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Contents

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Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ASR	age-standardised rate (per 100,000 population)
AusDiab	Australian Diabetes, Obesity and Lifestyle Study
BMI	body mass index
CHD	coronary heart disease
CVD	cardiovascular disease
ICD-9	International Classification of Diseases, 9th Revision
ICD-10	International Classification of Diseases, 10th Revision
OECD	Organisation for Economic Co-operation and Development

Summary

This report looks at recent mortality trends over time in cardiovascular disease (CVD) and its main component diseases, across different age and sex groups.

Death rates for total CVD and each of its component diseases: coronary heart disease (CHD), stroke, heart failure/cardiomyopathy, rheumatic fever and rheumatic heart disease all fell between 1987 and 2006.

The main contributors to the overall trend for CVD are CHD and stroke, which have both shown substantial annual falls over the 20 years to 2006.

The annual decline in death rates for heart failure/cardiomyopathy has been accelerating.

The annual decline in rheumatic fever and rheumatic heart disease has been smaller than for CHD and stroke.

For CHD and stroke mortality:

- recent declines have been greatest among people aged 55–74 years
- the average annual rate of decline has accelerated among older people (65 years and over)
- the rate of decline for CHD has slowed among younger people (aged 35–54 years)
- the rate of decline for stroke has slowed among younger women (aged 35–54 years).

Despite the falls observed, death rates from CHD remain higher than those in many other developed countries, indicating the potential for further declines. The situation is similar for stroke.

For the Australian population as a whole, there have been:

- favourable trends in smoking rates and blood pressure levels
- little evidence of national change in blood cholesterol levels
- unfavourable trends in physical inactivity, obesity, and diabetes prevalence.

It is not possible to say how these trends have combined to affect the overall risk of CVD for Australians.

Improvements in medical care and treatment have also contributed to the declines in death rates from CHD and stroke.

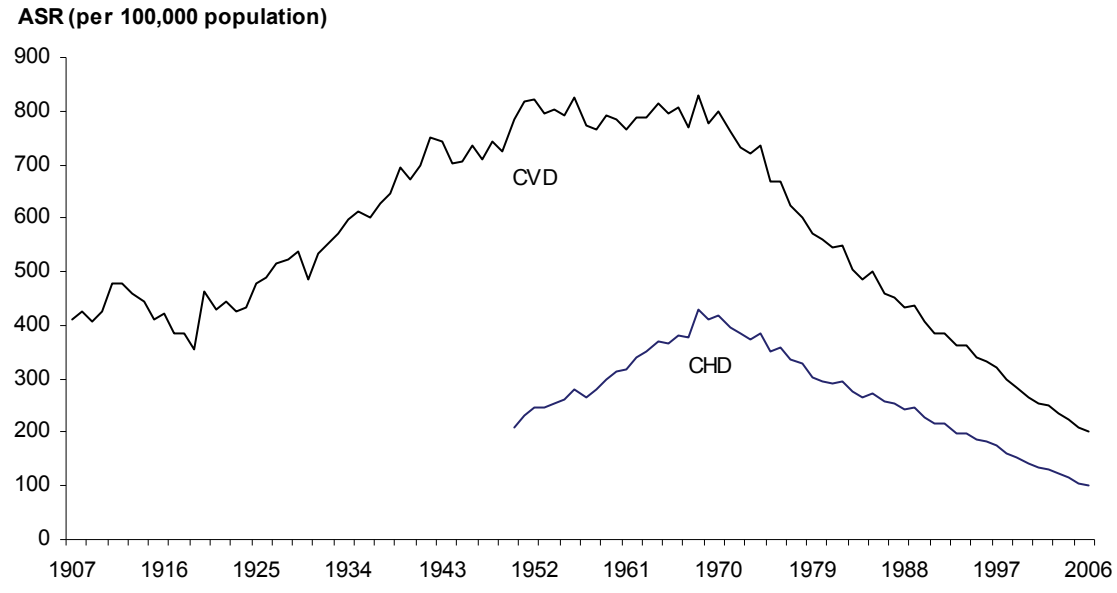
The ageing of Australia's population, combined with the observed acceleration of the rate of decline in CHD and stroke death rates among older people, will lead to increased numbers of older Australians in coming years. This has important implications for the allocation of resources for preventative, medical and care services.

1 Introduction

1.1 Background

Cardiovascular disease (CVD) has been the dominant cause of death in Australia for many decades, with coronary heart disease (CHD) and stroke ranking high among leading causes of death. CVD accounts for more than 46,000 deaths annually in Australia, and 3.7 million Australians have a long-term cardiovascular disease (AIHW 2008). Of these, 640,000 have CHD and another 350,000 have had a stroke. Coronary heart disease, the most common form of CVD, is the most common cause of sudden death in Australia, and stroke is a significant cause of disability. CVD is one of the eight areas identified for attention under the National Health Priority Area initiative.

Despite the magnitude of the current CVD burden, Australia has benefited from substantial declines in both CHD and stroke mortality during the last three decades of the 20th century (Figure 1.1). Death rates have fallen considerably from the peak levels of the late 1960s and early 1970s, when CVD was responsible for about 60,000 deaths annually, or roughly 55% of all deaths each year. The age-standardised death rate (ASR) from CVD declined from about 830 per 100,000 population in 1968 to just over 200 per 100,000 in 2006. These reductions in CVD mortality have resulted from a combination of improvements in the prevention, detection and clinical management of people who have the disease.



Note: Standardised directly to the 2001 Australian population.

Source: AIHW 2009; see also AIHW 2006.

Figure 1.1: Trends in age-standardised death rates from CVD and CHD, 1907–2006

While the declines over time in total deaths and age-standardised death rates for CVD in Australia have been widely reported, trends in specific age groups have received less

attention. There is some evidence from the United Kingdom and the United States that CHD mortality rate declines have accelerated in some older age groups but slowed in some younger age groups in the recent past (Allender et al. 2008, Ford & Capewell 2007, O'Flaherty et al. 2008). Others have documented a flattening of the stroke trend (Gillum & Sempos 1997).

1.2 Aims

The aim of this report is to gain a better understanding of recent mortality trends in CVD over time, across different age and sex groups, and the individual diseases that make up CVD. First, CVD is considered in total, followed by chapters on major contributors to the cardiovascular burden in Australia, namely CHD, stroke and heart failure/cardiomyopathy. Stroke is further subdivided into ischaemic stroke and haemorrhagic stroke. Rheumatic fever and chronic rheumatic heart disease, a significant problem among Aboriginal and Torres Strait Islander people, is also considered. The relative importance of these diseases in terms of deaths is shown in Table 1.1.

Table 1.1: Deaths from cardiovascular diseases, 2006

Underlying cause of death	Deaths (number)	Per cent
Coronary heart disease	22,983	50.3
Stroke	8,484	18.6
Ischaemic stroke	*912*	*2.0*
Haemorrhagic stroke	*2,274*	*4.9*
Heart failure/cardiomyopathy	3,539	7.7
Rheumatic fever and rheumatic heart disease	285	0.6
Other cardiovascular diseases	10,379	22.7
Total cardiovascular disease	**45,670**	**100.0**

Note: Percentages do not add to 100.0 because of rounding.

Source: AIHW National Mortality Database

In addition, a chapter on trends in cardiovascular risk factors provides useful background for interpreting the mortality trends. An international context is provided by a chapter on risk factor and mortality trends in OECD (Organisation for Economic Co-operation and Development) countries, of which Australia is a member.

Some of the key questions considered in this report are:

Q1 What are the overall mortality trends in cardiovascular diseases?

Q2 Are there differences in the trends for the main cardiovascular component diseases?

Q3 Are there differences in trends among different age and sex groups?

Q4 Are the observed trends consistent with trends in CVD risk factors?

Q5 What are the trends in CVD in other countries and how does Australia compare?

In this way, the report aims to help better understand the factors that have contributed to the fall in CVD mortality, and whether the decline is being experienced by all age–sex groups,

and give some indication of whether current downward mortality trends can be expected to continue.

The data presented in this report have been taken from key national statistical collections that have collected cardiovascular-related data over time.

1.3 Methods

For the chapters on mortality trends (chapters 2–6), the National Mortality Data Collection is used together with official estimates of the Australian population to calculate rates. The following steps were taken for cardiovascular disease and its component diseases: coronary heart disease, stroke (ischaemic stroke and haemorrhagic stroke separately), heart failure/cardiomyopathy, and rheumatic fever and rheumatic heart disease.

- Deaths data for the calendar years 1987 to 2006 were extracted from the National Mortality Database.
- Data were analysed separately for men and women and for the age groups: 35–44, 45–54, 55–64, 65–74, 75–84, and 85 years and over. Age groups less than 65 years were combined for diseases where the numbers of deaths in younger age were too few for accurate analysis.
- Causes of death were based on the International Classification of Diseases 9th Revision (ICD-9) codes for 1987 to 1996 and the International Classification of Diseases 10th Revision (ICD-10) codes for 1997 to 2006 (see 'Data sources and classifications').
- All analyses were for the underlying cause of death. For heart failure/ cardiomyopathy—for which an incomplete picture can be given by examining the underlying cause of death only—the analyses were repeated for heart failure/ cardiomyopathy as an underlying or associated cause of death. This was possible because of multiple cause-of-death coding that has occurred since 1997 with the introduction of ICD-10. However, as the results were similar, only results for heart failure/cardiomyopathy as an underlying cause of death are reported.
- Where deemed necessary, 'comparability' factors were applied to observed numbers of deaths to account for changes from ICD-9 to ICD-10 and the introduction of automatic coding (see 'Data sources and classifications' for more details).
- Age-specific rates and age-standardised rates were calculated by dividing the number of deaths by the appropriate Australian population estimates.
- Age-specific death rates were expressed as a percentage of the 1987 base year to better illustrate relative differences in age-specific trends.
- Average annual rates of change were estimated for each age and sex group using log-linear modelling.
- Average annual rates of change were estimated separately for the periods 1987–1996 and 1997–2006, and compared. Since these periods coincide with ICD-9 and ICD-10, respectively, neither estimate of the average annual rates of change is affected by a change in ICD version.

