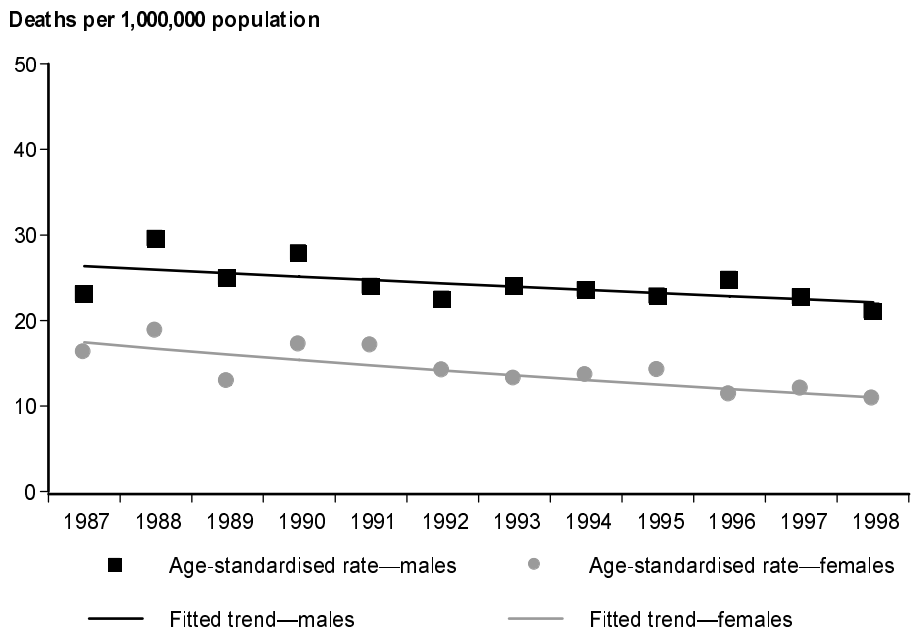
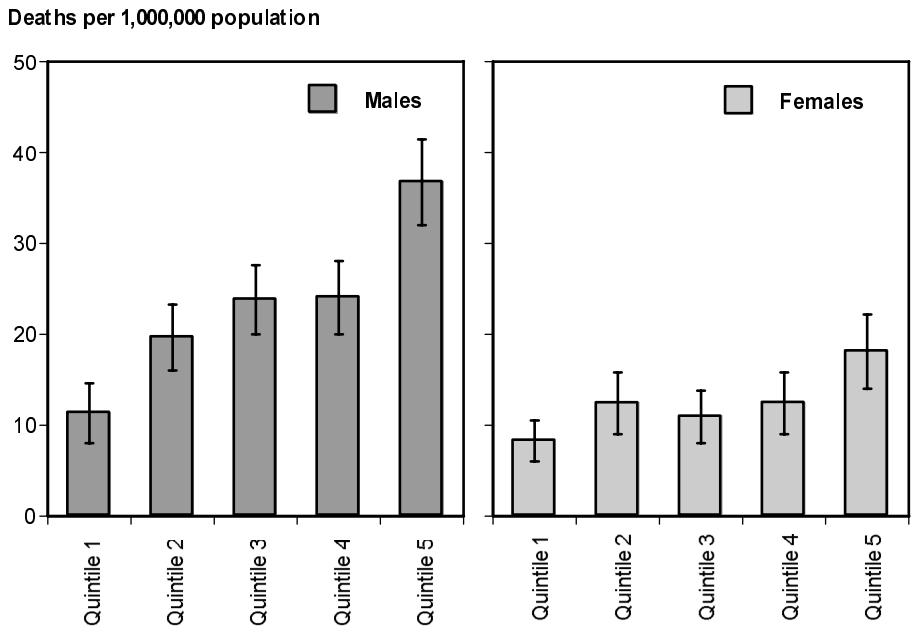


Figure 15.2: Age-standardised mortality rates and fitted trends for homicide, Australia, 1987–1998



Notes

1. The population has been divided into five segments: Quintile 1 represents the highest socioeconomic status, and Quintile 5 the lowest.
2. Bars on graphs represent 95% confidence intervals.

Figure 15.3: Age-standardised mortality rates for homicide by socioeconomic status and sex, Australia, 1995–1997

Table 15.1: Age-specific and age-standardised mortality rates for homicide per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	18	2	5	18	31	40	32	35	34	29	16	26	14	18	14	22	28	0	23	23
1988	13	5	6	19	53	52	36	44	39	30	33	29	22	24	14	21	41	53	29	29
1989	5	5	3	26	43	43	41	34	27	35	39	16	14	16	9	13	13	25	25	25
1990	20	5	5	26	44	41	36	44	34	36	24	35	35	19	23	6	0	0	28	28
1991	8	6	3	17	38	46	50	27	32	25	32	5	22	16	4	19	24	23	24	24
1992	3	2	0	16	30	39	28	34	41	32	31	35	25	6	13	6	23	21	22	22
1993	27	8	5	15	34	41	36	28	18	27	29	23	31	15	4	31	11	60	24	24
1994	14	6	3	15	44	40	34	39	35	37	19	18	8	12	8	12	20	0	24	24
1995	15	3	8	25	36	30	29	37	35	16	34	12	23	24	4	12	10	35	23	23
1996	14	3	1	23	32	51	46	36	24	17	25	24	20	39	11	11	19	17	24	25
1997	13	9	4	23	29	48	30	28	24	27	28	16	11	20	7	36	9	30	23	23
1998	15	7	4	16	27	36	32	40	22	24	23	24	16	17	14	0	9	0	21	21
Females																				
1987	12	5	6	22	35	28	17	11	21	17	16	14	8	16	4	5	24	0	16	16
1988	23	3	10	25	34	30	24	25	21	21	19	3	8	6	4	5	15	20	19	19
1989	23	7	7	7	11	27	21	8	17	11	8	8	3	3	19	9	30	29	13	13
1990	13	11	5	12	28	24	23	32	19	27	7	6	8	6	18	18	7	19	17	17
1991	19	3	7	21	30	27	25	12	27	12	15	11	8	14	11	4	21	9	17	17
1992	11	6	3	14	27	29	26	13	6	17	9	8	14	14	0	4	20	0	14	14
1993	16	6	5	21	25	19	11	10	6	17	14	16	11	6	10	4	13	16	13	13
1994	22	5	2	11	18	15	20	21	21	15	13	5	11	8	0	4	12	16	13	14
1995	9	8	8	6	20	25	26	13	15	21	8	8	11	8	19	13	17	7	14	14
1996	11	6	3	11	13	23	10	11	15	16	12	5	14	14	3	8	6	7	11	11
1997	8	3	6	18	16	16	11	21	13	12	20	14	8	3	12	8	0	0	12	12
1998	16	0	2	14	13	16	22	6	11	7	14	7	8	8	18	4	22	6	11	11

Note: ASMR = age-standardised mortality rate.

Table 15.2: Number of deaths and age-standardised mortality rates for homicide per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	349	293	214	70	64	13	7	73	1,081
1994–1998	411	175	206	90	77	22	7	56	1,044
				Deaths per million population					
1987–1991	24	28	31	20	16	12	9	186	26
1994–1998	27	16	25	25	17	19	8	116	23
				Confidence intervals (95%)					
1987–1991	22–27	25–31	27–35	15–24	12–20	5–18	2–16	133–238	24–27
1994–1998	24–29	13–18	21–28	20–30	13–21	11–27	2–14	83–149	22–24
Females									
				Deaths					
1987–1991	242	166	128	65	35	12	16	31	687
1994–1998	183	97	122	67	41	21	10	29	565
				Deaths per million population					
1987–1991	17	16	18	18	9	11	26	80	16
1994–1998	12	8	15	19	9	18	13	69	12
				Confidence intervals (95%)					
1987–1991	15–19	13–18	15–21	14–23	6–12	5–17	13–38	45–115	15–18
1994–1998	10–13	7–10	12–17	14–23	6–12	10–26	5–21	39–98	11–13

Table 15.3: Age-standardised mortality rates for homicide per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	22	20–25	12	10–13
Rural	20	17–24	10	8–13
Remote	71	53–89	44	29–59

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 15.4: Age-standardised mortality rates for homicide per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	11	8–14	8	6–11
2	20	16–23	12	9–15
3	24	20–28	11	8–14
4	24	20–28	12	9–15
5 Low SES	37	32–42	18	14–22

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 15.5: Age-standardised mortality rates per million population for homicide, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Japan	145	0–382	Hungary	137	0–391
Poland	48	0–111	Germany	61	0–131
USA	41	0–90	France	52	0–155
Finland	39	0–116	Finland	33	0–98
Germany	37	0–78	Japan	29	0–68
China	32	0–65	Hong Kong and Macau	21	0–47
New Zealand	26	12–40	Korea	19	0–58
Australia	**22**	**20–24**	New Zealand	14	4–24
Austria	21	0–51	**Australia**	**13**	**11–14**
United Kingdom and Ireland	16	10–23	Malta	12	0–28
Singapore	14	0–42	USA	9	0–26
Hong Kong and Macau	14	0–34	China	7	0–22
Italy	7	0–14	United Kingdom and Ireland	7	3–11
Hungary	6	0–17	Greece	5	0–10
Greece	4	0–10	Netherlands	3	0–10
Netherlands	2	0–7	Italy	3	0–6
Canada	—	—	Poland	2	0–5
Chile	—	—	Austria	—	—
France	—	—	Canada	—	—
Israel	—	—	Chile	—	—
Korea	—	—	Israel	—	—
Malta	—	—	Mauritius	—	—
Mauritius	—	—	Portugal	—	—
Portugal	—	—	Singapore	—	—
Switzerland	—	—	Switzerland	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

16 Diabetes

Disease characteristics

Diabetes (diabetes mellitus) is a common condition in which either not enough of the hormone insulin is made by the body, or the body cannot use the hormone properly. This disturbs the body's main energy processes and raises the blood glucose level. Diabetes is estimated to affect between 3% and 5% of Australians (DHAC & AIHW 1999). It can have a range of serious effects, especially on the heart and blood vessels, which can result in heart attack, stroke, blindness or gangrene leading to the need for amputation of the affected extremities.

There are several types of diabetes.

- Type 1 diabetes makes up about 10–15% of cases and is the most serious type. The body stops making insulin so daily insulin injections are needed for life. This type of diabetes most often starts in those aged under 40 years.
- Type 2 is the most common form and usually affects those aged 50 years and over. Some people with Type 2 can control their blood glucose levels with diet alone. But many also need to take tablets to help them produce more insulin and many will later need to go on to insulin injections.
- Gestational diabetes occurs during pregnancy in about 4–6% of females not previously diagnosed with diabetes. Gestational diabetes can be an indicator of greater risk of developing Type 2 diabetes later in life.

Type 1 diabetes is believed to be caused by particular biological interactions and exposure to environmental triggers. The risk of developing Type 2 diabetes increases with age, genetic predisposition and body fatness. Low birthweight is considered to be a good marker of the lifetime risk for Type 2 diabetes and physical activity is believed to play a protective role against it. The risk factors for gestational diabetes are similar to those for Type 2 diabetes (AIHW 2000a).

It is estimated that there are 15,000 PYLL each year before age 75 because of diabetes, making it a major cause of premature death in Australia.

Historic view

The diabetes mortality rates increased from 144 deaths per million population for males and 196 for females in 1907, to a peak of 203 for males (or 503 deaths) and 341 for females (or 984 deaths) in the early 1940s. The mortality rates remained high until about 1950, at which time insulin injection was introduced as an effective treatment for Type 1 diabetics. By the late 1950s, rates had decreased to 128 deaths per million population for males and 160 for females. Females continued to have higher diabetes mortality rates than men until 1968, when the rate peaked at 216 deaths per million population for males (or 856 deaths) and 208 for females (or 1,099 deaths).

After 1968, rates for females decreased more sharply than for males, falling to 109 deaths per million population for females and 140 for males in the early 1980s. Since the early 1980s diabetes mortality rates for males have increased and in 1998 the rate was 171 deaths per million population (or 1,515 deaths). Mortality rates for females have remained relatively

stable since the early 1980s and in 1998 there were 113 deaths per million population (or 1,412 deaths) (Figure 16.1).

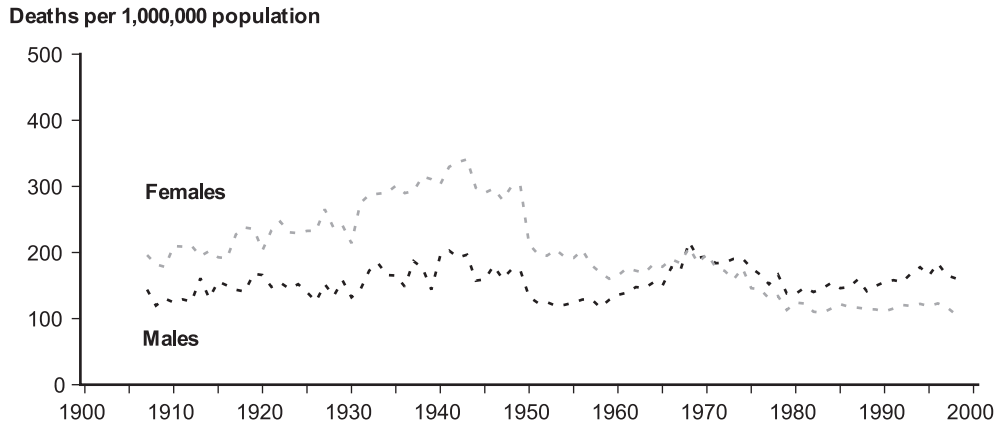


Figure 16.1: Age-standardised mortality rates for diabetes, Australia, 1907–1998

Age–sex distribution

In 1998, 2% of all deaths were attributed to diabetes. Of the 2,927 deaths, 1,515 were of males and 1,412 were of females. In 1998 the mortality rates were 171 deaths per million population for males and 113 for females (Table 16.1). Generally death from diabetes occurs later in life.

- In 1998, about 88% of deaths occurred after age 60, and only 10 deaths occurred before the age of 25 years.
- In 1998, 85% of male deaths occurred from age 60 and 49% occurred from age 75.
- In 1998, 90% of female deaths occurred from age 60 and 64% occurred from age 75.

Twelve-year trends 1987–1998

Across the 1987–1998 period, the diabetes mortality rates increased significantly, by 3.7% per year for males and by 2.1% per year for females. There were significant increases in age-specific rates for males aged 55–59 years and 65–84 years (Table 16.1; Figure 16.2). There were no significant increases in age-specific rates for females.

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The rates of diabetes deaths increased between the periods 1987–1991 and 1994–1998 for males and females overall (Table 16.2). The mortality rates for diabetes also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national diabetes mortality rate:

- The mortality rate for males in Victoria was significantly higher.
- Mortality rates for males in New South Wales, Queensland and Western Australia were significantly lower.
- Mortality rates for females in Victoria and the Northern Territory were significantly higher.
- Mortality rates for females in New South Wales, Queensland and Western Australia were significantly lower.