This report emphasises trends in age-specific rates, although mention has been made of trends in age-standardised rates as a summary measure. Figures for each disease were

included that show age-specific death rates from 1987 to 2006, age-specific death rates as a percentage of the 1987 value, and the average annual rate of change in death rates for the two periods 1987–1996 and 1997–2006. A break in the time series separates the two time periods and indicates where the change in ICD version occurred.

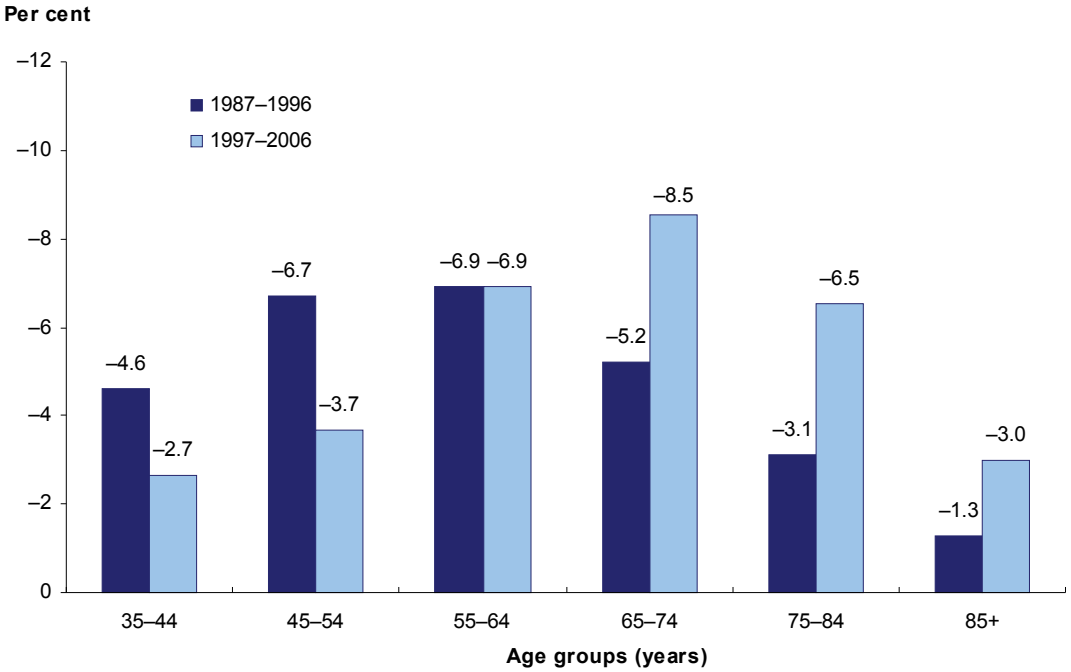
The overview of risk factor trends (Chapter 7) uses cross-sectional data collected in repeat surveys that have used reasonably consistent methods over time, such as the National Heart Foundation Risk Factor Prevalence Surveys, the National Health Surveys, the National Drug Strategy Household Surveys and the National Physical Activity Surveys.

Data for the international trends chapter (Chapter 8) have been taken from the latest information compiled by the Organisation for Economic Co-Operation and Development.

Detailed descriptions of the major data sources used, disease classifications and statistical methods are given as appendices.

Interpretation of figures showing average annual change

The figures in this report, which compare the average annual percentage change during the periods 1987–1996 and 1997–2006, have the values on the y-axis in reverse order (see, for example Figure 3.5 which is repeated here over the page). Negative values on the y-axis are shown above the x-axis rather than below, which is the traditional practice.



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 3.5: Average annual change in CHD death rates in men, 1987–1996 and 1997–2006

In this figure, a larger bar represents a greater average annual decline. For example, for men aged 65–74 years, the average annual change of –5.2% during 1987–1996 is shown above the x-axis and represents an average decline of 5.2% per year during that period. During the next 10 years, the average decline was 8.5% per year. This is an increase in the average rate of decline from one period to the next and is a positive development. The rate of decline has accelerated.

A change from –6.7% to –3.7 (as for men aged 45–54 years) is a decrease in the average rate of decline from 6.7% to 3.7% and is a negative development. The rate of decline has slowed.

2 Trends in all cardiovascular disease

2.1 What are cardiovascular diseases?

Cardiovascular diseases cover all diseases and conditions of the heart and blood vessels. In developed countries such as Australia, the main underlying cause is atherosclerosis. This is a condition that forms abnormal build-ups of fat, cholesterol and other substances in the inner lining of the arteries (plaque). It is most serious when it leads to a reduced or blocked blood supply to the heart (causing angina or heart attack) or to the brain (which can lead to a stroke). The process leading to atherosclerosis is slow and complex, often starting in childhood and progressing with age.

CHD, stroke and heart failure/cardiomyopathy are major contributors to the CVD burden in Australia. Rheumatic fever and rheumatic heart disease are significant problems among Aboriginal and Torres Strait Islander people.

Risk factors

Tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition and diabetes are major preventable risk factors for CVD. In addition, atrial fibrillation, transient ischaemic attack and high intake of alcohol increase the risk of stroke (AIHW: Field 2004).

2.2 Deaths from cardiovascular disease

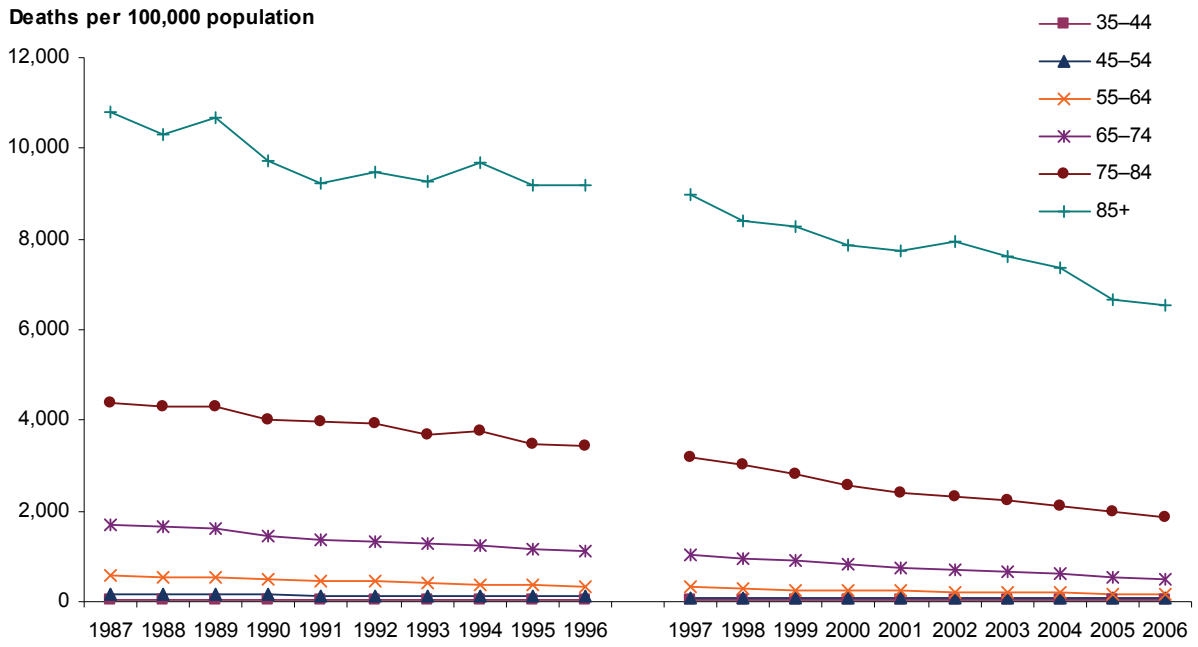
Age-standardised death rates

Over the two decades to 2006, the steady decline in CVD death rates, which began in the late 1960s, has continued. In men, the age-standardised death rates for CVD decreased on average by 3.3% per year during 1987–1996 and 5.0% during 1997–2006 (Table A15). For women, the decline was 3.2% per year and 4.5% per year, respectively, over the two periods.

Age-specific death rates

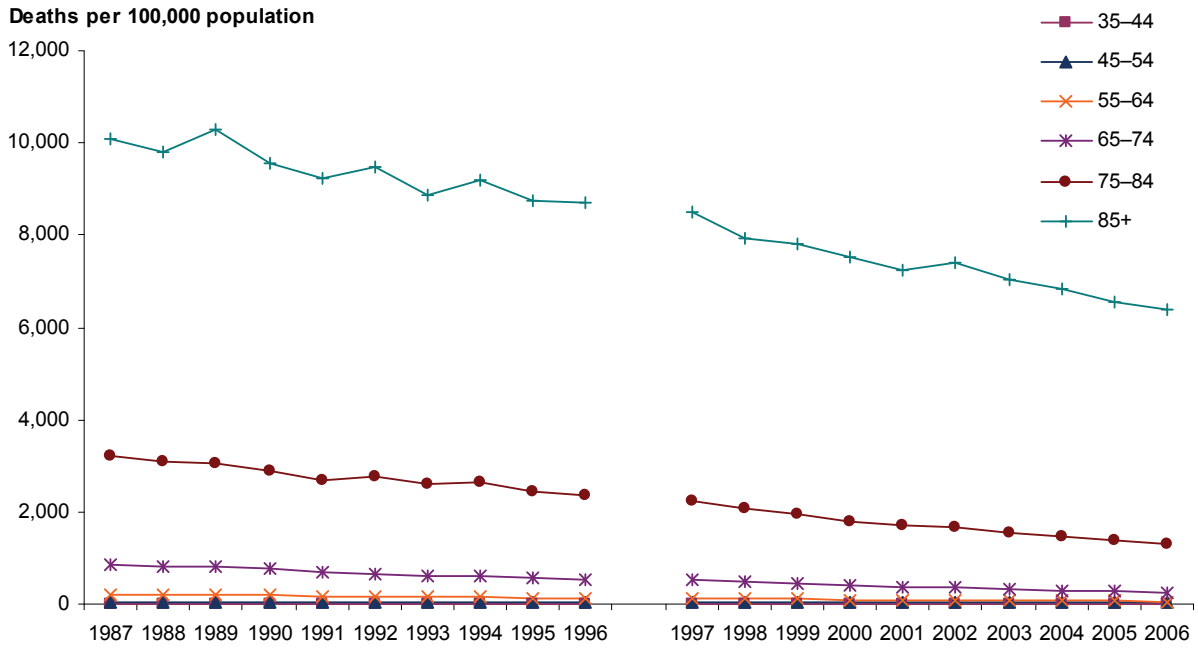
A steady decline occurred for each age group and for both sexes (figures 2.1 to 2.4). Since 1987, declines have been greatest among men and women aged 55–64 and 65–74 years (figures 2.3 and 2.4). However, the rate of decline has slowed over the most recent decade in men aged 35–44 and 45–54 years. This is confirmed in Figure 2.5, which shows a slowing in the average annual rate of decline for men aged 35–44 and 45–54 years. The pattern is very different for older men where the rate of change in CVD death rates has continued to improve over recent years.

The pattern was similar in women; their rate of decline slowed in the 45–54 year age group but accelerated among older age groups (Figure 2.6).



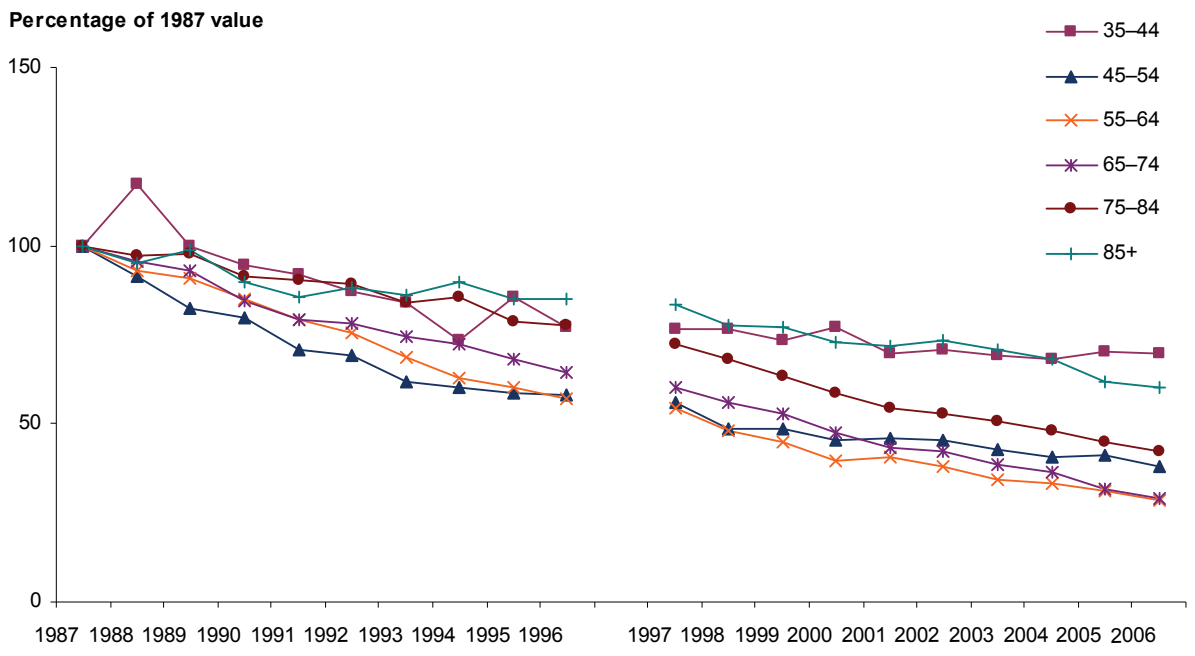
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Table A1 for data points and ASRs.

Figure 2.1: Trends in age-specific death rates from CVD in men, 1987–2006



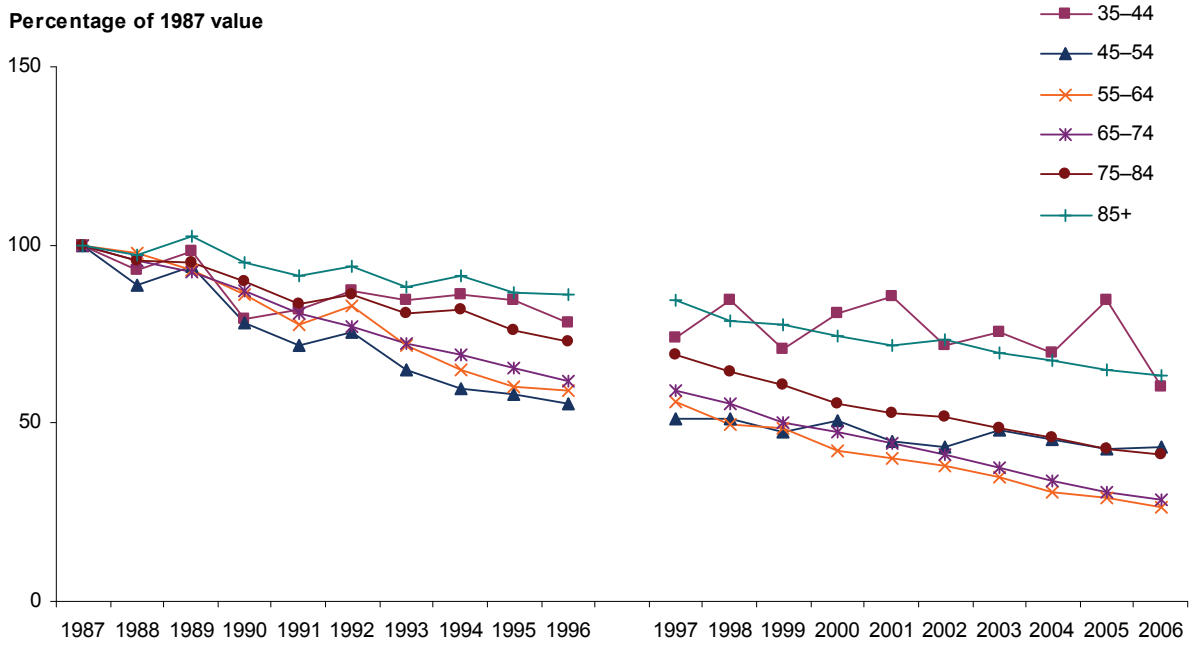
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Table A2 for data points and ASRs.

Figure 2.2: Trends in age-specific death rates from CVD in women, 1987–2006



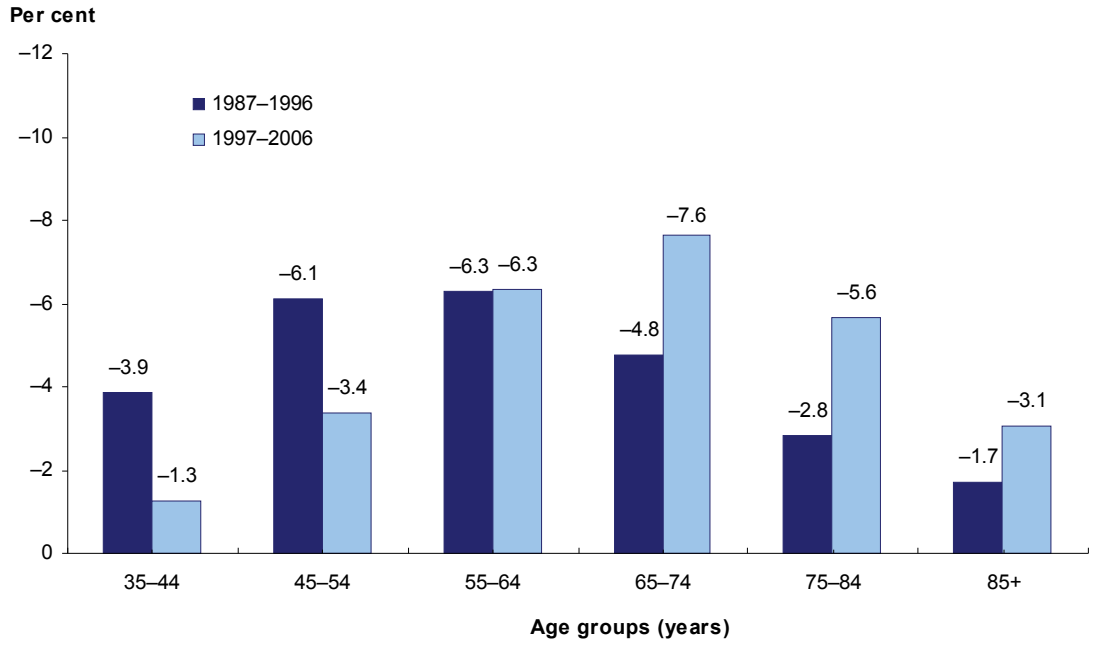
Note: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10.