During the 1994–1998 period:

- Mortality rates for males in Victoria, South Australia and the Northern Territory were significantly higher.
- Mortality rates for males in New South Wales and Queensland were significantly lower.
- Mortality rates for females in Victoria, South Australia and the Northern Territory were significantly higher.
- The mortality rate for females in New South Wales was significantly lower.

Geographic category (by metropolitan, rural and remote area)

During 1995–1997, mortality rates in remote regions were significantly higher than in metropolitan and rural areas, about 60% higher for males (275 deaths per million persons) and 180% higher for females (323).

The differences in mortality rates between rural and metropolitan areas were not as marked. There was no significant difference for males, but the difference for females (17%) was significantly higher (Table 16.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for diabetes for Australian males born in Australia was 100 deaths per million population (Table 16.5).

- The mortality rate for Australian males born in New Zealand was significantly lower than for Australian males born in Australia.
- Mortality rates for Australian males born in Malta, Poland and Italy were significantly higher than for Australian males born in Australia.

For the period 1992–1994, the world-standardised mortality rate for diabetes for Australian females born in Australia was 71 deaths per million population.

- Mortality rates for Australian females born in Canada, New Zealand, and the United Kingdom and Ireland were significantly lower than for Australian females born in Australia.
- Mortality rates for Australian females born in Malta, Italy, Poland and China were significantly higher than for Australian females born in Australia.

Socioeconomic status

For the period 1995–1997, there was an inverse relationship between diabetes mortality rates and socioeconomic status, with 16% of deaths occurring in the highest of the five SEIFA groups and 26% in the lowest SEIFA group (Table 16.4; Figure 16.3) (see Appendix D).

- The mortality rate in the lowest SEIFA group was significantly higher than in the highest SEIFA group, for males (49% higher, 209 deaths per million population compared to 140).
- The mortality rate for females was 98% higher (160 deaths per million population compared to 81).

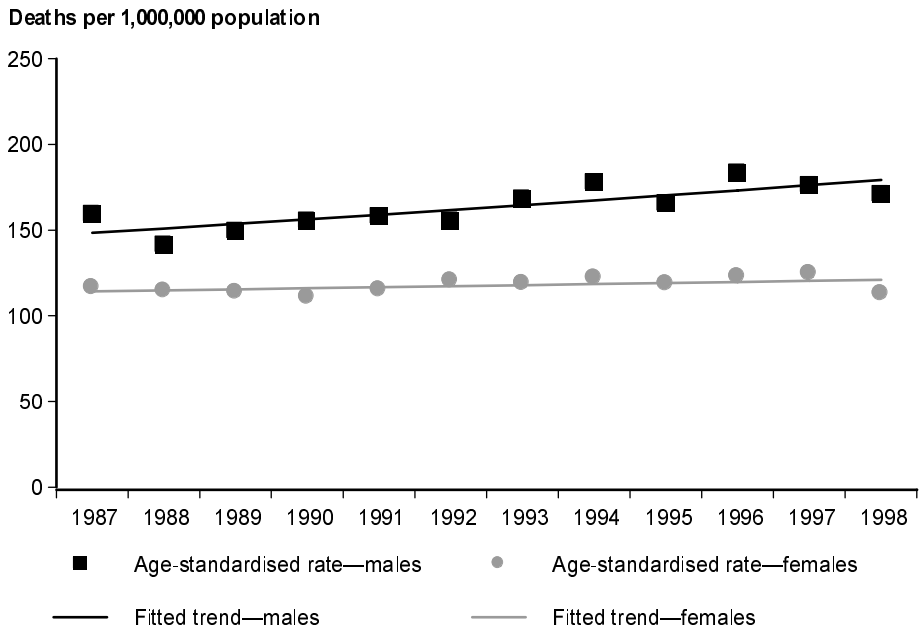
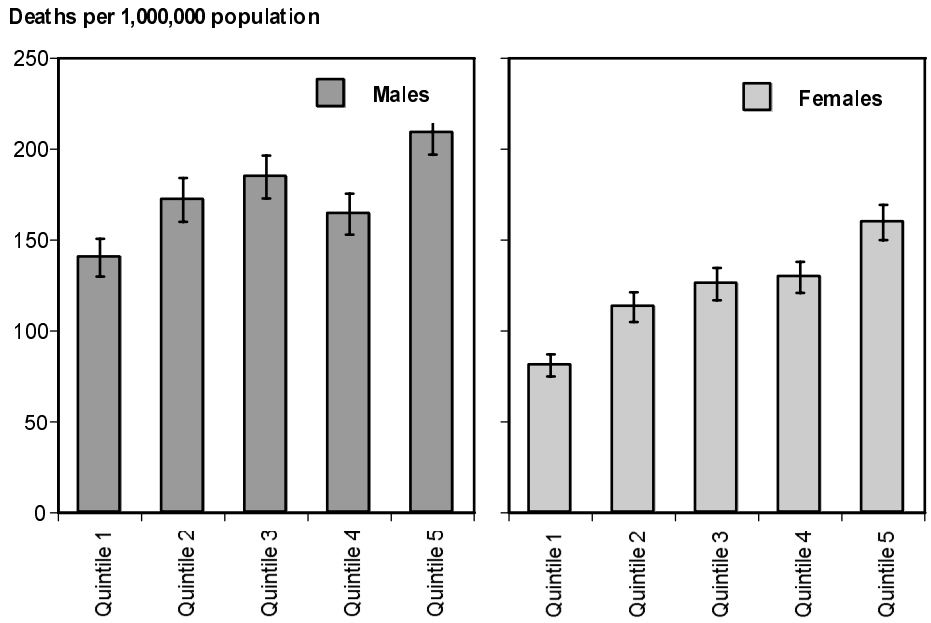


Figure 16.2: Age-standardised mortality rates and fitted trends for diabetes, Australia, 1987–1998



Note: Bars on graphs represent 95% confidence intervals.

Figure 16.3: Age-standardised mortality rates for diabetes by socioeconomic status and sex, Australia, 1995–1997

Table 16.1: Age-specific and age-standardised mortality rates for diabetes per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	0	0	3	3	14	17	32	31	86	129	267	502	789	1,344	2,217	3,227	123	159
1988	0	0	0	0	0	4	20	14	15	37	91	152	277	387	687	1,208	1,911	2,772	112	141
1989	2	0	3	1	1	4	12	14	27	23	79	148	266	459	806	1,242	1,998	2,876	120	149
1990	0	0	0	3	3	7	11	9	28	28	59	134	329	519	854	1,301	1,832	3,103	127	155
1991	0	2	2	0	0	7	6	12	24	53	74	161	281	456	731	1,321	2,002	3,709	129	158
1992	0	0	2	0	6	4	14	10	28	34	52	150	259	499	782	1,425	1,833	3,358	130	155
1993	0	0	0	5	5	4	21	15	35	45	79	201	304	506	878	1,310	2,060	3,535	145	168
1994	0	0	2	2	1	1	4	19	20	60	61	162	329	520	876	1,513	2,476	3,791	155	178
1995	0	0	0	0	0	4	8	14	20	54	69	177	334	543	889	1,233	2,271	3,206	149	165
1996	0	0	0	3	3	3	4	12	24	41	99	174	342	599	913	1,587	2,305	3,847	167	183
1997	0	0	0	2	3	7	9	23	34	49	94	179	289	597	901	1,434	2,343	3,342	165	176
1998	2	0	0	2	5	6	12	21	27	39	86	207	288	582	863	1,385	2,300	3,131	163	171
Females																				
1987	0	0	0	0	0	4	3	11	28	28	65	95	236	266	584	1,076	1,559	2,428	131	116
1988	3	0	0	1	2	3	8	8	18	14	50	132	200	304	572	981	1,627	2,435	131	115
1989	2	0	0	0	2	3	6	5	7	18	41	83	205	315	553	917	1,861	2,568	132	114
1990	0	0	2	0	6	4	4	6	8	17	52	123	148	330	514	961	1,572	2,594	129	111
1991	0	0	0	2	1	6	6	11	11	16	48	100	195	373	577	1,060	1,520	2,372	136	115
1992	3	0	0	0	1	3	3	10	14	17	40	117	214	371	588	1,069	1,624	2,638	145	120
1993	0	0	0	0	3	7	7	9	11	37	65	138	197	394	567	765	1,800	2,626	145	119
1994	2	0	2	2	1	1	7	9	23	30	55	75	216	403	618	948	1,573	2,886	152	122
1995	0	0	2	0	1	4	4	4	19	28	38	119	193	347	598	951	1,746	2,665	151	119
1996	0	2	2	0	1	1	6	8	18	34	58	137	177	324	602	972	1,835	2,832	160	123
1997	2	0	2	3	2	0	9	13	14	28	58	109	217	381	632	1,052	1,694	2,633	162	125
1998	0	0	2	5	2	3	6	9	26	26	73	104	193	284	606	933	1,436	2,523	150	113

Note: ASMR = age-standardised mortality rate.

Table 16.2: Number of deaths and age-standardised mortality rates for diabetes per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	1,589	1,789	693	374	464	124	37	45	5,115
1994–1998	1,916	2,496	1,170	620	752	189	50	71	7,265
				Deaths per million population					
1987–1991	136	210	123	121	162	134	139	224	153
1994–1998	132	242	160	163	209	169	116	353	175
				Confidence intervals (95%)					
1987–1991	129–142	200–220	113–132	109–134	147–177	110–159	90–188	137–311	148–157
1994–1998	126–138	232–251	151–169	150–176	194–224	145–193	82–150	254–452	171–179
Females									
				Deaths					
1987–1991	1,596	1,998	768	457	498	138	34	53	5,542
1994–1998	1,879	2,416	1,140	661	685	185	74	87	7,130
				Deaths per million population					
1987–1991	91	157	101	100	126	104	84	349	114
1994–1998	89	156	117	125	138	115	120	454	120
				Confidence intervals (95%)					
1987–1991	86–95	150–164	94–108	91–110	115–138	86–121	56–113	245–453	111–117
1994–1998	85–93	150–163	111–124	116–135	127–148	98–132	92–147	347–562	117–123

Table 16.3: Age-standardised mortality rates for diabetes per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	168	162–174	113	109–117
Rural	183	173–193	132	125–139
Remote	275	230–320	323	274–373

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 16.4: Age-standardised mortality rates for diabetes per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	140	130–151	81	75–88
2	172	160–184	113	105–121
3	185	173–197	126	117–134
4	164	153–176	130	121–138
5 Low SES	209	197–221	160	150–169

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 16.5: Age-standardised mortality rates per million population for diabetes, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Malta	281	199–363	Malta	277	196–358
Chile	187	0–449	Italy	148	128–168
Canada	169	52–285	Finland	147	3–291
Hungary	154	83–225	Poland	127	92–162
Poland	144	108–180	Hungary	122	67–176
Finland	142	2–282	China	121	82–159
Italy	141	120–162	Mauritius	96	2–190
Mauritius	118	2–234	Israel	96	0–228
Greece	107	75–138	Portugal	95	0–227
Australia	**100**	**95–104**	Greece	90	64–116
Germany	99	63–135	Netherlands	89	62–116
USA	97	22–171	Switzerland	87	0–187
Netherlands	91	56–127	Austria	86	31–141
Singapore	90	0–215	Japan	83	0–200
United Kingdom and Ireland	86	76–95	Germany	81	57–104
China	83	47–119	Korea	77	0–228
France	78	0–169	**Australia**	**71**	**68–74**
Austria	72	18–127	Singapore	57	0–135
Portugal	70	0–208	United Kingdom and Ireland	56	49–63
New Zealand	61	35–87	Hong Kong and Macau	50	0–120
Hong Kong and Macau	51	0–123	USA	48	0–96
Israel	—	—	New Zealand	26	12–40
Japan	—	—	Canada	21	0–52
Korea	—	—	Chile	—	—
Switzerland	—	—	France	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

17 Mental disorders

Characteristics

Mental disorders are disturbances of mood or thought that can affect behaviour and distress the person suffering the disorders or those around them, so that the person cannot function normally (AIHW 2000a). The major groups of mental disorders include schizophrenia, depression, anxiety disorders, dementia (not including Alzheimer's disease) and substance use disorders.

Episodes of mental disorder can be acute or chronic and vary widely in severity, with many sufferers experiencing successive periods of mental illness throughout life. In 1997, the National Survey of Mental Health and Wellbeing found that almost one in five (18%) of adults surveyed reported having a mental disorder within the 12-month period before the survey (DHAC & AIHW 1998b). Mental health care takes place in many settings, from schools to general practitioner's surgeries, to the acute healthcare settings and psychiatric institutions. The care can be administered in many different ways. The treatments used for mental disorders are varied and range from drug therapy to psychological counselling to behavioural strategies, and combinations of these. Depression is the leading cause of non-fatal disease burden in the community (Mathers et al. 1999).

A National Mental Health Strategy has been in place since 1992 and mental health has been identified as one of the six National Health Priority Areas.

Mental retardation is also included with mental disorders. Mentally retarded individuals can experience the full range of mental disorders at rates three to four times those of the general population (WHO 1992).

It is estimated that, in 1998, 33,000 Person Years of Life Lost (PYLL) for males, and about 9,000 PYLL for females were due to mental disorders (ranked fifth for males and ninth for females on this measure).

Of the 3,903 deaths in 1998 from a mental disorder, 29% (1,119) died from a mental disorder associated with dementia, and 24% (922) died from a mental disorder related to drug abuse (alcoholic psychoses, drug pychoses, alcoholic dependence syndrome, drug dependence and non-dependent abuse of drugs). The remaining deaths were attributed to psychoses (not associated with drug abuse or dementia), neurotic disorders, personality disorders and other nonpsychotic mental disorders, and mental retardation (from which there were only 10 deaths in 1998).

It is important to note that about a third of deaths counted in the Dementia and related disorders profile are also included here as deaths due to mental disorders; see Chapter 18.

Age–sex distribution

In 1998, 2.5% of all deaths were due to mental disorders. Of these 3,903 deaths, 1,855 were male and 2,048 were female (Table 17.1; Figure 17.2).

- Deaths from mental disorders increased as age increased.
- In 1998, 58% of the male deaths occurred from the age of 60 years and 45% occurred from age 75.

- For females, 90% of deaths occurred from age 60 years and 82% occurred from age 75.
- While there is a general increase with age in risk of death from mental disorders, the risk is greatest for males between the ages of 20 and 44, and females from age 70.
- In 1998, the mortality rate for mental disorders for males was 214 deaths per million population and for females 145 deaths.

Twelve-year trends 1987–1998

Over the 12-year period, mortality rates attributed to mental disorders increased significantly for males (6.5% per year) and females (7.0%). There were significant increases in age-specific mortality rates for males aged 15–49 years and 65 years and over, and for females aged 30–44, and 60 years and over.

During the 1987–1998 period there was an increase in the absolute numbers of deaths due to mental disorders. The increase was due mostly to senile and pre-senile psychosis, with increases mostly for those aged 75 years and older. While no explanation can be offered at this stage, it is possible that more reliable diagnoses and varying practices in death certification have contributed to this increase (DHAC & AIHW 1998b); as well as increased survival to these ages (Table 17.1; Figure 17.1). The use of illegal drugs has also contributed to the increase in deaths due to mental disorders over the 1987–1998 period.