Figure 2.3: Age-specific death rates for CVD in men, as a percentage of the 1987 value



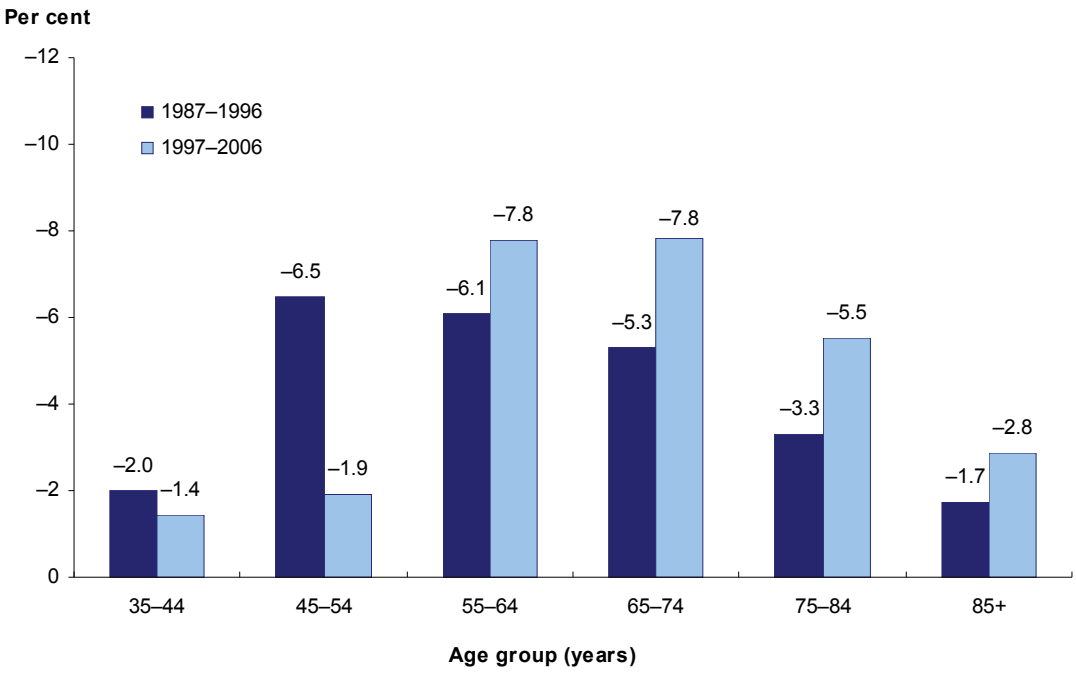
Note: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10.

Figure 2.4: Age-specific death rates for CVD in women, as a percentage of the 1987 value



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 2.5: Average annual change in CVD death rates in men, 1987–1996 and 1997–2006



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 2.6: Average annual change in CVD death rates in women, 1987–1996 and 1997–2006

3 Trends in coronary heart disease

3.1 What is coronary heart disease?

Coronary heart disease, also known as ischaemic heart disease, is the most common form of heart disease. There are two major clinical forms—heart attack (often known as acute myocardial infarction or AMI) and angina.

A heart attack is a life-threatening event that occurs when a blood vessel supplying the heart is suddenly blocked completely, threatening to damage the heart and its functions. The blockage is due to a blood clot that forms when a plaque breaks open.

Angina is a chronic condition in which short episodes of chest pain can occur periodically when the heart has a temporary deficiency in its blood supply. Episodes occur when one of the heart's main arteries is already significantly narrowed by plaque and cannot meet an extra demand for blood flow, such as with exercise or strong emotion.

Risk factors

Major preventable risk factors for CHD are tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, and overweight and obesity. Nutrition factors and diabetes have also been associated with higher risk of CHD. Depression, social isolation and lack of quality social support are significant independent risk factors for CHD as well (AIHW 2004).

3.2 Deaths from coronary heart disease

Age-standardised death rates

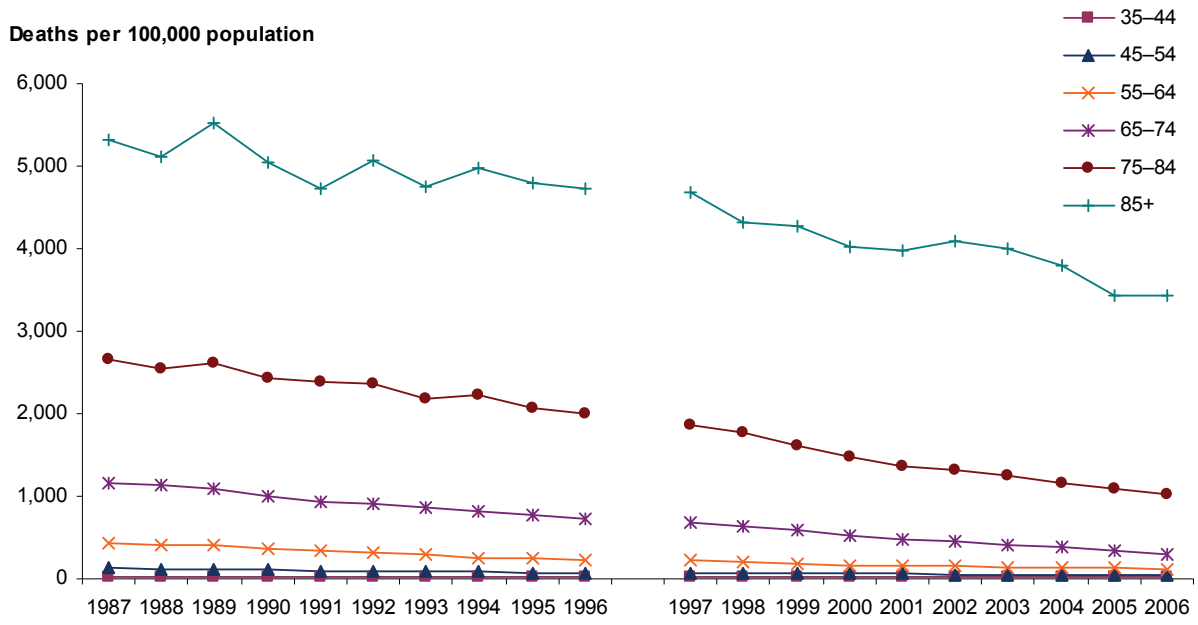
The steady decline in CHD death rates, which began in the late 1960s, has continued in men and women. In men, the age-standardised death rates for CHD decreased on average by 3.8% per year during 1987–1996 and 5.6% during 1997–2006. Similarly for women, the decline was 3.4% per year during 1987–1996 and 5.5% during 1997–2006 (Table A15).

Age-specific death rates

The steady decline in CHD death rates that began in the late 1960s has continued for each age group and for both sexes (figures 3.1 to 3.4). Over the two decades to 2006, declines have been greatest among men and women aged 55–64 and 65–74 years (figures 3.3 and 3.4).

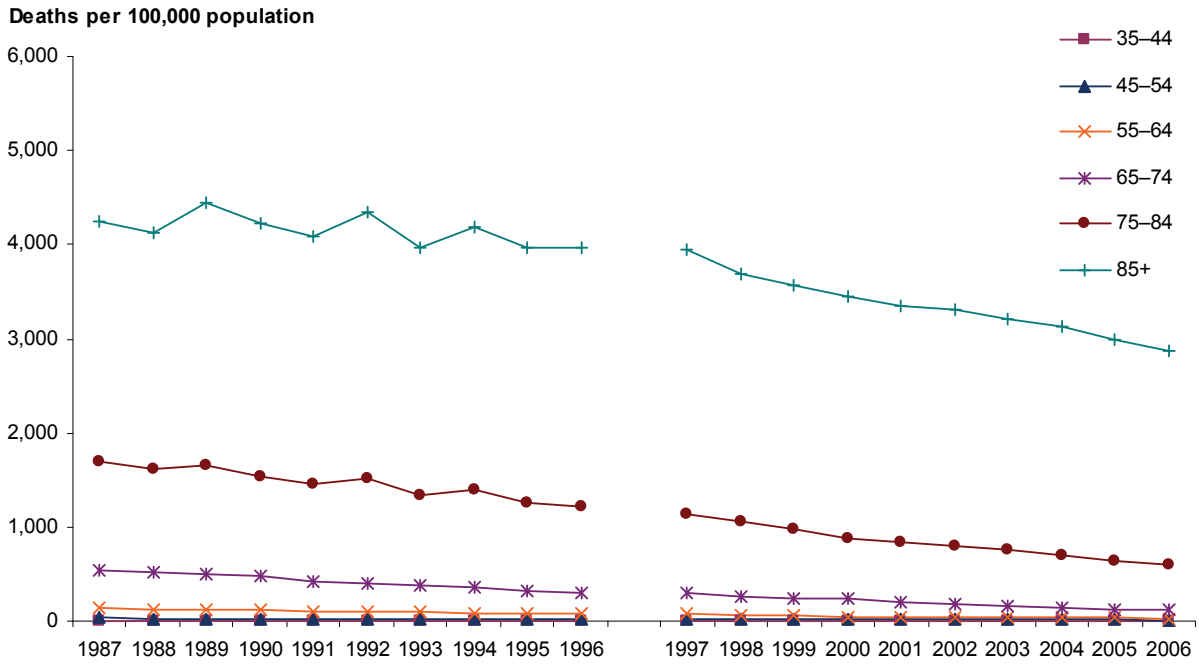
In men aged 35–44 and 45–54 years, the rate of decline has slowed over the most recent decade (Figure 3.5). This pattern is very different within older men where the rate of change in CHD mortality rates has continued to improve over recent years.

For women, the rate of decline has slowed in the 45–54 year age group but has accelerated among the older age groups (Figure 3.6).



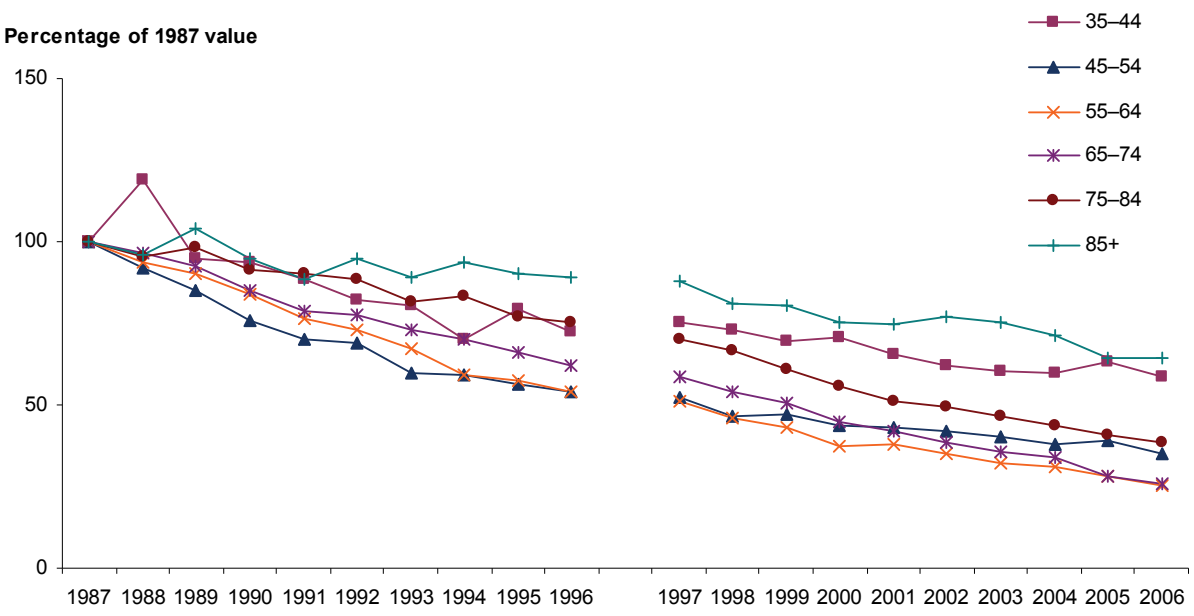
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Table A3 for data points and ASRs.

Figure 3.1: Trends in age-specific death rates from CHD in men, 1987–2006



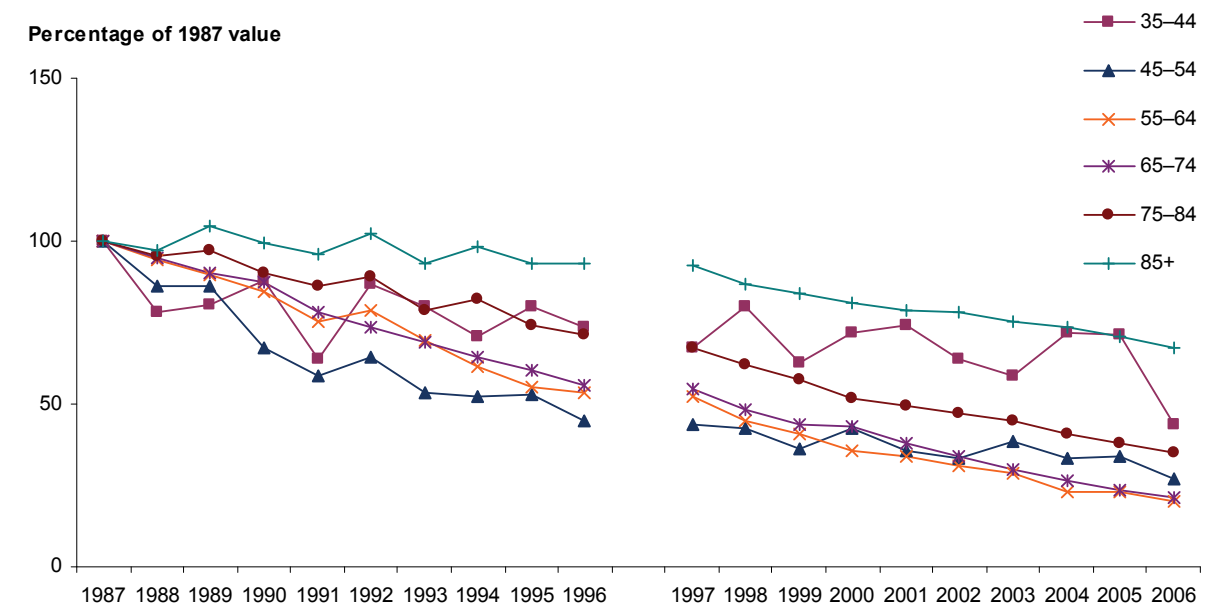
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Table A4 for data points and ASRs.

Figure 3.2: Trends in age-specific death rates from CHD in women, 1987–2006



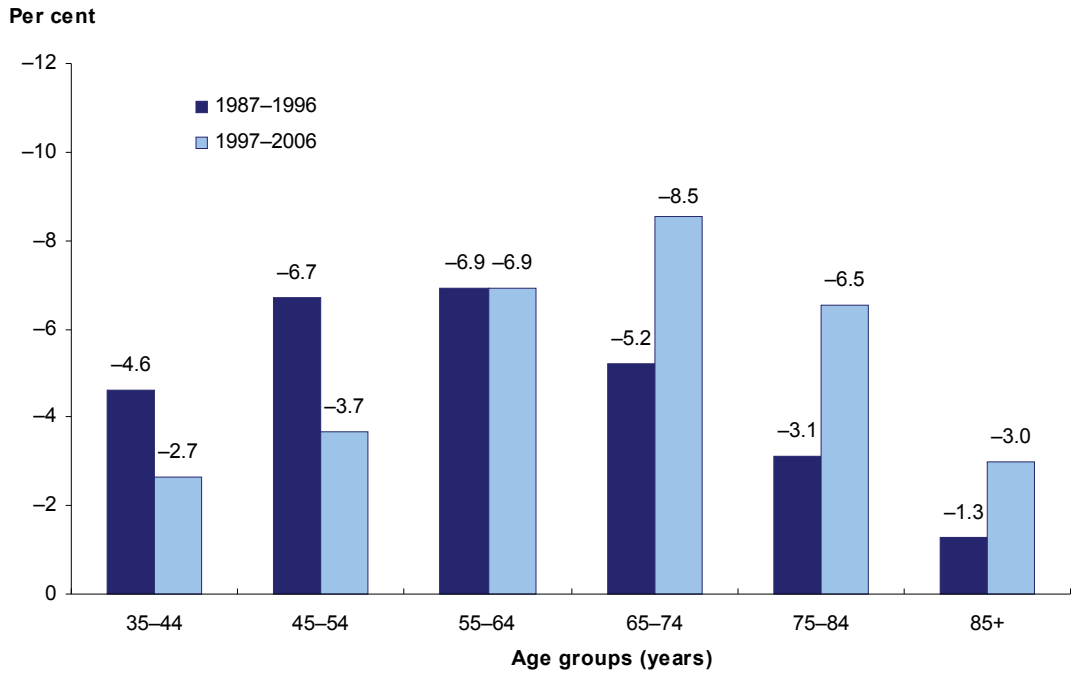
Note: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10.

Figure 3.3: Age-specific death rates for CHD in men, as a percentage of the 1987 value



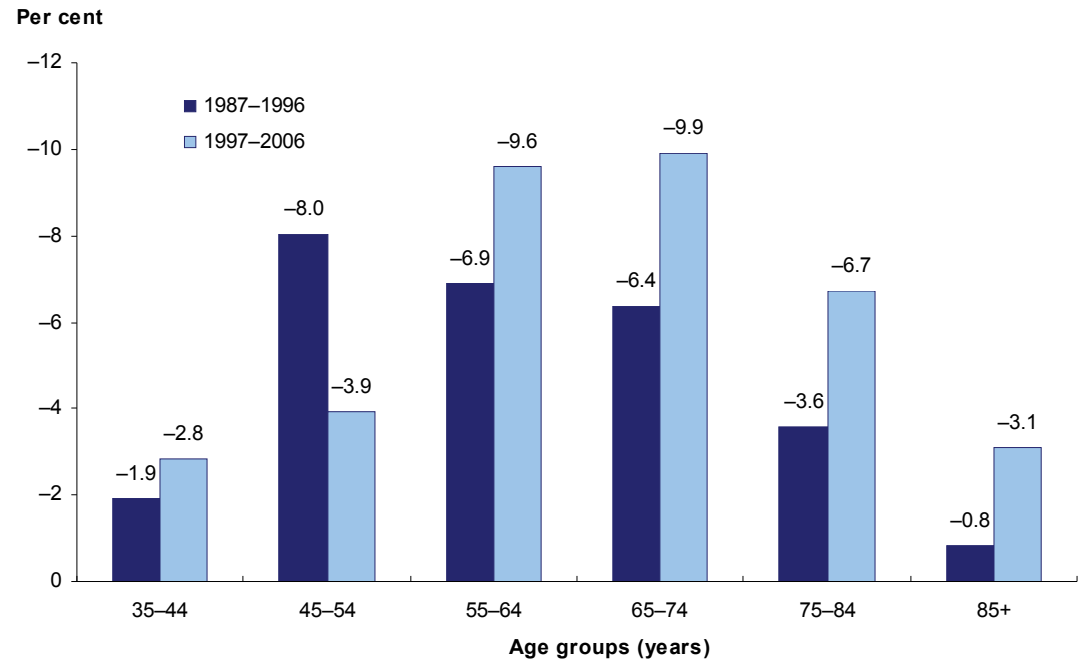
Note: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10.