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The mortality rates due to mental disorders increased significantly between the two periods 1987–1991 and 1994–1998 for males in New South Wales, Victoria, Western Australia and South Australia, and for females in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Australian Capital Territory. There were increases in all States and Territories, except in Tasmania where the rate for males decreased. The mortality rates for mental disorders also showed some variation among the States and Territories (Table 17.2).

During the 1987–1991 period, compared with the national mortality rate for mental disorders:

- The mortality rate for males in Victoria was significantly higher.
- Mortality rates for males in Western Australia, South Australia and the Australian Capital Territory were significantly lower.
- Mortality rates for females in Victoria and Tasmania were significantly higher.
- Mortality rates for females in Western Australia and the Australian Capital Territory were significantly lower.

During the 1994–1998 period:

- Mortality rates for males in New South Wales and Victoria were significantly higher.
- Mortality rates for males in Queensland, Tasmania and the Australian Capital Territory were significantly lower.
- Mortality rates for females in Victoria and South Australia were significantly higher.
- The mortality rate for females in Queensland was significantly lower.

Geographic category (by metropolitan, rural and remote area)

During 1995–1997, mortality rates due to mental disorders for those living in metropolitan areas were 27% higher for males and 11% for females than for those living in rural areas, with the difference being statistically significant. While not statistically significant, mortality rates for remote areas were higher than for rural areas (19% higher for males and 28% for females) (Table 17.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for mental disorders for Australian males and females born in Australia was 97 deaths per million population for males and 68 deaths per million population for females (Table 17.6).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for mental disorders than Australian males and females born in Australia.

Socioeconomic status

Of the five population quintiles of socioeconomic status, measured using the SEIFA Index of Relative Socioeconomic Disadvantage, males and females in the third quintile group had the greatest risk of death from mental disorders (216 deaths per million population and 157 respectively) during 1995–1997.

In comparison, males in the highest socioeconomic group had a significantly lower risk of death (153 deaths per million population).

The converse was true for females, with risk of death significantly lower for the lowest socioeconomic groups than for females in the third quintile (131 and 138 deaths per million population for females in the fourth and fifth quintiles respectively) (see Appendix D) (Table 17.4).

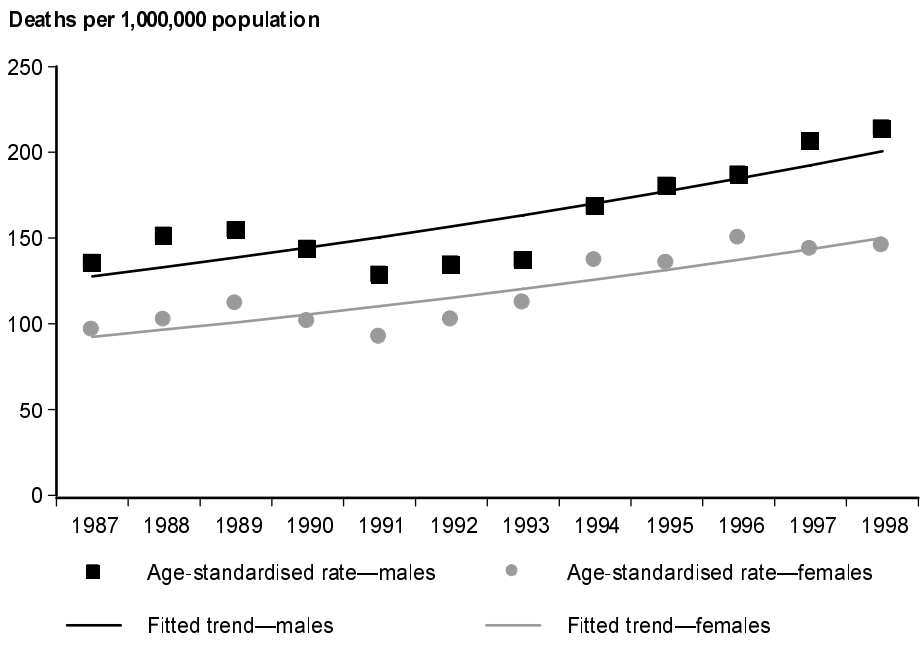


Figure 17.1: Age-standardised mortality rates and fitted trends for mental disorders, Australia, 1987–1998

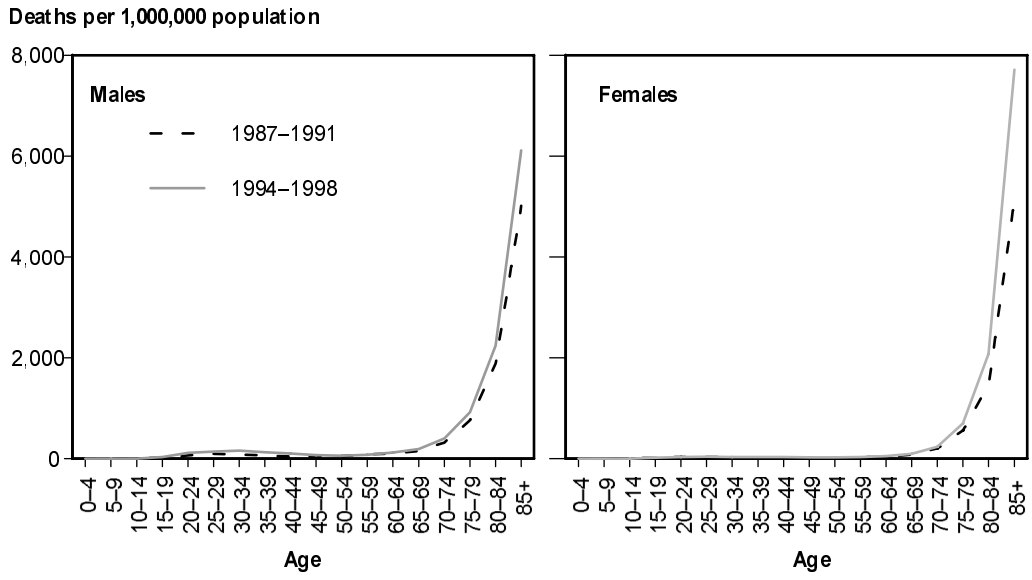


Figure 17.2: Age-specific mortality rates for mental disorders, by sex, Australia, 1987–1991 and 1994–1998

Table 17.1: Age-specific and age-standardised mortality rates for mental disorders per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	0	0	0	17	67	78	62	43	27	43	39	74	98	140	390	734	1,762	4,882	100	135
1988	0	0	2	18	74	109	93	73	65	20	56	75	97	144	301	775	2,074	5,174	115	151
1989	0	0	0	15	59	106	87	89	21	44	69	65	123	166	335	888	2,141	5,128	119	154
1990	0	0	0	24	54	103	97	69	39	42	48	93	109	156	312	705	1,758	5,052	113	144
1991	0	2	0	9	55	70	66	44	46	44	37	79	93	131	254	686	1,694	4,839	101	128
1992	0	0	0	6	61	85	95	61	54	36	49	72	85	178	284	673	1,698	4,647	110	134
1993	0	0	0	2	59	83	86	79	37	42	64	44	89	173	239	716	1,996	4,687	114	137
1994	0	2	2	21	75	84	97	92	62	39	27	71	124	183	360	906	2,263	6,043	142	168
1995	0	0	0	28	73	123	159	110	74	82	52	59	99	170	337	861	2,290	6,148	157	180
1996	2	0	1	31	100	121	111	92	80	58	41	64	93	133	340	986	2,447	6,982	164	187
1997	0	0	2	48	143	183	181	173	123	82	79	88	142	223	551	865	1,931	5,619	191	206
1998	2	0	0	34	179	170	223	156	153	69	68	80	132	231	400	950	2,271	5,839	199	214
Females																				
1987	0	0	0	12	26	40	17	8	11	24	22	25	30	76	180	528	1,381	4,939	115	96
1988	0	0	0	17	46	37	20	14	14	11	21	19	38	58	224	631	1,402	4,989	123	102
1989	2	0	0	16	30	27	30	19	17	15	13	28	32	93	211	591	1,719	5,668	137	112
1990	2	0	0	16	24	25	27	14	13	17	17	25	24	77	192	517	1,507	5,322	126	101
1991	0	0	0	8	17	30	21	17	13	20	15	25	32	63	188	510	1,348	4,735	117	92
1992	0	0	0	6	20	32	22	10	5	9	24	19	36	48	161	550	1,618	5,630	135	102
1993	2	0	5	11	15	18	26	23	12	10	16	19	53	87	198	596	1,813	5,843	151	112
1994	0	0	0	10	13	34	26	26	20	18	11	18	42	93	217	716	2,100	7,694	192	137
1995	2	0	0	13	37	28	37	25	24	16	15	35	36	79	198	656	2,001	7,556	194	135
1996	0	0	0	13	22	25	23	22	25	20	20	17	50	62	226	767	2,231	8,821	224	150
1997	0	0	0	23	51	57	33	35	22	41	38	31	56	115	276	563	1,996	7,401	212	143
1998	4	0	0	28	38	41	42	45	37	20	33	33	48	126	263	764	2,044	7,150	218	145

Note: ASMR = age-standardised mortality rate.

Table 17.2: Number of deaths and age-standardised mortality rates for mental disorders per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	1,659	1,396	690	351	280	145	21	50	4,591
1994–1998	2,972	2,074	1,069	713	663	162	56	74	7,783
				Deaths per million population					
1987–1991	144	170	134	119	105	173	69	215	142
1994–1998	210	207	152	200	183	151	122	242	191
				Confidence intervals (95%)					
1987–1991	137–151	161–180	123–144	107–132	93–118	144–201	35–103	128–301	138–147
1994–1998	202–217	198–216	143–162	185–215	169–197	128–175	87–157	167–317	187–195
Females									
				Deaths					
1987–1991	1,718	1,754	780	340	397	180	29	15	5,213
1994–1998	3,167	2,824	1,411	863	940	244	86	39	9,571
				Deaths per million population					
1987–1991	95	127	94	68	94	124	70	125	101
1994–1998	137	162	124	138	163	132	135	228	142
				Confidence intervals (95%)					
1987–1991	91–100	121–133	88–101	61–75	85–103	106–142	44–96	51–198	98–103
1994–1998	132–142	156–169	118–131	128–147	152–173	115–149	106–164	145–311	139–145

Table 17.3: Age-standardised mortality rates for mental disorders per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	202	195–208	146	142–151
Rural	159	150–169	131	124–137
Remote	189	152–225	168	135–202

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 17.4: Age-standardised mortality rates for mental disorders per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	153	142–164	141	133–149
2	195	182–208	147	138–155
3	216	203–229	157	148–165
4	185	173–197	131	123–140
5 Low SES	201	188–213	138	129–146

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 17.5: Age-standardised mortality rates per million population for mental disorders, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Israel	206	0–466	Israel	317	59–574
France	156	13–300	Switzerland	150	14–287
Finland	154	3–306	Poland	82	49–114
Switzerland	145	0–311	Finland	72	0–214
Japan	139	0–411	**Australia**	**68**	**66–71**
Hungary	138	67–208	Netherlands	63	39–88
Mauritius	121	0–263	United Kingdom and Ireland	63	57–69
Germany	121	65–177	Canada	60	0–121
Canada	105	0–214	Portugal	59	0–174
Australia	**97**	**93–101**	Hungary	56	21–91
USA	87	16–158	Germany	49	22–76
Singapore	86	0–255	Italy	44	34–55
New Zealand	85	57–112	Austria	44	11–78
United Kingdom and Ireland	83	73–92	France	38	0–91
Poland	77	47–108	New Zealand	38	22–54
Malta	64	17–112	Greece	37	21–54
Italy	58	41–75	USA	37	0–73
China	51	16–85	Korea	31	0–92
Netherlands	47	24–69	China	31	13–48
Greece	44	17–71	Mauritius	22	0–64
Austria	35	0–76	Hong Kong and Macau	19	0–56
Portugal	19	0–55	Chile	18	0–52
Chile	—	—	Malta	17	0–36
Hong Kong and Macau	—	—	Japan	—	—
Korea	—	—	Singapore	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

18 Dementia and related disorders

Disease characteristics

This disease category includes some of the conditions also included in the previous disease category *mental disorders*.

Dementia is a general and usually worsening loss of brain power, and affects memory, understanding and reasoning. This affects a person's ability to carry out tasks of daily living, and can also affect social and emotional life.

Dementing illnesses have an insidious onset and usually progress slowly. Dementia can be described in terms of a series of stages, from the initial and mild symptoms to a terminal decline of the central nervous system. The symptoms that occur during the course of the illness and the effects on the individual vary considerably. Eventually, the effects of damage to the brain tissue are cumulative, disabling and terminal (Victorian Department of Human Services 1997).

The most common forms of dementia are Alzheimer's disease, vascular dementia (resulting from one or more strokes that destroy tissue in the brain related to memory and intelligence), and a mixed form of dementia that includes features of both Alzheimer's disease and multi-stroke dementia (Henderson & Jorm 1998).

The causes of dementia are not fully understood, but a number of risk factors have been identified. They differ by type of dementia.

- The risk factors for Alzheimer's disease include a family history of the disease (a genetic component has been isolated), head trauma, age and Down syndrome.
- The risk factors for vascular dementia include family history and a genetic component, age, and cardiovascular related risk factors that include stroke, diabetes mellitus, hypertension, blood cholesterol and smoking.

In 1997, the ABS introduced an automatic system for the coding of death certificates. The introduction of this system has resulted in changes in the coding rules for this cause of death. Consequently, there has been a break in the time series for deaths due to dementia and related disorders and therefore this report only includes data up until 1996.

Age–sex distribution

In 1996, 3% of all deaths were due to dementia and related disorders. Of these 3,873 deaths, 1,294 were of males and 2,579 were of females (Table 18.1).

- For males, 99% of male dementia deaths occurred from the age of 60 and over, and 36% occurred from age 75.
- For females, 100% of the deaths occurred from the age of 60 and over, and 93% occurred from age 75.

In 1996, the overall mortality rates for males (171 per million population) and females (182) were similar. Mortality rates tended to be higher for males than females between 65 and 84 years, and 63% of deaths in females occurred after the age of 84.

Ten-year trends 1987–1996

There has been an increase over time in the mortality rates for dementia and related disorders. The increase has been significant for both males (2.9% per year) and females (5.3%). This upward trend has been particularly influenced by the significant increases in the population of males aged 80 and older, and females aged 75 years and older. It is possible that more reliable diagnoses and varying practices in death certification may also have contributed to this increase (DHAC & AIHW 1998b) (Table 18.1; Figure 18.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The mortality rates due to dementia and related disorders increased between the two periods 1987–1991 and 1994–1996 for males and females in all States and Territories, except in Tasmania where the rate for females decreased. The mortality rates for dementia and related disorders also showed some variation among the States and Territories (Table 18.2).

During the 1987–1991 period, compared with the national mortality rate for dementia and related disorders:

- Mortality rates for males in Victoria and Tasmania were significantly higher.
- The mortality rate for males in the Australian Capital Territory was significantly lower.
- Mortality rates for females in Victoria and Tasmania were significantly higher.
- Mortality rates for females in New South Wales, Queensland and the Australian Capital Territory were significantly lower.