Figure 3.4: Age-specific death rates for CHD in women, as a percentage of the 1987 value



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 3.5: Average annual change in CHD death rates in men, 1987–1996 and 1997–2006



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 3.6: Average annual change in CHD death rates in women, 1987–1996 and 1997–2006

4 Trends in stroke

4.1 What is stroke?

A stroke occurs when a blood vessel to the brain is suddenly blocked by a clot (an ischaemic stroke) or bleeds (a haemorrhagic stroke). This disturbance in the blood supply may result in part of the brain dying, leading to a loss of brain function or impairment in a range of activities including movement, thinking and communication, and may lead to death. Ischaemic and haemorrhagic strokes account for about 80% and 20% of cases, respectively. Although ischaemic strokes are more common, haemorrhagic strokes have a much higher fatality rate.

Symptoms and signs of stroke include one or more of the following:

- motor impairments (weakness or paralysis of parts of the body, including the face, on one or both sides)
- sensory impairments (touch, pain, warm/cold), most often on one side
- speech difficulties or slurred speech
- vision difficulties (sudden loss of vision, blurred vision), most often on one side
- dizziness, loss of balance or unexplained fall
- sudden severe headache
- difficulty swallowing

A related condition is a transient ischaemic attack, sometimes called a 'mini-stroke', which produces temporary stroke-like symptoms, and is an extremely important predictor of stroke. It usually results from a temporary blockage of blood vessels that reduces blood supply to the brain and may last only a few minutes, with symptoms disappearing completely within 24 hours. Strokes and transient ischaemic attacks are sometimes referred to as cerebrovascular events.

Risk factors

Risk factors for stroke include transient ischaemic attack, high blood pressure, tobacco smoking, diabetes, high alcohol consumption, high blood cholesterol, atrial fibrillation, other heart disease and narrowing of the carotid arteries (carotid stenosis) (AIHW 2004).

4.2 Deaths from stroke

Age-standardised death rates

The steady decline in stroke mortality, which began in the early 1970s, has continued in men and women. In men, the age-standardised death rate for stroke decreased on average by

2.6% per year during 1987–1996 and 4.5% during 1997–2006. Similarly for women, the decline was 2.6% per year during 1987–1996 and 3.9% during 1997–2006 (Table A15).

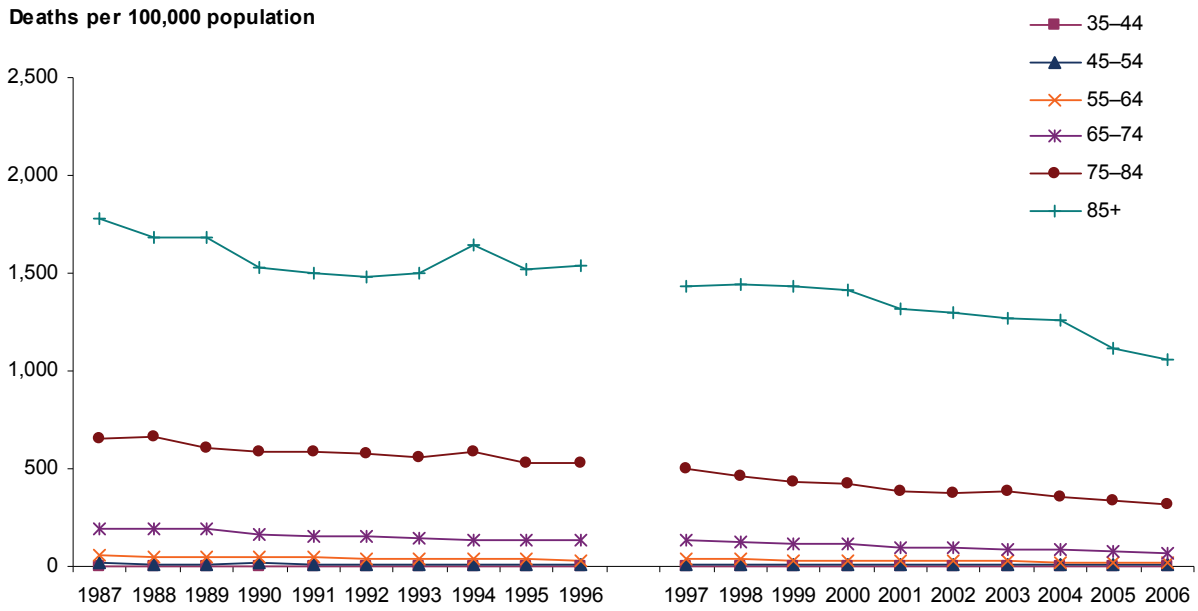
Recent declines have been greater for ischaemic stroke (about 8% per year) than haemorrhagic stroke (about 2% per year) (Table A15).

Age-specific death rates

Age-specific death rates from stroke are shown in figures 4.1 and 4.2. The decline in stroke death rates for each age group are shown in figures 4.3 to 4.6. Over the two decades to 2006, declines have been greatest among men and women aged 55–64 and 65–74 years (figures 4.3 and 4.4).

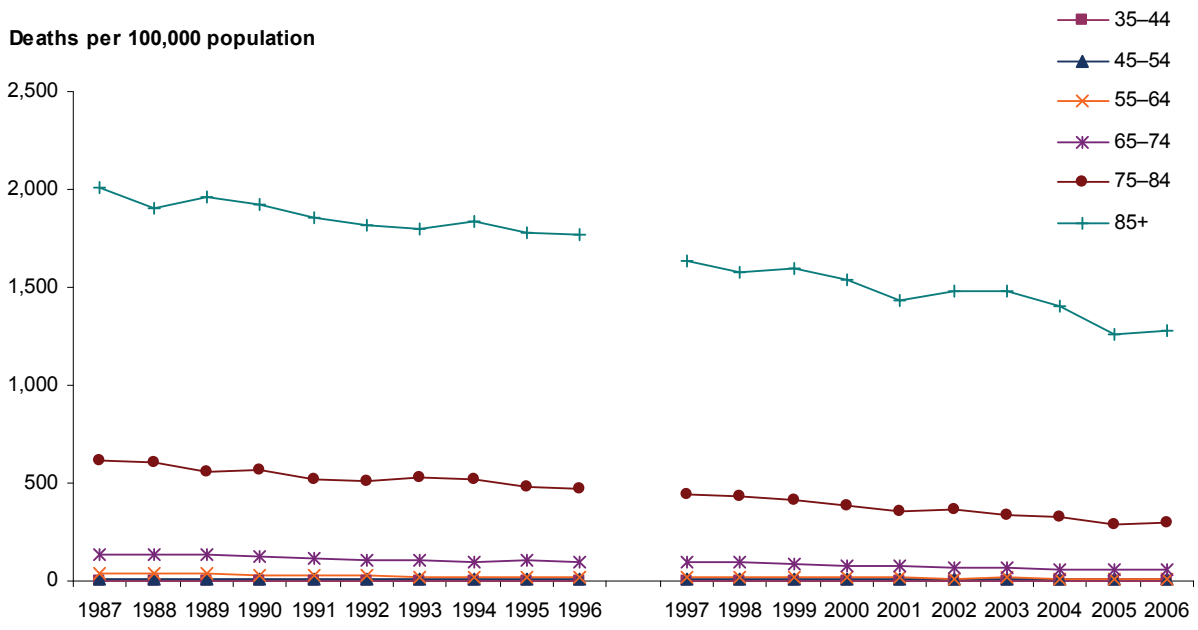
In men, there has been no marked slowing of the rate of decline in any age group. In women aged 45–54 years, the annual rate of decline has slowed noticeably over the most recent decade, from 5% during 1987–1996 to 0.7% during 1997–2006. For both men and women, the annual rate of decline has accelerated among the older age groups (figures 4.5 and 4.6).

Age-specific death rates and rates of change for ischaemic stroke and haemorrhagic stroke are shown in figures 4.7 to 4.12 and 4.13 to 4.18, respectively. Again, they show that the rate of mortality decline has been much greater for ischaemic stroke than haemorrhagic stroke. While the rate of decrease for ischaemic stroke mortality has accelerated among the older age groups, there has been little change for haemorrhagic stroke mortality, and the decline has stalled among men and women aged 85 and over (figures 4.17 and 4.18).



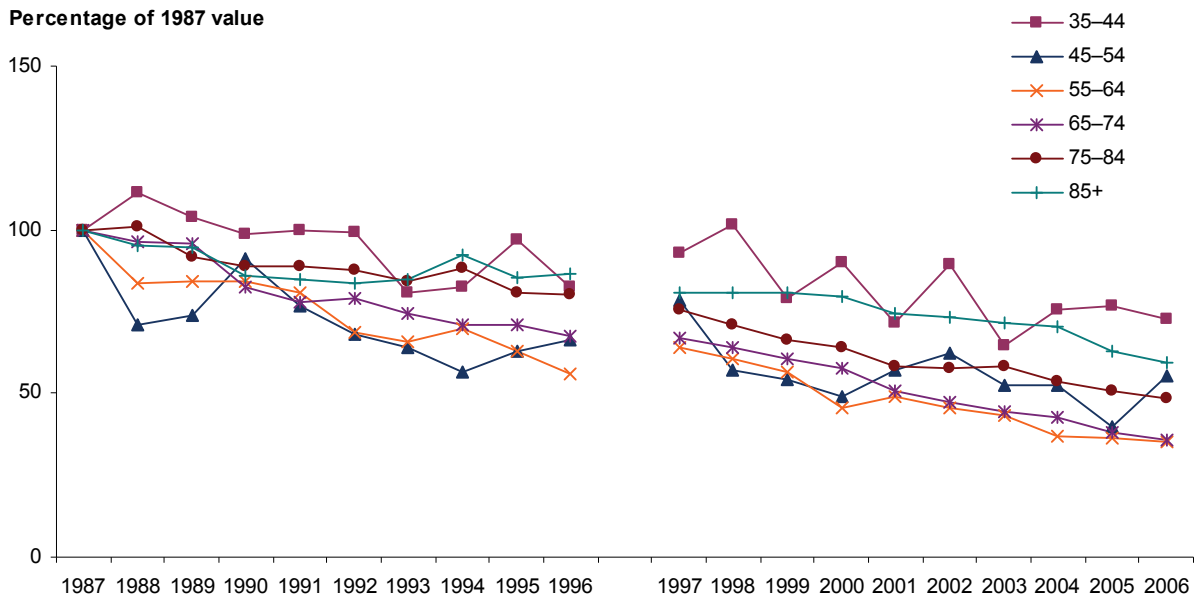
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.83 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A5 for data points and ASRs.

Figure 4.1: Trends in age-specific death rates from stroke in men, 1987–2006



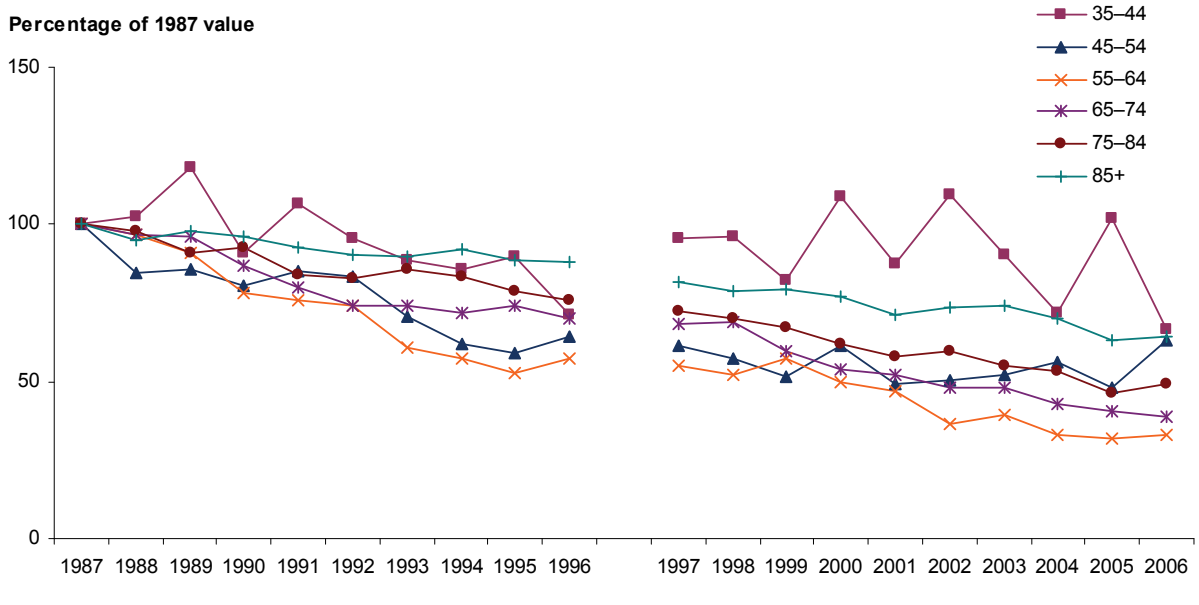
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.83 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A6 for data points and ASRs.

Figure 4.2: Trends in age-specific death rates from stroke in women, 1987–2006



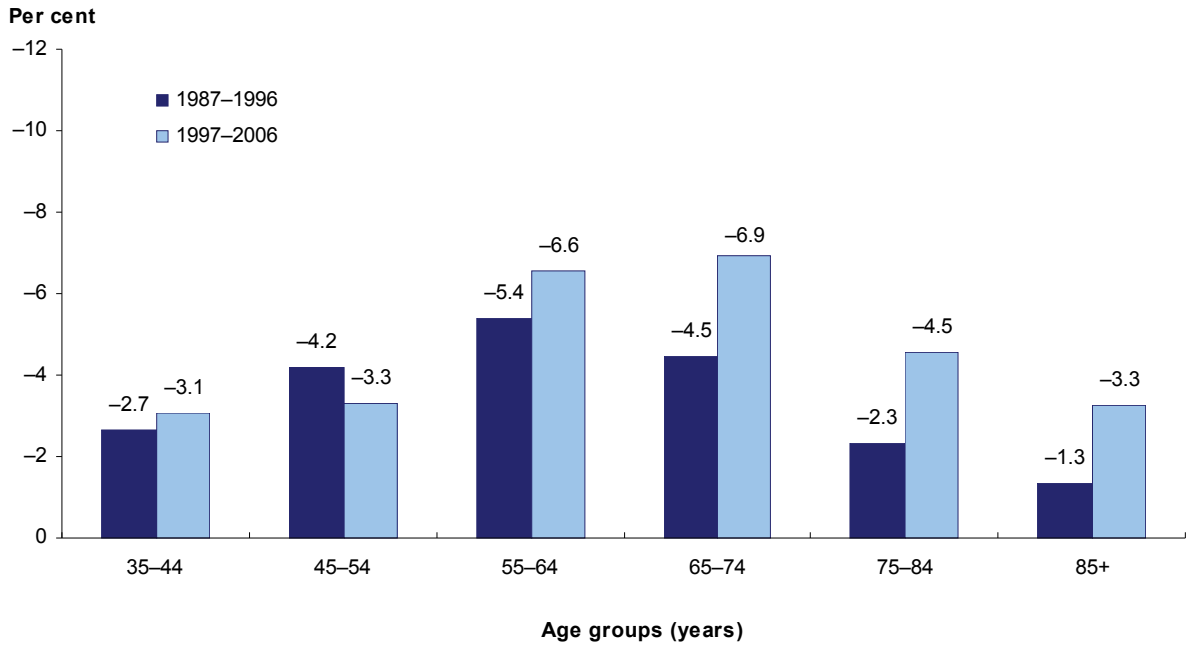
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.83 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 4.3: Age-specific death rates for stroke in men, as a percentage of the 1987 value



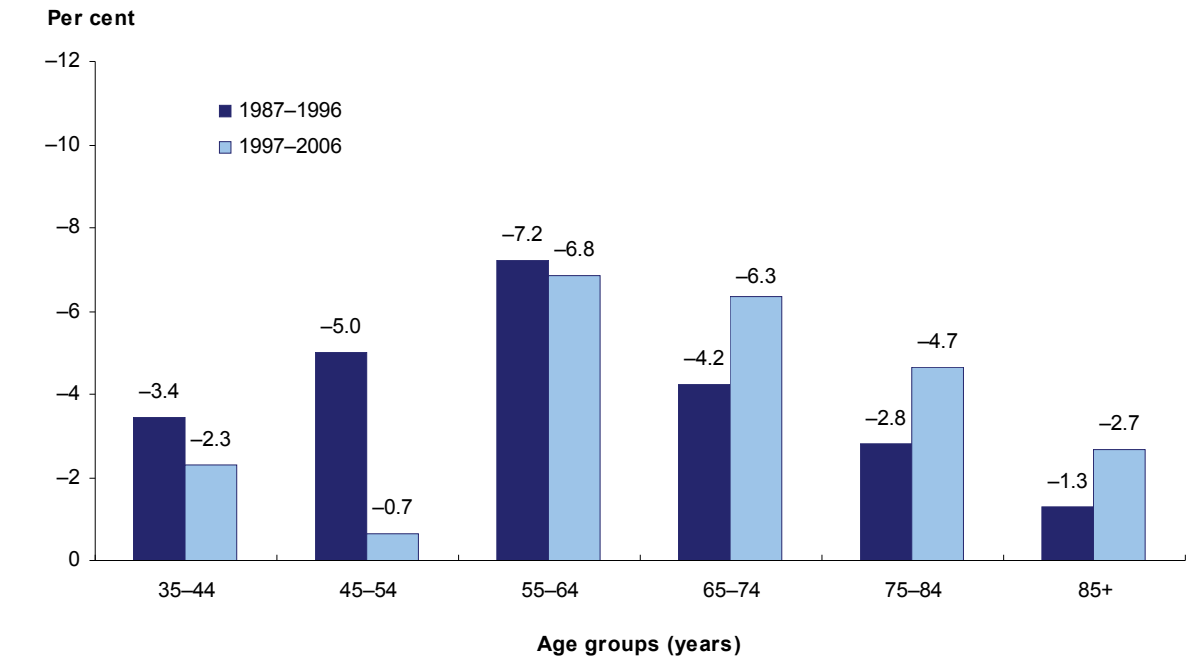
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.83 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 4.4: Age-specific death rates for stroke in women, as a percentage of the 1987 value