During the 1994–96 period:

- Mortality rates for females in Victoria and South Australia were significantly higher.
- The mortality rate for females in Australian Capital Territory was significantly lower.

Geographic category (by metropolitan, rural and remote area)

In the 2-year period 1995–1996, the risk of death from dementia and related disorders was significantly lower for males living in remote areas (97 deaths per million population) than for males living in rural areas (158 deaths per million population) and metropolitan areas (169 deaths per million population).

There were no significant differences between areas for females, and mortality rates varied by about 14% across areas, with the highest rate in metropolitan areas (178 deaths per million population) (Table 18.3; Figure 18.2).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for dementia and related disorders for Australian males and females born in Australia was 79 deaths per million population for males and 82 deaths per million population for females (Table 18.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for dementia and related disorders than Australian males and females born in Australia.
- Mortality rates for Australian males born in China and Italy were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian females born in Malta, China, Greece, Germany, New Zealand and Italy were significantly lower than for Australian females born in Australia.

Socioeconomic status

In the 2-year period 1995–1996, there was no significant difference between the mortality rates in the highest and lowest of the five socioeconomic groups, using the SEIFA Index of Relative Socioeconomic Disadvantage.

The risk of death for males was greatest in the lowest socioeconomic group while for females the greatest risk tended to be in the three highest groups (Table 18.4) (see Appendix D).

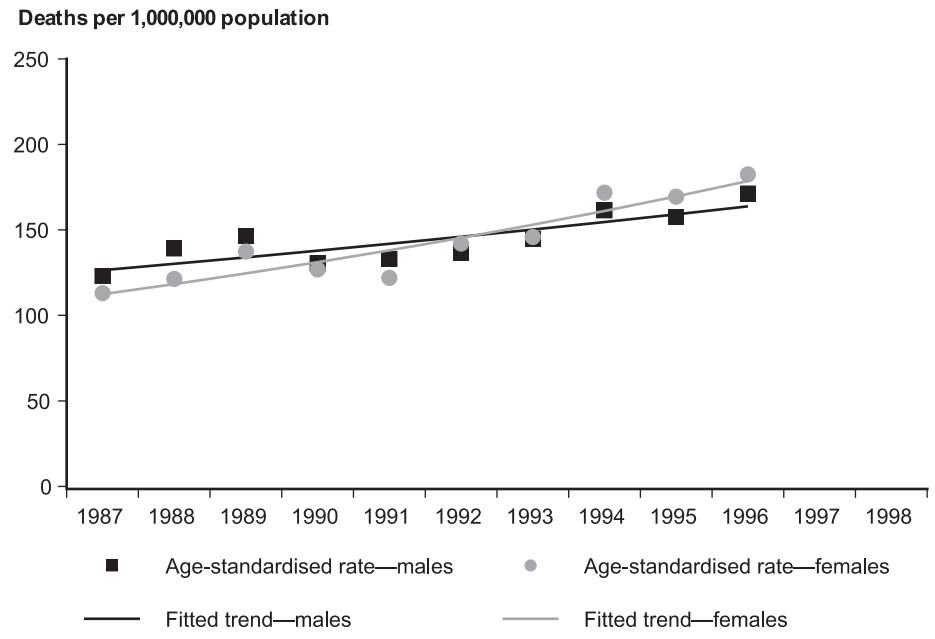
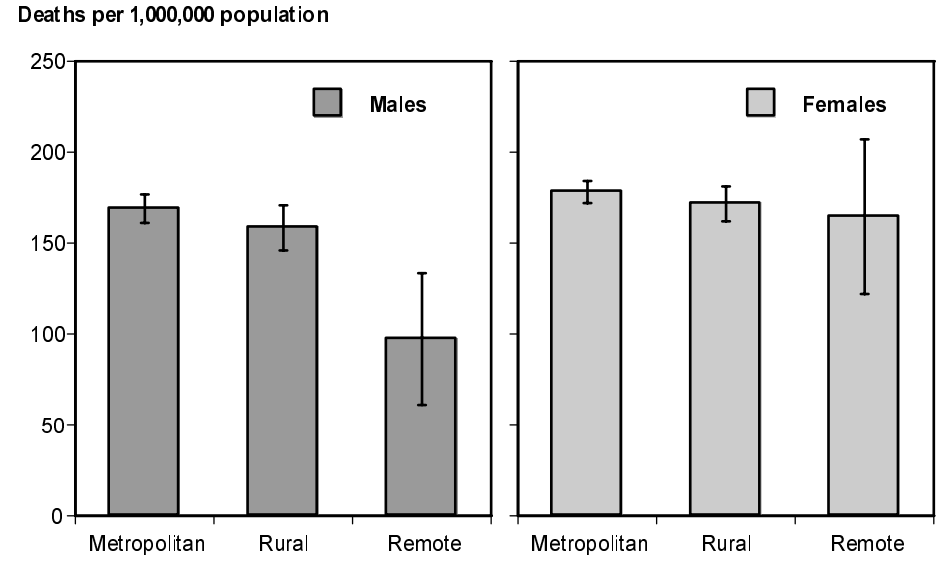


Figure 18.1: Age-standardised mortality rates and fitted trends for dementia and related disorders, Australia, 1987–1996



Note: Bars on graphs represent 95% confidence intervals.

Figure 18.2: Age-standardised mortality rates for dementia and related disorders, by geographic area and sex, Australia, 1995–1996

Table 18.1: Age-specific and age-standardised mortality rates for dementia and related disorders per million population, Australia, 1987–1996

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	2	0	0	0	0	0	0	0	2	7	3	11	37	122	390	973	2,331	5,765	80	123
1988	3	0	0	0	0	0	0	0	2	4	5	16	33	123	339	1,104	3,036	6,335	92	139
1989	0	0	0	0	0	1	0	2	0	0	0	16	33	130	396	1,268	2,959	6,703	99	146
1990	2	0	0	0	0	0	0	0	0	0	10	16	46	118	307	1,042	2,414	6,520	89	130
1991	0	0	0	0	0	0	0	0	0	4	2	8	44	106	319	956	2,808	6,536	94	133
1992	0	2	0	0	0	0	3	0	0	2	9	11	17	142	359	987	2,478	7,139	99	137
1993	2	0	0	0	1	1	0	1	0	3	4	13	34	118	327	1,059	2,983	7,230	109	145
1994	2	0	0	0	0	0	0	1	2	0	4	5	45	132	447	1,176	3,065	8,239	126	161
1995	0	0	0	2	0	0	0	1	0	0	2	17	25	137	344	1,115	3,089	8,279	126	157
1996	0	0	1	0	0	1	0	0	0	0	4	21	31	122	424	1,270	3,250	8,955	142	171
Females																				
1987	3	0	0	0	0	0	3	2	0	0	0	11	62	98	254	810	1,931	6,081	138	113
1988	3	0	0	0	0	0	0	0	2	2	5	8	41	94	303	957	1,945	6,582	150	121
1989	0	0	0	0	0	0	0	0	2	2	8	14	38	140	316	861	2,511	7,528	173	137
1990	0	0	0	0	0	0	0	0	0	2	5	11	35	138	288	802	2,031	7,376	162	127
1991	0	0	0	0	0	0	1	0	0	4	0	20	22	91	223	825	2,132	7,062	160	122
1992	0	0	0	0	0	0	0	0	0	2	2	14	38	79	314	947	2,555	8,086	191	142
1993	0	0	0	2	0	0	0	1	0	2	5	3	58	96	264	935	2,672	8,388	203	146
1994	0	0	0	0	1	0	0	0	2	2	2	34	25	133	334	1,023	2,991	10,227	247	172
1995	0	2	0	0	0	0	0	1	3	3	6	20	34	99	319	994	2,946	10,266	252	169
1996	2	0	0	2	0	1	1	0	1	3	2	10	50	99	327	1,058	3,012	11,420	280	182

Note: ASMR = age-standardised mortality rate.

Table 18.2: Number of deaths and age-standardised mortality rates for dementia and related disorders per million population, States and Territories, 1987–1991 and 1994–1996

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	1,212	1,095	612	387	314	157	15	6	3,798
1994–1996	796	658	373	250	246	79	20	6	3,546
				Deaths per million population					
1987–1991	124	153	129	144	128	191	60	88	135
1994–1996	155	178	147	183	192	193	151	179	164
				Confidence intervals (95%)					
1987–1991	117–131	144–162	118–139	130–159	113–142	161–222	28–91	11–165	130–139
1994–1996	144–166	164–192	132–162	160–206	168–216	151–236	82–219	35–322	158–169
Females									
				Deaths					
1987–1991	2,124	2,125	923	588	571	217	31	9	6,588
1994–1996	1,600	1,380	749	464	522	109	29	12	7,081
				Deaths per million population					
1987–1991	113	150	111	115	135	149	79	106	124
1994–1996	165	194	167	172	225	145	120	274	175
				Confidence intervals (95%)					
1987–1991	108–118	143–156	104–118	106–125	124–146	129–169	51–106	35–178	121–127
1994–1996	157–173	183–204	155–180	156–188	206–245	118–173	76–164	117–431	171–179

Table 18.3: Age-standardised mortality rates for dementia and related disorders per million population, by geographic area, 1995–1996

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	169	161–177	178	172–184
Rural	158	146–170	172	162–181
Remote	97	61–134	164	122–207

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 18.4: Age-standardised mortality rates for dementia and related disorders per million population, by socioeconomic status, 1995–1996

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High	153	139–167	171	160–181
2	169	153–184	184	172–196
3	169	154–184	197	186–209
4	153	138–167	161	150–172
5 Low	179	164–194	168	157–179

Notes
1. ASMR = age-standardised mortality rate; SES = socioeconomic status.
2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 18.5: Age-standardised mortality rates per million population for dementia and related disorders, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Israel	246	0–588	Israel	290	58–522
Japan	139	0–411	Switzerland	177	31–323
Hungary	109	56–161	Finland	106	0–262
Canada	95	0–197	Poland	87	55–119
Netherlands	88	55–121	United Kingdom and Ireland	83	77–89
Germany	87	51–124	**Australia**	**82**	**79–85**
Singapore	86	0–255	Netherlands	78	51–104
Switzerland	84	0–200	Hungary	69	31–107
Australia	**79**	**76–83**	Italy	61	49–74
Finland	79	0–189	Austria	60	20–101
United Kingdom and Ireland	75	68–83	Canada	60	0–121
New Zealand	73	44–101	USA	59	11–106
Poland	71	47–94	Portugal	59	0–174
Malta	62	14–109	France	57	0–123
Italy	60	46–73	New Zealand	53	34–72
USA	57	0–118	Germany	49	30–68
Greece	53	30–76	Greece	48	29–67
France	52	0–125	Singapore	44	0–130
China	36	11–61	China	43	22–64
Austria	36	0–77	Hong Kong and Macau	38	0–90
Mauritius	33	0–96	Mauritius	35	0–84
Chile	—	—	Korea	31	0–92
Hong Kong and Macau	—	—	Malta	27	0–54
Korea	—	—	Chile	—	—
Portugal	—	—	Japan	—	—

Notes
1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.

19 Smoking-related disease

Disease characteristics

Smoking is the single greatest preventable agent of disease in Australia and similar countries. Smoking has been causally linked to death from 36 diseases (see Appendix Table D5). It is estimated that in 1998 there were 17,820 deaths in Australia attributable to the smoking of tobacco (accounting for 14% of all deaths) (Figure 19.1).

Mortality due to tobacco smoking is of major concern, because of the large numbers of deaths attributed each year and because, on the whole, these deaths are preventable. Tobacco increases the risk of coronary heart disease, stroke and peripheral vascular disease as well as a range of cancers and other diseases and conditions (Mathers et al. 1999).

Most deaths associated with active cigarette smoking are due to lung cancer, ischaemic heart disease and COPD. Most associated deaths occur after the age of 65–73% of deaths in males and 76% of deaths in females.

Tobacco consumption has existed for many centuries in a number of different forms, from sucking and chewing tobacco to smoking it with pipes and cigars. The manufactured cigarette is a more recent phenomenon in historical terms, and has had a major impact on how tobacco is used worldwide. The accessibility and convenience of smoking cigarettes has led to frequent, addictive use. While the other methods of tobacco consumption have their own disease burdens, the frequency of use and depth of inhalation involved in cigarette smoking have resulted in far more disease.

Passive-smoking-related deaths are not included here due to the difficulties associated with estimating total passive exposure to cigarette smoke. Deaths due to exposure of the foetus to cigarette smoking by the mother have been included in the analysis (English et al. 1995).

There were an estimated 118,000 PYLL before the age of 75 in 1998, making smoking-related disease the largest cause of preventable premature death in Australia.

Historic view

The manufactured cigarette was first marketed in England in the 1850s. The convenience of cigarettes meant that they were distributed widely, and during the First World War 60% of tobacco donated to the Allies was in the form of the cigarette. Between the First and Second World Wars, it was males who smoked, but by the time the Second World War was over, three-quarters of the male population and a quarter of the female population were smoking. In 1950 Doll and Bradford-Hill published their studies causally linking smoking and lung cancer and by the early 1960s the evidence on the harmful effects of smoking was overwhelming (Winstanley, Woodward & Walker 1995).

Smoking rates in Australia have been declining since the 1970s but the rates of decrease slowed in the 1990s (Mathers et al. 1999). Male rates of smoking declined from 72% in 1945 to 30% in 1995, while female smoking rates increased from 26% in 1945 to 33% in 1976, and fell back to 25% in 1995 (Makkai & McAllister 1998).

Age–sex distribution

The causes of death causally linked to smoking are listed in Appendix Table D5. Males represented 12,849 (72%) of the smoking-related deaths. For 1998 it is estimated that 19% of all male deaths were attributable to tobacco smoking, with the mortality rate for males (1,437 per million) three times as high as the rate for females (428) (Table 19.1). These estimates refer only to active smoking of cigarettes. The health problems associated with cigar and pipe smoking have not been included because their much lower use makes it difficult to estimate their population impact as precisely as that of cigarettes.

Age-specific mortality rates were 66 per million for boys aged 0–4 (due to exposure of the foetus to cigarette smoking by the mother) and 53 per million for girls 0–4, before dropping off significantly until adulthood (Figure 19.3; Table 19.1).

Twelve-year trends 1987–1998

Smoking-related mortality rates decreased significantly over 1987–1998, reflecting declines in cigarette use in earlier decades. Mortality rates for males decreased by 8.7% each year, with significant decreases in the 0–4 years age group and all age groups from age 35 onwards. Mortality rates for females decreased 0.6% each year with significant decreases in the 0–4 years age group, and most age groups from age 40 years onwards (Table 19.1; Figure 19.2).

Figure 19.1 provides an insight into the impact of smoking on overall cancer mortality rates over the second half of the 20th century. If lung cancer, which is almost entirely due to smoking, is included, overall male cancer mortality rates steadily increase over the period. If lung cancer is excluded these rates would have remained fairly constant.

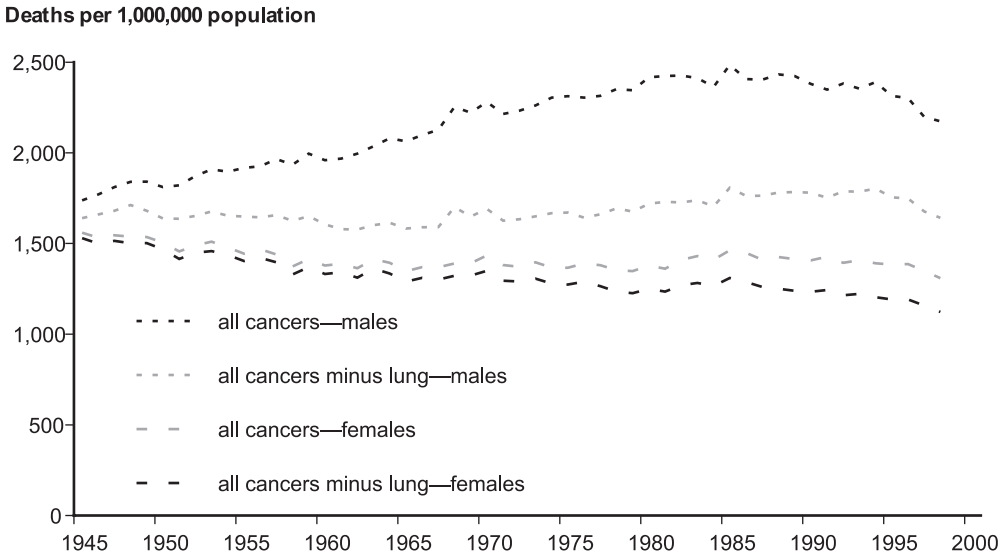


Figure 19.1: Trends in all cancers, with and without lung cancer: age-standardised rates by year, Australia, 1945–1998

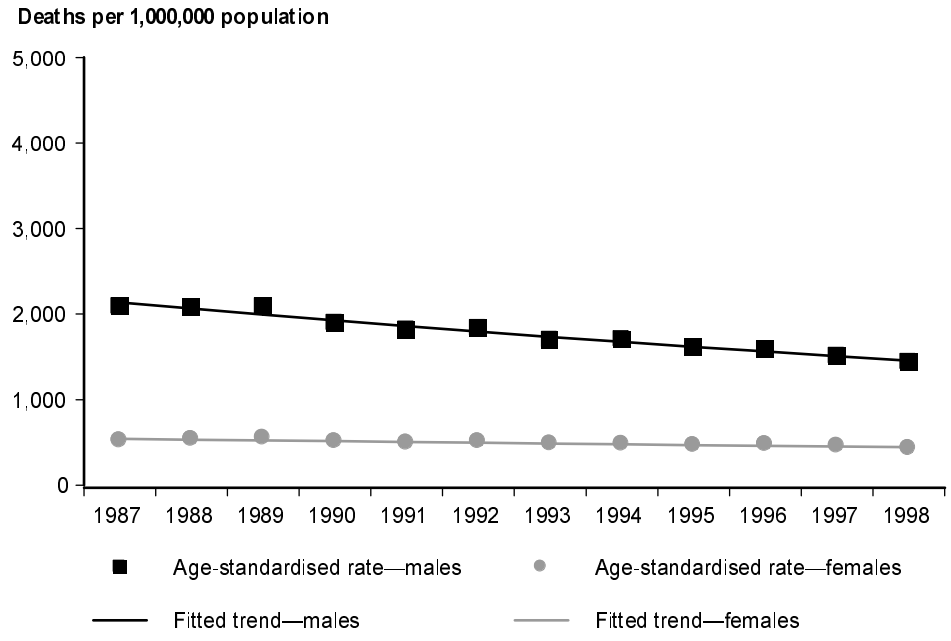


Figure 19.2: Age-standardised mortality rates and fitted trends for smoking-related disease, Australia, 1987–1998

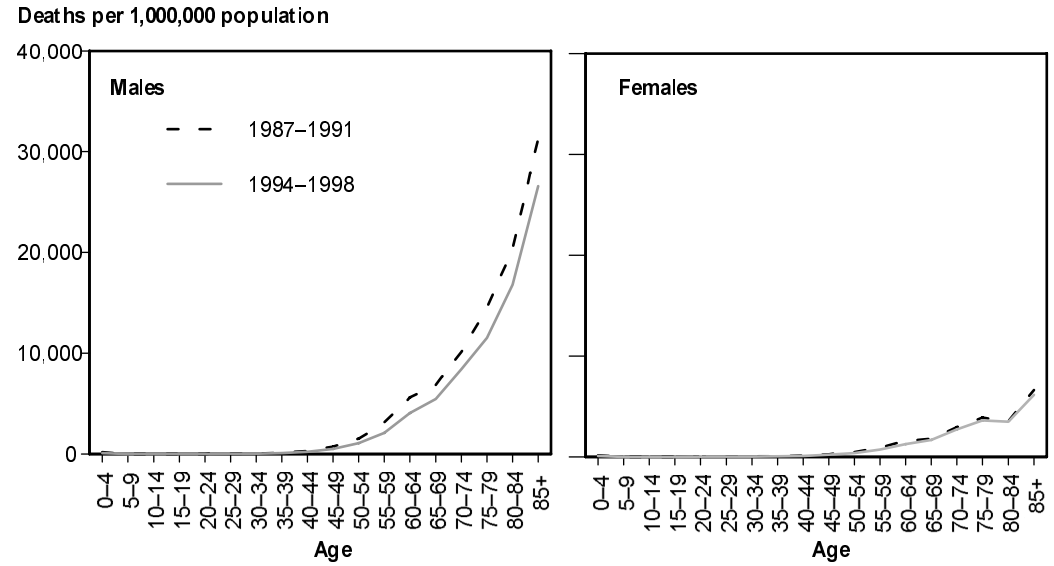


Figure 19.3: Age-specific mortality rates for smoking-related disease, by sex, Australia, 1987–1991 and 1994–1998

Comparisons by State and Territory, geographic category, Indigenous origin, country of birth and socioeconomic status have not been made for deaths attributable to tobacco smoking.

Table 19.1: Age-specific and age-standardised mortality rates for smoking-related disease per million population, Australia, 1987–1998

	Age																		ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	238	0	1	9	14	25	53	141	321	859	1,707	3,549	5,961	7,152	10,631	14,960	20,722	32,328	1,718	2,088
1988	225	1	1	6	17	30	58	158	343	807	1,599	3,249	5,991	6,984	10,599	15,266	21,120	32,405	1,718	2,076
1989	210	1	1	9	12	32	65	149	296	771	1,577	3,147	5,698	7,077	10,898	15,312	21,791	33,912	1,737	2,087
1990	206	0	0	9	22	31	47	124	297	711	1,429	3,040	5,356	6,572	9,450	13,786	19,886	29,646	1,600	1,895
1991	175	0	0	10	13	27	55	131	282	665	1,337	2,762	5,094	6,501	9,172	13,346	18,456	28,718	1,556	1,813
1992	155	1	0	3	14	22	53	116	280	610	1,323	2,668	5,097	6,509	9,333	13,643	19,325	29,592	1,592	1,833
1993	123	1	1	4	12	19	51	133	252	552	1,250	2,495	4,758	5,884	8,841	12,418	17,587	27,799	1,498	1,695
1994	104	1	1	8	12	25	60	118	241	551	1,190	2,331	4,481	6,027	9,143	12,903	17,073	29,346	1,527	1,704
1995	114	1	0	4	17	24	48	131	239	540	1,129	2,222	4,140	5,678	8,659	11,659	17,438	26,654	1,466	1,607
1996	114	1	0	6	12	26	49	104	243	530	1,124	2,028	4,114	5,460	8,281	11,652	17,643	27,511	1,468	1,586
1997	80	0	0	11	16	30	60	118	235	524	1,019	1,976	3,969	5,128	8,029	10,985	16,453	26,119	1,422	1,508
1998	66	1	0	10	11	28	54	110	236	469	946	1,903	3,604	4,965	7,847	10,571	15,641	24,810	1,379	1,437
Females																				
1987	149	0	0	4	9	20	36	69	122	260	509	879	1,569	1,730	2,902	3,807	3,530	6,692	566	520
1988	146	0	0	2	12	17	35	58	126	257	465	1,003	1,664	1,860	2,977	3,924	3,630	6,546	585	535
1989	145	1	0	3	11	19	35	53	129	269	474	986	1,662	1,851	3,177	4,031	3,763	7,031	605	550
1990	162	0	0	5	9	23	32	63	106	223	431	831	1,553	1,785	2,882	3,900	3,353	6,461	564	509
1991	116	1	0	2	11	20	27	50	103	240	421	815	1,513	1,692	2,784	3,795	3,345	6,345	551	492
1992	116	1	0	1	14	16	30	47	102	207	444	835	1,505	1,832	2,888	4,009	3,459	6,728	579	510
1993	93	3	0	5	9	14	30	55	112	223	404	760	1,371	1,740	2,866	3,854	3,238	6,066	555	483
1994	87	1	1	6	8	12	25	51	94	212	409	768	1,290	1,739	2,794	3,834	3,478	6,292	560	479
1995	83	2	1	3	8	12	26	48	98	188	415	657	1,334	1,704	2,735	3,642	3,428	6,041	548	465
1996	89	0	0	4	7	13	26	59	93	196	411	756	1,273	1,702	2,735	3,785	3,495	6,507	571	476
1997	60	0	0	9	6	14	36	51	85	208	363	716	1,214	1,704	2,631	3,492	3,479	6,417	557	457
1998	53	1	0	7	14	18	27	57	94	184	350	642	1,140	1,486	2,583	3,275	3,426	5,773	528	428

Note: ASMR = age-standardised mortality rate.

20 Alcohol-related disease

Disease characteristics

It is estimated that 77% of Australians consume alcohol, making it the most widely used drug in Australia. Thirty-six per cent of those consuming alcohol will usually do so at what is considered a harmful rate (over four standard drinks per day for males, over two standard drinks per day for females, and less than two alcohol-free days per week) (DHAC 2000a).

Alcohol consumption is considered by many health officials to be an important and intractable problem. The use of alcohol in Australian society cuts across a wide range of social groups, and it plays a role in most social gatherings and celebrations. Attributing related deaths is difficult (Makkai & McAllister 1998). However, it is presently causally linked to death from 35 diseases (see Appendix Table D.6).

Using data from the 1995 National Drug Survey, Makkai and McAllister found that while there did not appear to be a significant difference between the sexes in harmful/hazardous drinking. Males were more likely to indicate that they were moderate drinkers, and females were more likely to indicate that they were non-drinkers. They also found that for the period 1988–1995, the level of heavy drinking declined and the level of abstinence increased.

Deaths due to alcohol-related disease represented about 3.5% of all deaths, and 67,000 PYLL (about 7%) before the age of 75 making alcohol related disease a major cause of death in Australia. However, these results need to be offset against the known benefits of moderate alcohol consumption.

Age–sex distribution

The causes of death causally linked to alcohol are listed in Appendix Table D6.

There are about 3,500 deaths each year due to alcohol-related disease. In 1998, there were 2,344 male deaths and 1,193 female deaths attributed to alcohol consumption. The rate of death attributable to alcohol for males (252 deaths per million population) was 2.4 times the rate for females (104).

Mortality rates for males were highest among those aged 15–29, largely due to accidents and injuries involving consumption of alcohol, and for ages 50 and over, largely related to chronic alcohol consumption. For women, the effect of alcohol-related accidents and injuries was not so great and mortality rates generally increased with age, particularly from age 65 onwards (Table 20.1; Figure 20.2).

Twelve-year trends 1987–1998

Over the period 1987–1998, there was a significant downward trend in deaths due to alcohol-related disease. There was a significant decrease in mortality rates for males of 2.6% each year, with significant decreases for males aged 5 years and older. The decrease for females was 1.7% per year, with significant decreases for females aged between 20–29, 45–49 and aged 55 years and over (Table 20.1; Figure 20.1).

Comparisons by State and Territory, geographic region, Indigenous origin, country of birth and socioeconomic status have not been made for deaths attributable to excessive consumption of alcohol.

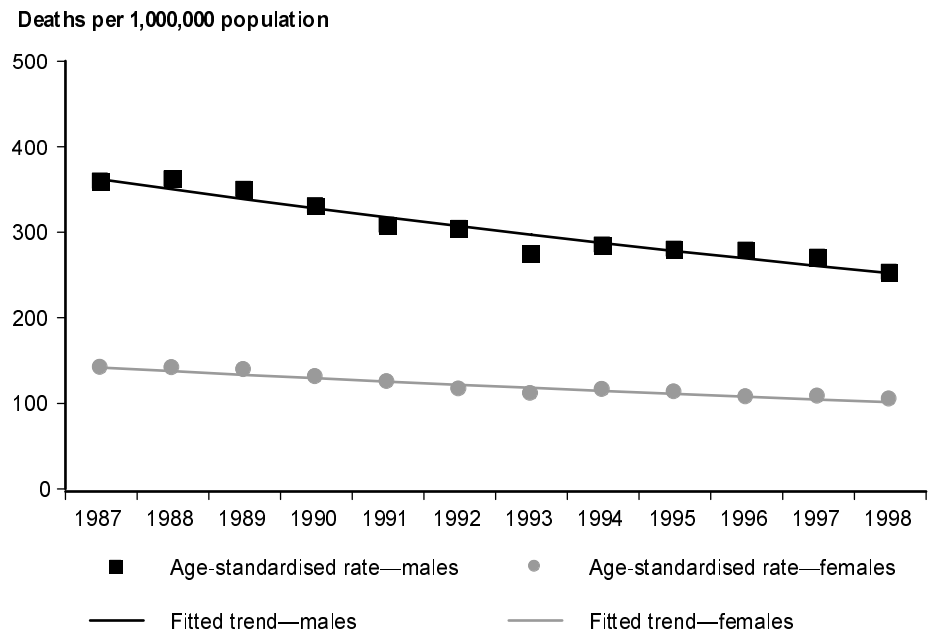


Figure 20.1: Age-standardised mortality rates and fitted trends for alcohol-related disease, Australia, 1987–1998

Figure 20.2: Age-specific mortality rates for alcohol-related disease, by sex, Australia, 1987–1991 and 1994–1998

Table 20.1: Age-specific and age-standardised mortality rates for alcohol-related disease per million population, Australia, 1987–1998

	Age																			ASMR
Year	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude rate	Aust 1991
Males																				
1987	26	22	30	209	347	246	177	208	247	379	537	713	894	882	1,074	1,009	1,205	2,043	336	359
1988	25	24	30	217	368	303	195	205	296	320	477	573	858	869	1,085	1,120	1,178	2,335	338	361
1989	17	20	28	207	342	295	190	231	200	315	485	615	757	949	1,009	1,058	1,231	2,352	327	349
1990	24	26	23	177	305	278	186	190	227	326	445	594	767	875	991	954	1,027	2,204	311	330
1991	15	18	21	165	269	226	174	196	221	300	391	578	726	871	887	949	1,098	1,815	291	307
1992	15	18	18	140	242	216	158	173	235	289	443	529	731	945	870	943	1,143	1,902	289	304
1993	21	12	15	145	236	214	145	189	199	270	400	469	577	741	857	820	870	1,930	263	274
1994	14	10	18	140	230	205	134	193	226	267	344	501	668	756	888	944	1,136	2,006	273	284
1995	15	15	16	137	255	200	146	188	198	270	374	489	649	768	833	842	1,007	2,002	271	279
1996	19	12	19	142	244	188	169	189	216	277	390	452	648	707	862	767	1,099	1,896	273	278
1997	18	10	15	144	229	195	150	162	225	288	389	442	612	741	845	748	976	1,695	268	270
1998	13	10	13	122	219	197	155	168	203	241	350	423	576	671	726	747	840	1,841	252	252
Females																				
1987	11	9	10	43	86	62	54	59	86	137	144	171	238	335	785	219	960	2,420	152	141
1988	11	10	9	42	92	70	50	58	87	142	154	183	280	294	754	282	894	2,176	152	141
1989	12	10	8	38	78	55	52	62	88	116	143	184	247	327	738	291	927	2,372	151	138
1990	8	11	8	38	76	51	38	63	58	115	157	179	224	366	708	228	849	2,174	142	130
1991	9	5	5	37	73	72	50	55	71	98	144	178	234	344	650	185	820	1,857	136	124
1992	7	5	6	31	70	54	44	53	52	111	129	159	221	315	598	170	748	1,986	130	116
1993	8	7	7	31	56	34	47	55	51	83	130	165	202	298	622	166	779	1,840	126	110
1994	13	7	5	27	51	45	39	55	73	133	112	149	245	277	568	207	782	1,990	134	115
1995	5	6	8	31	56	51	47	47	73	103	133	160	174	281	586	190	757	1,957	132	112
1996	7	6	6	28	43	43	33	47	67	97	126	160	187	271	566	191	734	1,868	127	106
1997	5	4	6	30	57	45	53	50	86	95	145	119	157	263	538	182	720	1,871	129	107
1998	8	2	4	34	49	38	49	56	58	89	127	132	161	274	532	206	676	1,860	127	104

Note: ASMR = age-standardised mortality rate.

Appendixes

Appendix A List of tables

Appendix B List of figures

Appendix C Population data

Table C.1: Australian Standard Population and World Standard Population

	Australian Standard Population (1991)*		World Standard Population**	
	Population	% of total	Population	% of total
0–4	1,271,703	7.4	12,000	12.0
5–9	1,272,208	7.4	10,000	10.0
10–14	1,241,619	7.2	9,000	9.0
15–19	1,364,074	7.9	9,000	9.0
20–24	1,396,764	8.1	8,000	8.0
25–29	1,399,663	8.1	8,000	8.0
30–34	1,425,735	8.2	6,000	6.0
35–39	1,328,387	7.7	6,000	6.0
40–44	1,294,271	7.5	6,000	6.0
45–49	1,029,145	6.0	6,000	6.0
50–54	846,934	4.9	5,000	5.0
55–59	725,950	4.2	4,000	4.0
60–64	736,868	4.3	4,000	4.0
65–69	671,390	3.9	3,000	3.0
70–74	510,755	3.0	2,000	2.0
75–79	384,495	2.2	1,000	1.0
80–84	229,828	1.3	500	0.5
85+	154,247	0.9	500	0.5
Total	**17,284,036**	**100.0**	**100,000**	**100.0**

Sources: *ABS (1993); **Doll and Smith (1982).

Table C.2: Selected countries mortality rates per 100,000, world standard population, males, 1996

Country	All deaths	Lung	Prostate	Ischaemic heart disease	Cerebro-vascular	Road traffic accidents	Suicide
Hungary	11,361	837	177	2,269	1,222	240	392
Israel	5,515	281	124	1,181	404	153	111
Finland	6,804	413	180	1,881	597	106	358
Poland	9,638	735	111	1,147	583	270	215
USA	6,804	555	173	1,373	308	206	172
France	5,863	463	162	508	323	191	244
Germany	6,577	466	170	1,331	524	159	175
Austria	6,386	408	175	1,313	537	198	266
United Kingdom	6,262	477	171	1,624	459	83	99
Canada	5,583	512	164	1,193	296	138	178
Netherlands	6,056	612	196	1,025	392	101	105
Portugal	7,511	287	170	652	1,231	351	92
Italy	5,917	553	114	803	554	198	93
Australia	5,647	402	196	1,305	403	149	185
Greece	8,461	726	163	1,281	1,199	336	55
Singapore	6,428	453	72	1,231	579	127	150
Chile	7,721	234	143	607	664	157	102

Source: WHO World Health Statistics Annual 1998.

Table C.3: Selected countries mortality rates per 100,000, world standard population, females, 1996

Country	All deaths	Lung	Prostate	Ischaemic heart disease	Cerebro-vascular	Road traffic accidents	Suicide
Hungary	5,888	189	231	1,090	818	64	108
Israel	1,911	88	250	718	338	49	36
Finland	3,565	70	175	793	467	35	97
Poland	5,085	113	163	392	420	68	39
USA	4,063	263	211	703	263	91	40
France	2,911	58	197	192	22	68	78
Germany	3,735	92	221	617	397	54	56
Austria	3,639	96	216	618	414	57	73
United Kingdom	3,955	206	251	723	405	28	25
Canada	3,348	233	220	562	244	58	46
Netherlands	3,548	136	253	420	328	37	51
Portugal	4,218	48	174	310	931	92	31
Italy	3,370	77	207	346	432	53	27
Australia	3,370	136	204	664	342	60	40
Greece	3,525	72	159	342	686	87	9
Singapore	6,428	161	150	718	554	26	92
Chile	4,722	61	127	452	498	36	19

Source: WHO World Health Statistics Annual 1998.

Appendix D Methods

Death registration data

Registration of deaths in Australia is a legal requirement and is administered by the State and Territory Registrars of Births, Deaths and Marriages, under State and Territory legislation. Death registration data are used in a number of areas, for example, for legal issues (ascertaining a person's death), measuring and improving the health of a community, and genealogy.

Information on the cause of death is supplied by the medical practitioner certifying the death or by a coroner. Other information about the deceased is supplied by a relative or other person acquainted with the deceased or by an official of the institution where the death occurred. With the exception of deaths of foreign diplomatic personnel, all deaths which occur within Australia are within the scope of the collection.

The Registrars provide the information to the ABS for compilation into aggregate statistics. After processing by the ABS, the data are provided to the AIHW where they are held in the AIHW Mortality Database.

The statistics in this publication relate to the year of registration of the death, not the year of occurrence. Usually about 4–5% of deaths occurring in one year are not registered until the following year.

Data variables used in this report

The data extracted for this report contain the following variables: cause of death, year of registration (registration of the death), age, sex, place of usual residence, Indigenous status and country of birth.

The *cause of death* is recorded and coded using the ICD-9 (WHO) rubrics. Analysis was undertaken using all deaths as a group, and then 174 disease groupings (16 of which are featured in this report). The disease groupings have been chosen based on the number of deaths and community/health sector interest surrounding them.

The *year of registration* is the year in which a death is registered. The majority of deaths are registered shortly after the death occurs, but a relatively small number can take months or even years to be registered. For this reason *year of death* counts are retrospectively revised to reflect these deaths. Consequently, when looking at the most recent one or two years of data, it is more appropriate to use *year of registration*, as is the case in this report.

Indigenous status refers to whether or not a person considers themselves an Aboriginal, a Torres Strait Islander or both.

Because the Indigenous data collected in most of the States and Territories were generally poorly covered, the analysis of Indigenous status in this report is based on data from South Australia, Western Australia and the Northern Territory only. Also, the period 1995–1997 was used for the Aboriginal and Torres Strait Islander analysis as it is now generally held that data for the period 1995–1997 are more reliable than data from previous years. From these data, estimates have been calculated for national Indigenous mortality rates. In the calculation of Indigenous mortality rates, the census population of 1996 was used as the base population.

Country of birth was analysed for 14 of the featured mortality profiles. The countries of birth analysed for this report were chosen on the basis of population size present in Australia, available population data, and available international age-standardised rates for comparison. The countries/regions of birth analysed were Australia, Austria, Canada, Chile, China, Finland, France, Germany, Greece, Hong Kong and Macau, Hungary, Israel, Italy, Japan, Korea, Malta, Mauritius, Netherlands, New Zealand, Poland, Portugal, Singapore, Switzerland, United Kingdom and Ireland, and the United States of America.

For the purposes of this report, persons of unknown age have been excluded from the mortality counts and mortality rates (130 for the period 1986–1997).

Classification of cause of death

The International Classification of Diseases, 9th Revision (ICD-9), published by WHO, is the classification used in cause-of-death coding in Australia. This classification has now been superseded by ICD-10, the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, produced by WHO as the most recent in its series of ICD classifications. Consistent with international moves to update to the new classification for mortality coding, the ABS implemented the WHO version of ICD-10 from 1 January 1999 for coding causes of death.

Mortality profiles are featured in this report for the following cause of death classifications:

- Colorectal cancer (ICD-9 153–154, 159)
- Lung cancer (ICD-9 162)
- Breast cancer (female) (ICD-9 174)
- Prostate cancer (ICD-9 185)
- Diabetes mellitus (ICD-9 250)
- Mental disorders (ICD-9 290–319) (includes dementia and related disorders)
- Dementia and related disorders (ICD-9 290, 294.1, 331)
- Ischaemic heart disease (ICD-9 410–414)
- Cerebrovascular disease (stroke) (ICD-9 430–438)
- Chronic obstructive pulmonary disease (excluding asthma) (ICD-9 491, 492, 496)
- Asthma (ICD-9 493)
- Motor vehicle accidents (ICD-9 E810–E819)
- Suicide (ICD-9 E950–E959)
- Homicide (ICD-9 E969).

In addition to these causes of death, the following mortality categories were analysed:

- Smoking-related diseases
- Alcohol-related diseases.

Coding issues

In 1997 the ABS introduced two changes to the coding of deaths. The first introduced the reporting of multiple cause of deaths (ABS 1999). The second change automated the coding of deaths (see Classification of diseases, Chapter 1). These changes had the following effects:

- The introduction of multiple causes of death allows all contributing causes of death that appear on the death certificate to be presented in the statistics and therefore associations between recorded causes of death to be examined.
- The introduction of autocoding brought about a number of changes in the way the underlying cause of death is now coded. This has affected the number of principal causes of death, and created a break in the time series after 1996 for those diseases. The automated system reads in the underlying cause of death from the certificate and in most cases this becomes the underlying cause of death recorded in the mortality database, using a series of rules for determining underlying cause. The introduction of the automated system (developed in the United States of America) has meant some changes in the rules applied for determining underlying cause.

The underlying cause of death most affected is pneumonia. Under the manual system previously employed in Australia, pneumonia might be treated as a contributing cause of death under certain conditions, even if recorded as underlying on the death certificate. For instance, the age at death would have an impact on how pneumonia was previously recorded by the coders. If age at death was older than a stipulated age, then other more chronic conditions such as dementia might be considered and recorded as underlying instead.

By employing autocoding, the number of deaths captured due to pneumonia has increased, and consequently in 1998 pneumonia became the eighth leading cause of death for males and the third leading cause for females. The other causes significantly affected include senile and pre-senile organic psychotic conditions—dementia (ICD-9 290), and Alzheimer's disease (ICD-9 331.0), affecting the category of dementia and related diseases. Consequently this publication uses data up to and including 1996 data for the affected diseases, i.e. pneumonia and dementia and related disorders.

Pneumonia

Under the previous Australian coding interpretations for causes of death, many of the deaths attributed to pneumonia in 1997 and 1998 would have been coded to dementia, Alzheimer's disease, ischaemic heart disease, cardiac dysrhythmias and heart failure, malignant neoplasms, COPD and renal failure. Hence, while applying Automatic Coding System coding interpretations has caused pneumonia deaths to rise, deaths coded to a wide range of other conditions have declined, in particular those due to dementia (ABS 1998a).

Dementia and related disorders

There was a drop in the number of deaths attributed to dementia and related disorders in 1997, and consequently, a break in the time series (a large number of these deaths are now coded to pneumonia). Up until the break in the time series, deaths due to dementia had more than doubled between 1986–1996. If the number of deaths for 1996 is ranked with deaths from other diseases in 1998, it is the fifth most common cause of death for females and the 11th most common cause for males.

Adjustments to time series

To minimise the break in time series, deaths data for 1997 and 1998 for the affected causes of death have been adjusted, using comparability factors provided by the ABS. The following causes of death have been adjusted for this publication:

Table D.1: Adjustment to time series data

Condition	Adjustment
Ischaemic heart disease (ICD-9 410–414)	1.0101
Cerebrovascular disease (ICD-9 430–438)	1.0526
Colorectal cancer (ICD-9 153, 154, 159)	1.0101
Female breast cancer (ICD-9 174)	1.0101
Prostate cancer (ICD-9 185)	1.0101
Chronic obstructive pulmonary disease (ICD-9 491, 492, 496)	1.0753
Asthma (ICD-9 493)	1.0204
Diabetes (ICD-9 250)	1.0638
Homicide (ICD-9 960–969)	0.9709
Mental disorders (ICD-9 290–319)	1.1905

Source: ABS 1999.

The coding of deaths due to dementia and related disorders was significantly affected by the introduction of autocoding and consequently the comparability factor was judged unreliable by the ABS. For the purposes of this publication, deaths from dementia and related disorders have been omitted for 1997 and 1998.

Mortality rates

This report uses three forms of mortality rate. These are age-specific mortality rates, crude mortality rates and age-standardised mortality rates, as described below. All rates are calculated separately for males and females and are expressed per 1,000,000 population.

The mortality rates specific to a certain age group are known as the *age-specific mortality rates*. They have been calculated for each age group as the number of deaths in that age group from a particular cause divided by the group's mid-year estimated resident population. This may be calculated for particular age and sex groupings, e.g.

$$\text{Age-specific mortality rates in males aged 75–79 in 1998} = \frac{\text{Number of deaths of males aged 75–79 in 1998}}{\text{Australian male population aged 75–79 in 1998}} \times 1{,}000{,}000$$

The annual *crude mortality rate* is the total number of deaths in a year divided by the total mid-year estimated resident population. The *crude mortality rate* is influenced by changes in the age structure of the population.

Age-standardisation is a technique for eliminating or reducing the effect of variation in the population age structure when comparing mortality rates. This report has used *direct standardisation* by applying the age-specific mortality rates for a particular year to a standard population. This produces an estimate of the mortality rate that would have prevailed in the standard population if it had experienced the *age-specific mortality rates* in the year under study. The method for this calculation comprises three steps:

Step 1 Calculate the age-specific rate (as shown above) for each age group.

Step 2 Calculate the expected number of deaths in each age group by multiplying the age-specific rate by the corresponding standard population for each age group, and dividing by 1,000,000 to obtain the expected number of deaths per 1,000,000.

Step 3 Sum the expected number of deaths in each age group and divide this sum by the total of the standard population, and multiply by 1,000,000 to give the age-standardised mortality rate per 1,000,000.

The standard population used is the total estimated resident population of Australia at 30 June 1991. Where international comparisons have been made, the World Standard Population has been used. The usual convention of using age-specific mortality rates for 5-year age groups has been followed.

Confidence intervals (CI)

The age-standardised and crude incidence and mortality rates presented in the body of this report also show 95% confidence intervals. These confidence intervals indicate the variation that might be expected in such estimates purely by chance. The confidence intervals are calculated using the methods presented in Holman et al. (1987).

A relatively simple approximation of the confidence limits that readers might use when examining State and Territory age-standardised rates is as set out below.

$$\text{CI approximation} = \text{AS Rate} \pm 1.96 \times \frac{\text{AS Rate}}{\sqrt{\text{Number of cases}}}$$

Average annual rates of change

To indicate the extent of change in age-standardised rates over time, a linear line of best fit is calculated for the time frame in question. Average annual rates of change are then calculated using the geometric formula:

$$\text{Average rate of change} = \left(\left(P_n / P_o\right)^{1/N} - 1\right) \times 100$$

where P_n = rate at later year

P_o = rate at earlier year

N = $n - o$.

This process averages out variations in the actual annual changes that may have occurred between the two points in time.

Person years of life lost (PYLL)

By linking sex-specific life table estimates of *years of life left* to each death, it is possible to determine the number of *years of life lost* for each death. Age groups 0–4 up to 70–74 were used for the calculations. These *years of life lost* are then summed over all deaths due to a particular cause giving the estimate of the *person years of life lost (PYLL)*. The ages used in this report are in five-year groups, with the remaining years of life left calculated from the life tables averaged over the five ages within each age group.

Mortality data on the Internet

As part of the report a complete collection of data on deaths from 174 diseases is made available via the Internet at address www.aihw.gov.au. The following data models, trend analyses and statistical tests have been used.

Modelling the data to test for statistical significance

The data model

An appropriate model for mortality data is a Poisson regression model, with a Poisson error distribution, a log link function and the natural log of population treated as an 'offset' (Breslow & Day 1987; Brillinger 1986; Valkonen 1989). For a particular cause of death, the model may be expressed as:

$$\log_e(D_t) = \log_e(N_t) + \text{constant} + \alpha t$$

Where t is the year of registration of death, D_t is the expected number of deaths registered in year t, N_t is the mid-year population in year t, and α is the estimated annual rate of increase or decrease in mortality.

This model forms the basis for the estimate of underlying trend and the statistical tests described below. The criteria for applying it to the mortality time series data were:

- the cause of death met the criterion for a full mortality surveillance profile;
- the series contained non-zero deaths for at least 4 years;
- the average number of deaths across the 12 years was at least two.

Where the above criteria were met, this model was fitted separately for males and females, for each age group and for the age-standardised rate.

Statistical tests

Statistical tests were applied to both the age-standardised and age-specific mortality rates for males and females separately wherever the data meet the above criteria for modelling. Two tests are presented in the mortality surveillance profile. They are a test for trend and a test for difference, as described below.

Test for 1987–1998 trend

This test is based on the estimated value of α from the Poisson regression model fitted to the rates for all 12 years. It is designed to establish whether mortality rates are generally increasing or decreasing over the period and if so, to what extent.

Based on α, an average annual rate of change has been derived as follows:

$$\text{per cent change} = [e^{\alpha} - 1] \times 100\%$$

The data contained in the web site also contains a calculation to determine annual per cent increase (or decrease). It is presented in the 'Trend' column under statistical tests and can be interpreted as the average per cent change in mortality rate between any two consecutive years. In interpreting this data:

- A blank denotes that the data did not meet the modelling criteria.
- Asterisks have indicated trends, which were statistically significant at the 5% and 1% levels of significance.

Test for difference

This test was based on a Poisson regression model fitted to the first 11 years of the mortality time series (1987–1997). This model was used to estimate a projected value for the most recent year (1998) and the difference between the observed rate and the projected rate has been expressed as a percentage of the projected rate.

A blank denotes that the data did not meet the modelling criteria.

Significance level

All of the above tests of statistical significance were two-tailed. For example, when testing for trend there was no prior assumption that the mortality rate would be increasing or decreasing and the alternative hypothesis was that the change in mortality rate was different from zero.

Many hundreds of significance tests have been performed throughout the report and it is therefore likely that some test results reported as 'statistically significant' are the result of chance. This should be considered when making judgments about whether statistically significant trends have sufficient medical or epidemiological importance to warrant further attention.

Tables and graphs

The following terms and symbols are used in the electronic tables on the web site:

ICD	International Classification of Diseases
Trend	estimated annual change (per cent) together with its statistical significance
RD	relative difference between the observed and projected rate for 1997, as a percentage of the projected value, with statistical significance
*	statistically significant at the 5%
**	statistically significant at the 1%
blank	the data did not meet the modelling criteria.

For each cause of death, the scale on the y-axis of the graph has been chosen to best display the data. The same scale has been used for males and females, but the scales usually differ between causes of death. Care should be taken when comparing graphs between causes of death.

Socioeconomic analysis

A measure of socioeconomic disadvantage was analysed across 15 of the 17 mortality profiles featured in this report, using the *Socioeconomic Indexes for Areas (SEIFA)* 1996 package produced by the ABS. *SEIFA* provides five summary indexes, each index focusing on a different aspect of the socioeconomic conditions in the geographic area. The analysis in this report was based on the Index of Relative Socioeconomic Disadvantage. The Index of Relative Socioeconomic Disadvantage is derived from attributes such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations.

The mortality data were extracted by Statistical Local Area (SLA), and the corresponding SEIFA index value for that SLA was assigned to each of the deaths. In this way, each death was given a value of between 1 and 5, for the level of Relative Socioeconomic Disadvantage,

1 being the least disadvantaged, and 5 being the most. For example, where the place of usual residence was Ku-ring-gai in Sydney a death would be given an Index of Relative Socioeconomic Disadvantage value of 1 (least disadvantaged). In contrast, where place of usual residence was Elizabeth in the northern outskirts of Adelaide, a death would be given a value of 5 (most disadvantaged).

Mortality rates were then calculated for each mortality profile by measure of socioeconomic disadvantage, age and sex. The period 1995–1997 was selected for its proximity to the 1996 census year that the SEIFA indexes are based on.

For the period 1995–1997, the proportion of the Australian population in each SEIFA quintile is shown in Table D.2.

Table D.2: Population proportions in each SEIFA quintile

	Male	Female
SEIFA quintile	%	%
1st	19.7	20.3
2nd	19.7	19.6
3rd	20.4	20.1
4th	20.1	20.0
5th	20.2	20.0

The following Australian Standard Geographic Classification (ASGC) versions were used in coding SLA to SEIFA (Table D.3).

Table D.3: Year and ASGC version

Year	ASGC version
1995	2.4
1996	2.5
1997	2.5

SLA boundaries for 1995 and 1996 were recoded to the ASGC 1996 boundaries bringing them into line with SEIFA 1996.

Geographic analysis

A geographic analysis was performed on 15 of the 17 mortality profiles featured in this report using the Rural, Remote and Metropolitan Areas (RRMA) Classification (Department of Primary Industries and Energy & Department of Health and Family Services 1994). The SLA recorded for place of usual residence in each death record was converted to the 7-level urban/rural/remote RRMA classification. These 7-level classifications were then grouped into three categories as follows:

- Metropolitan (M1=Capital city, M2=Other metropolitan centre);
- Rural (R1=Large rural centre, R2=Small rural centre, R3=Other rural area); and
- Remote (Rem1=Remote centre, Rem2=Other remote area).

Mortality rates were then calculated for each mortality profile by geographic category, age and sex for the period 1995–1997. A 3-year period was used in order to smooth any effect of small death counts in each single year.

For the period 1995–1997, the proportion of the Australian population in each RRMA (3-point) category are shown in Table D.4.

Table D.4: Proportion of the Australian population in each RRMA (3-point) category

RRMA 3-point classification	Male (%)	Female (%)
Metropolitan	70.7	71.5
Rural	26.1	25.7
Remote	3.3	2.8

Country of birth analysis

This analysis was performed on 15 of the 17 mortality profiles featured in this report, over the 3-year period 1992–1994. A 3-year period was used so that more substantial numbers of deaths could be analysed by country, and the period 1992–1994 was chosen to make international comparisons possible using the latest available data. Because this analysis was performed on each of the feature diseases, a standard list of countries was devised that best fit across all of the diseases in terms of numbers of deaths and rates of death. Where a disease does not have a substantial number of deaths for a particular country, the calculated rate of death for that country was not reported as it is not considered statistically relevant.

Smoking- and alcohol-related deaths

Smoking- and alcohol-related deaths were determined by applying a set of aetiological fractions derived by English et al. (1995) to mortality data from related causes of death to determine the effect of active cigarette smoking, or hazardous and harmful alcohol use on Australia's mortality. The fractions were applied to the deaths in each year from 1987 to 1998. Tables D.5 and D.6 list the conditions related to use of tobacco and alcohol for which aetiological fractions were devised.

Table D.5: Smoking-related conditions

Conditions	ICD-9 codes
Oropharyngeal cancer	141, 143–146, 148–149
Oesophageal cancer	150
Stomach cancer	151
Anal cancer	154.3, 154.4
Pancreatic cancer	157
Laryngeal cancer	161
Lung cancer	162
Endometrial cancer	179, 182
Cervical cancer	180, 233.10
Vulvar cancer	184.4
Penile cancer	187.1–187.4
Bladder cancer	188
Renal parenchymal cancer	189.0
Renal pelvic cancer	189.1
Respiratory carcinoma in situ	231
Tobacco abuse	305.1
Parkinson's disease	332
Ischaemic heart disease	410–414
Pulmonary circulatory diseases	415.0, 416–417
Cardiac dysrhythmias	427
Heart failure	428–429
Stroke	430–438
Atherosclerosis	440–448
Pneumonia	480–487
Chronic obstructive pulmonary disease (COPD)	490–492, 496
Peptic ulcer	531–534
Crohn's disease	555
Ulcerative colitis	556
Ectopic pregnancy	633, 761.4
Spontaneous abortion	634, 761.8
Antepartum haemorrhage	640, 641, 762.0, 762.1
Hypertension in pregnancy	642, 760.0
Low birthweight	656.5, 764, 765
Premature rupture of membranes.	658.1–658.2, 761.1
Sudden infant death syndrome (SIDS)	798.0
Fire injuries	E890–E899

Source: English et al. 1995.

Table D.6: Alcohol-related conditions

Conditions	ICD-9 codes
Oropharyngeal cancer	141, 143–146, 148–149
Oesophageal cancer	150
Liver cancer	155
Laryngeal cancer	161
Female breast cancer	174
Alcoholic psychosis	291
Alcohol dependence	303
Alcohol abuse	305.0
Epilepsy	345
Alcoholic polyneuropathy	357.5
Hypertension	401–405
Alcoholic cardiomyopathy	425.5
Supraventricular cardiac dysrhythmias	427.0, 427.2, 427.3
Stroke	430–438
Oesophageal varices	456.0–456.2
Gastro-oesophageal haemorrhage	530.7
Alcoholic gastritis	535.3
Alcoholic liver cirrhosis	571.0–571.3
Cholelithiasis	574
Acute pancreatitis	577.0
Chronic pancreatitis	577.1
Psoriasis	696.1
Road injury	E810–E819
Alcoholic beverage poisoning	E860.0
Other ethanol and methanol poisoning	E860.1, E860.2
Fall injuries	E880–E888
Fire injuries	E890–E899
Drowning	E910
Aspiration	E911
Occupational and machine injuries	E919, E920
Suicide	E950–E959
Assault	E960, E965, E966, E968, E969
Child abuse	E967

Source: English et al. 1995.

Appendix E Data available on the AIHW web site

A series of 174 mortality profiles has been produced, based on the codes and categories used in the ICD-9. They are presented as self-contained Excel spreadsheets located at the AIHW web site (www.aihw.gov.au). The profiles provide tables and graphical representations by age and sex over the 12 years 1987–1998 of numbers of deaths, standardised mortality rates and PYLL, as well as statistical tests and modelled trends.

Table E.1: Mortality spreadsheets available at the AIHW web site

No.	ICD-9	Disease	No.	ICD-9	Disease
1	**Infectious**				
1.1	001–139	Infectious and parasitic diseases	1.3	38	Septicaemia
1.2	001–018	Tuberculosis	1.4	070	Viral hepatitis
2	**Neoplasms**				
2.1	140–239	Neoplasms	2.22	163	Malignant neoplasm of pleura
2.2	140–208	Malignant neoplasms (cancer)	2.23	170	Malignant neoplasm of bone
2.3	140–149	Malignant neoplasm of lip, oral cavity and pharynx	2.24	172	Malignant neoplasm of skin
2.4	141	Malignant neoplasm of tongue	2.25	173	Other malignant neoplasm of skin
2.5	143–145	Malignant neoplasm of mouth	2.26	174	Malignant neoplasm of female breast
2.6	146–148	Malignant neoplasm of pharynx	2.27	180	Malignant neoplasm of cervix
2.7	150–159	Malignant neoplasm of digestive organs	2.28	179, 182	Malignant neoplasm of other parts of uterus
2.8	150	Malignant neoplasm of oesophagus	2.29	183	Malignant neoplasm of ovary
2.9	151	Malignant neoplasm of stomach	2.30	185	Malignant neoplasm of prostate
2.10	152	Malignant neoplasm of small intestine	2.31	188	Malignant neoplasm of bladder
2.11	153	Malignant neoplasm of colon	2.32	189	Malignant neoplasm of kidney and other urinary organs
2.12	154	Malignant neoplasm of rectum	2.33	191	Malignant neoplasm of brain
2.13	153–154, 159	Malignant neoplasm of bowel	2.34	193	Malignant neoplasm of thyroid
2.14	155	Malignant neoplasm of liver	2.35	200–208	Malignant neoplasm of lymphatic tissue
2.15	155.0	Malignant neoplasm of liver primary	2.36	200, 202	Non-Hodgkin's lymphoma
2.16	155.1	Malignant neoplasm of intrahepatic bile ducts	2.37	201	Hodgkin's disease
2.17	156	Malignant neoplasm of gall bladder and extrahepatic bile ducts	2.38	203	Multiple myeloma
2.18	157	Malignant neoplasm of pancreas	2.39	204–208	Leukaemia
2.19	160	Malignant neoplasm of nasal cavities	2.40	204	Lymphoid leukaemia
2.20	161	Malignant neoplasm of larynx	2.41	205	Myeloid leukaemia
2.21	162	Malignant neoplasm of trachea, bronchus and lung	2.42	225.2	Meningioma
3	**Endocrine, nutritional and metabolic diseases and immunity disorders**				
3.1	240–279 excluding 279.1	Endocrine, nutritional, and metabolic diseases and immunity	3.4	272.0–272.4	Hyperlipidaemia
3.2	240–246	Thyroid disorders	3.5	278	Obesity
3.3	250	Diabetes			
4	**Diseases of the blood and blood-forming organs**				
4.1	280–289	Diseases of the blood and blood-forming organs	4.2	284	Aplastic anaemia

No.	ICD-9	Disease	No.	ICD-9	Disease
5	**Mental disorders**				
5.1	290–319	Mental disorders	5.3	303	Alcohol dependence
5.2	290, 294.1, 331	Dementia and related disorders	5.4	304	Drug dependence
6	**Diseases of the nervous system and sense organs**				
6.1	320–389	Diseases of the nervous system and sense organs	6.4	335.2	Motor neurone disease
6.2	320–322	Meningitis	6.5	340	Multiple sclerosis
6.3	332	Parkinson's disease	6.6	345	Epilepsy
7	**Diseases of the circulatory system**				
7.1	390–459	Cardiovascular disease	7.8	428	Congestive heart failure
7.2	390–398	Rheumatic fever and rheumatic heart disease	7.9	430–438	Cerebrovascular disease
7.3	401–405	Hypertensive disease	7.10	440–448	Diseases of the arteries, arterioles, and capillaries
7.4	410–414	Ischaemic heart disease	7.11	440	Atherosclerosis
7.5	410	Acute myocardial infarction	7.12	441–444	Peripheral vascular disease
7.6	411–414	Other coronary heart disease	7.13	415–427, 429, 446–459	Other cardiovascular disease
7.7	428	Heart failure			
8	**Diseases of the respiratory system**				
8.1	460–519	Diseases of the respiratory system	8.10	492	Emphysema
8.2	480–486	Pneumonia	8.11	493	Asthma
8.3	480	Viral pneumonia	8.12	494	Bronchiectasis
8.4	481	Pneumococcal pneumonia	8.13	496, 491, 492	Chronic obstructive pulmonary disease
8.5	485	Bronchopneumonia	8.14	500–505	Pneumoconiosis
8.6	486	Pneumonia unspecified	8.15	507	Inhalation pneumonia
8.7	487	Influenza	8.16	514	Pulmonary congestion and hypostasis
8.8	490–496	Chronic lung disease	8.17	515	Pulmonary fibrosis
8.9	490–491	Chronic bronchitis			
9	**Diseases of the digestive system**				
9.1	520–579	Diseases of the digestive system	9.8	570–573 (excluding 571.0–571.3)	Liver disease without mention of alcohol
9.2	531–533	Peptic ulcer	9.9	574–576	Disorders of biliary tract
9.3	550–553	Hernia	9.10	574	Cholelithiasis
9.4	557	Vascular disease of intestine	9.11	575	Other diseases of the gallbladder
9.5	560	Intestinal obstruction	9.12	577	Diseases of pancreas
9.6	562	Diverticula disease	9.13	578	Gastrointestinal haemorrhage
9.7	571.0–571.3	Chronic liver disease due to alcohol			
10	**Diseases of the genitourinary system**				
10.1	580–629	Diseases of the genitourinary system	10.5	585	Chronic renal failure
10.2	580–589	Nephritis, nephrotic syndrome and nephrosis	10.6	586	Unspecified renal failure
10.3	582	Chronic glomerulonephritis	10.7	590	Infections of kidney
10.4	584	Acute renal failure	10.8	600	Hyperplasia of prostate
12	**Diseases of the skin and subcutaneous tissue**				
12.1	680–709	Diseases of the skin and subcutaneous tissue			
13	**Diseases of the musculoskeletal system and connective tissue**				
13.1	710–739	Diseases of the musculoskeletal system and connective tissue	13.3	715	Osteoarthritis
13.2	714	Rheumatoid arthritis	13.4	733	Osteoporosis
14	**Congenital anomalies**				
14.1	740–759	Congenital anomalies			

No.	ICD-9	Disease	No.	ICD-9	Disease
16	**Symptoms, signs and ill-defined conditions**				
16.1	780–799	Symptoms, signs and ill-defined conditions	16.2	797	Senility
17	**External causes of Injury and poisoning**				
17.1	800–999	External causes of injury and poisoning	17.14	880–888	Accidental falls
17.2	800–848	Transport accidents	17.15	890–899	Accidental fire
17.3	800–807	Railway accidents	17.16	910	Accidental drowning
17.4	810–819	Motor vehicle traffic accidents	17.17	925	Accidental electrocution
17.5	811–813	Multiple-vehicle motor accidents	17.18	950–959	Suicide
17.6	814	Pedestrian accidents	17.19	952	Suicide by car exhaust
17.7	815–816	Single-vehicle accidents	17.20	953	Suicide by hanging
17.8	820–825	Off-road accidents	17.21	955	Suicide by firearms
17.9	830–838	Water transport accidents	17.22	960–969	Homicide
17.10	840–844	Air transport accidents	17.23	980–989	Injury undetermined whether accidentally or purposely inflicted
17.11	850–869	Accidental poisoning	17.24	980	Poisoning by solid or liquid substances, undetermined whether
17.12	850–858	Accidental poisoning by analgesics, antipyretics, antirheumatics	17.25	304.0, 850.0, 950.0, 980	Aggregate deaths relating directly to opiates
17.13	850	Accidental opiate poisoning			

Glossary

Aboriginal and Torres Strait Islander: A person of Aboriginal descent who identifies as an Aboriginal or Torres Strait Islander or as both and is accepted as such by the community in which he or she lives.

acute: Coming on sharply to a crisis and often brief, intense and severe.

age-specific mortality rate: See Appendix D.

age-specific rate: A rate for a specific age group. The numerator and denominator relate to the same age group.

age-standardisation: A method of removing the influence of age when comparing populations with different age structures.

age-standardised mortality rate (ASMR): See Appendix D.

Alzheimer's disease: A disease (named after a German physician) in which there is progressive loss of brainpower shown by worsening short-term memory, confusion and disorientation.

angina: Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs. See also *cardiovascular disease*.

anxiety disorders: A group of mental disorders marked by excessive feelings of apprehension, worry, nervousness and stress. Includes panic disorder, various phobias, generalised anxiety disorder, obsessive–compulsive disorder and post-traumatic stress disorder.

asthma: An inflammatory disease of the air passages that makes them prone to narrow too easily and too much in response to 'triggers', causing episodes of shortness of breath and wheezing or coughing. The triggers include exercise, pollens, the house dust mite, cold weather, throat and chest infections, tobacco smoke and other factors.

atherosclerosis: A process that gradually clogs arteries, through fatty and fibre-like deposits that build up on the inner walls of the arteries.

blood cholesterol: Fatty substance produced by the liver and carried by the blood supply to the rest of the body.

cancer: A range of diseases where some of the body's cells begin to multiply out of control, can invade and damage the area around them, and can also spread to other parts of the body to cause further damage.

cardiovascular disease: Any disease of the heart or blood vessels, including heart attack, angina, stroke and peripheral vascular disease. Also known as circulatory disease.

cause of death: From information reported on the medical certificate of cause of death, each death is classified by the underlying cause of death according to rules and conventions of the 9th revision of the International Classification of Diseases. The underlying cause is defined as the disease which initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the violence which produced the fatal injury, rather than to the nature of the injury.

cerebrovascular disease: See *stroke*.

chemotherapy: The use of drugs (chemicals) to prevent or treat disease, with the term usually being applied to treatment for cancer rather than for other conditions.

chronic: Persisting over a long period.

chronic bronchitis: Long-term lung condition with inflammation of the main air passages causing frequent coughing attacks and coughing up of mucus.

chronic obstructive pulmonary disease (COPD): A combination of emphysema and chronic bronchitis-related conditions, where damage to the lungs tends to obstruct their oxygen intake.

cohort: A group of individuals being studied who have experienced the same event at a specified period in time, e.g. 'birth cohort' refers to people born in the same year.

colonoscopy: A procedure whereby the inside of the large bowel (colon) is viewed using a long flexible fibre-optic tube inserted through the anus.

colorectal cancer: Cancer of the colon (the lower 1.5 to 2 metres of the intestine) or of the rectum (the final 15 cm at the end of the colon, ending with the anus).

confidence interval (CI): A statistical term describing a range (interval) of values within which we can be 'confident' that the true value lies, usually because it has a 95% or higher chance of doing so.

congenital: A condition that is recognised at birth, or that is believed to have been present since birth, including conditions which are inherited or caused by environmental factors.

coronary heart disease: See *ischaemic heart disease*.

crude mortality rate: The number of deaths in a year divided by the number in the corresponding population.

dementia: A general and worsening loss of brain power such as memory, understanding and reasoning.

depression: A mood disorder with prolonged feelings of being sad, hopeless, low and inadequate, with a loss of interest or pleasure in activities and often with suicidal thoughts or self-blame.

diphtheria: A bacterial infection that usually starts with soreness of the throat and tonsils but which can also affect other parts of the body and become severe enough to block breathing. Preventable by vaccine.

disability: The presence of one or more of seventeen limitations, restrictions or impairments.

disability-adjusted life year (DALY): Years of healthy life lost through premature death or living with disability due to illness or injury.

emphysema: A long-term lung disease where over expansion or destruction of the lung tissue blocks oxygen intake, leading to shortness of breath and other problems.

epidemiology: The study of the patterns and causes of health and disease in populations, and the application of this study to improve health.

expectation of life: See *life expectancy*.

external cause: Environmental event, circumstance and/or condition as the cause of injury, poisoning and/or other adverse effect. Used in disease classification.

health promotion: Activities to improve health and prevent disease.

health status: An individual's or population's overall level of health, taking account of various aspects such as life expectancy, amount of disability, levels of disease risk factors and so forth.

heart attack: Emergency illness that occurs when a vessel supplying blood to the heart muscle is suddenly blocked completely by a blood clot. The medical term commonly used for a heart attack is *myocardial infarction*. See also *cardiovascular disease*.

heart failure: When the heart cannot pump strongly enough to keep the blood circulating around the body at adequate rate.

hepatitis: Inflammation of the liver, which can be due to certain viral infections, alcohol excess or a range of other causes.

***Hib* (Haemophilus influenzae *type b*):** A bacterial infection of infants and children that can cause meningitis, pneumonia and other serious effects. Preventable by vaccine.

immunisation: Inducing immunity against infection by the use of an antigen to stimulate the body to produce its own antibodies. See *vaccination*.

incidence: The number of new cases (of an illness or event, etc.) occurring during a given period. Compare with *prevalence*.

Indigenous: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander and is accepted as such by the community with which he or she is associated.

inflammation: Local response to injury or infection, marked by local redness, heat, swelling and pain. Can also occur when there is no clear external cause and the body reacts against itself, as in the auto-immune disorders.

International Classification of Diseases (ICD): The World Health Organization's internationally accepted classification of death and disease. The 9th revision (ICD-9) was in use for the period of the study. In this report, causes of death classified before 1979 under previous revisions have been reclassified to ICD-9 by the AIHW.

ischaemia: Reduced or blocked blood supply. See also *ischaemic heart disease*.

ischaemic heart disease: Heart attack and angina (chest pain). Also known as coronary heart disease.

life expectancy: An indication of how long a person can expect to live. Technically it is the number of years of life remaining to a person at a particular age if mortality rates do not change.

lymphoma: A general term applied to any neoplastic disorder of the lymphoid tissue. Lymphomas are divided into two broad types, Hodgkin's disease/lymphoma and non-Hodgkin's lymphoma (NHL).

malignancy: See *cancer*.

mammogram: X-ray of the breast. May be used to assess a breast lump or as a screening test in women with no symptoms of cancer.

measles: A highly contagious infection, usually of children, that causes flu-like symptoms, fever, a typical rash and sometimes serious secondary problems such as brain damage. Preventable by vaccine.

mental disorder: A disturbance of mood or thought that can affect behaviour and distress the person or those around them, so the person cannot function normally. Includes anxiety disorders, depression and schizophrenia.

metastasis: The spread of a cancer from its original site to other parts of the body.

mumps: A contagious viral disease marked by acute and painful swelling of the saliva-producing glands, often similarly affecting the testicles and sometimes other parts.

myocardial infarction: Term still commonly used to mean a heart attack, but more correctly refers only to those heart attacks which have caused some death of heart muscle.

Organisation for Economic Co-operation and Development (OECD): An organisation of 24 developed countries, including Australia.

overweight: Defined as a Body Mass Index above 25 but not higher than 30.

parasuicide: The deliberate or ambivalent act of self-damage which is potentially life-threatening, but not resulting in death.

pathology: General term for the study of disease, but often used more specifically for diagnostic services which examine specimens, such as samples of blood or tissue.

perinatal: Pertaining to or occurring in the period shortly before or (usually 28 days) after birth.

pertussis (whooping cough): A highly infectious bacterial disease of the air passages marked by explosive fits of coughing and often a whooping sound on breathing in. Preventable by vaccine.

poliomyelitis (polio): Muscle paralysis, wasting and deformity of limbs after infection by a common virus (poliovirus) that can damage the so-called motor nerves in the spinal cord. Preventable by vaccine.

potential years of life lost (PYLL): Number of potential years of life lost in a population as a result of premature death.

prevalence: The number or proportion (of cases, instances, etc.) present in a population at a given time. Compare with *incidence*.

prevention (of disease): Action to reduce or eliminate the onset, causes, complications or recurrence of disease.

prostate cancer: Cancer of the prostate, the male organ that sits next to the urinary bladder and contributes to the semen (sperm fluid).

psychiatric hospitals: Establishments devoted primarily to the treatment and care of inpatients with psychiatric disorders.

public health: Health activities which aim to benefit a population. Prevention, protection and promotion of health are emphasised, as distinct from treatment tailored to individuals with symptoms. Examples include provision of a clean water supply and good sewerage, conduct of anti-smoking education campaigns and screening for diseases such as cancer of the breast and cervix.

quintile: A group derived by ranking the population according to specified criteria and dividing it into five equal parts.

risk factor: Any factor which represents a greater risk of a health disorder or other unwanted condition. Some risk factors are regarded as causes of disease, others are not necessarily so.

rubella (German measles): A contagious viral disease of children and young adults which has mild symptoms but which often causes serious birth defects if it occurs in a mother during the first 3 months of pregnancy. Preventable by vaccine.

statistical significance: An indication from a statistical test that the result of a comparison, suggesting a difference or change, may be significant or meaningful because it is unlikely to be due just to chance. A statistical result is usually said to be 'significant at the 95% confidence level' if it would occur by chance only once in twenty times or less.

stroke: When an artery supplying blood to the brain suddenly becomes blocked or bleeds, often causing paralysis of parts of the body or speech problems.

substance use disorders: Result from harmful use and/or dependence on illicit or licit drugs, including alcohol, tobacco and prescription drugs.

suicide: Deliberately ending one's own life.

symptom: Any indication of a disorder that is apparent to the person affected.

tetanus: A serious infection with a bacterial nerve poison causing spasm of the jaw muscles (lockjaw) and body muscles generally, from a bacterium entering through a wound. The disease is preventable by vaccine.

Torres Strait Islander: A person of Torres Strait Islander descent who identifies as a Torres Strait Islander and is accepted as such by the community in which he or she lives.

tuberculosis: A bacterial disease that affects the lungs especially, with serious fever-like symptoms and destruction of tissue. It can spread to other parts of the body, causing secondary problems and often death if not treated.

vaccination: The process of administering a vaccine to a person to produce immunity against infection. See *immunisation*.

whooping cough: See *pertussis*.

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