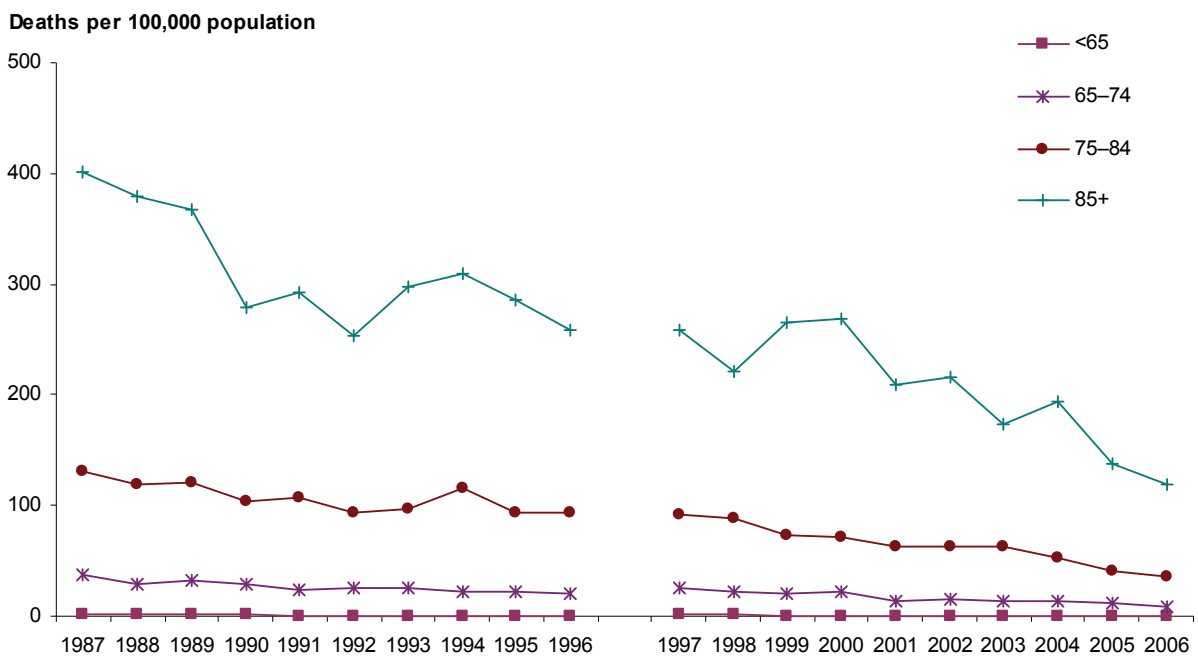
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 4.5: Average annual change in stroke death rates in men, 1987–1996 and 1997–2006



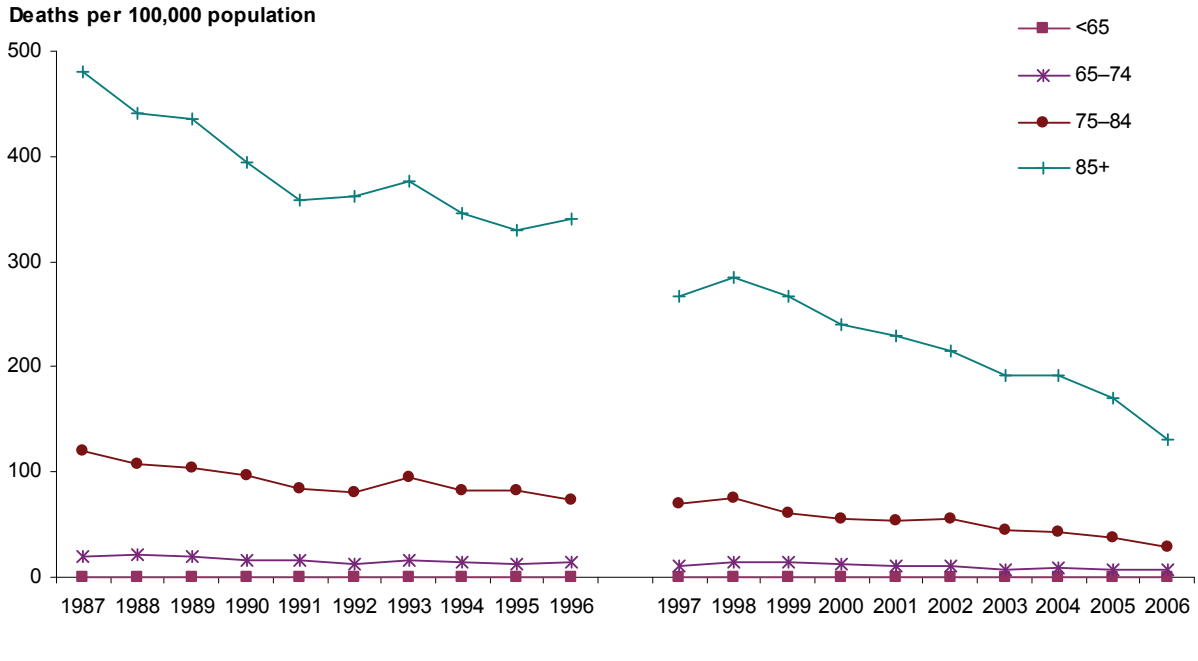
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 4.6: Average annual change in stroke death rates in women, 1987–1996 and 1997–2006



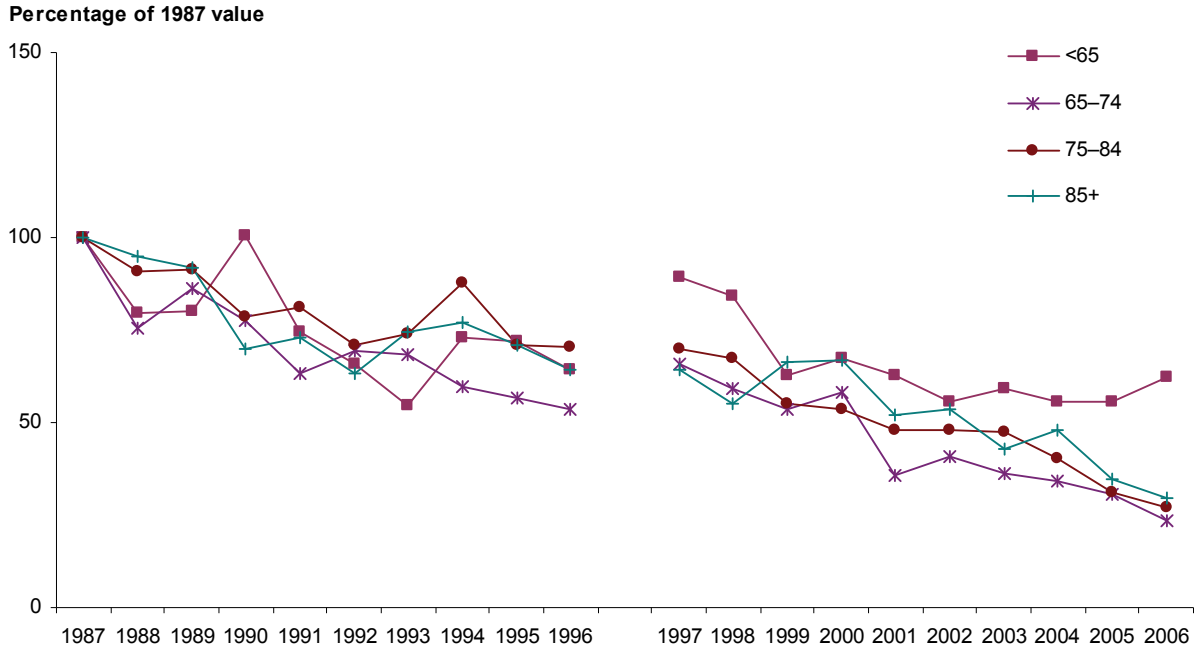
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.79 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A7 for data points and ASRs.

Figure 4.7: Trends in age-specific death rates from ischaemic stroke in men, 1987–2006



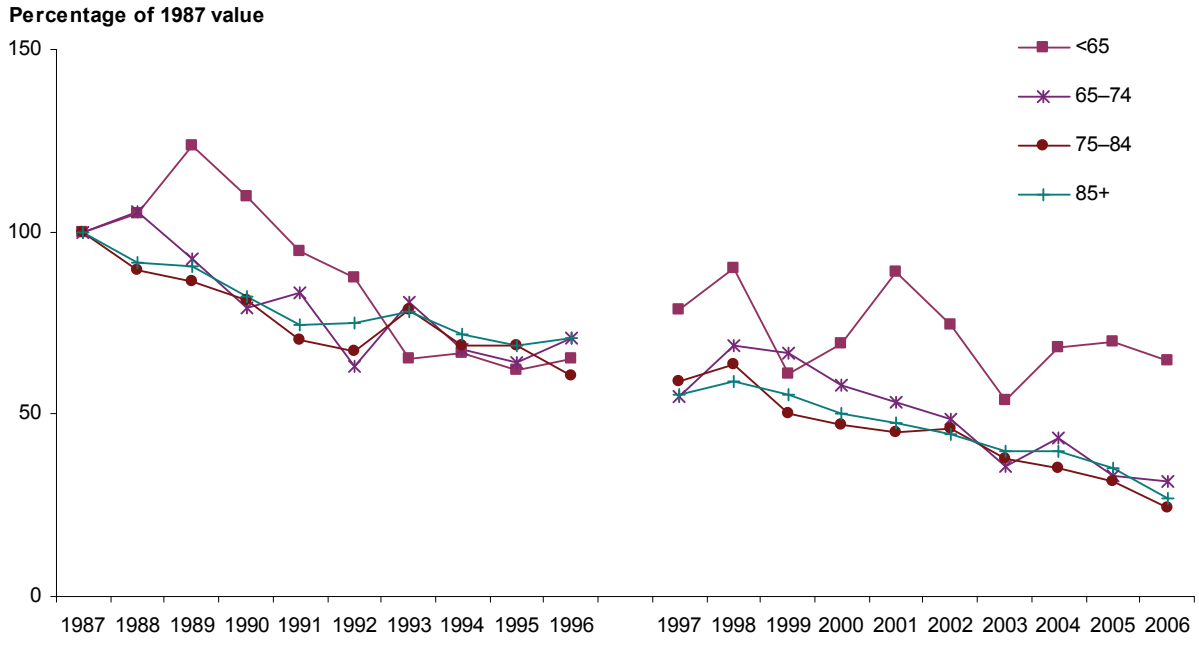
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.79 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A8 for data points and ASRs.

Figure 4.8: Trends in age-specific death rates from ischaemic stroke in women, 1987–2006



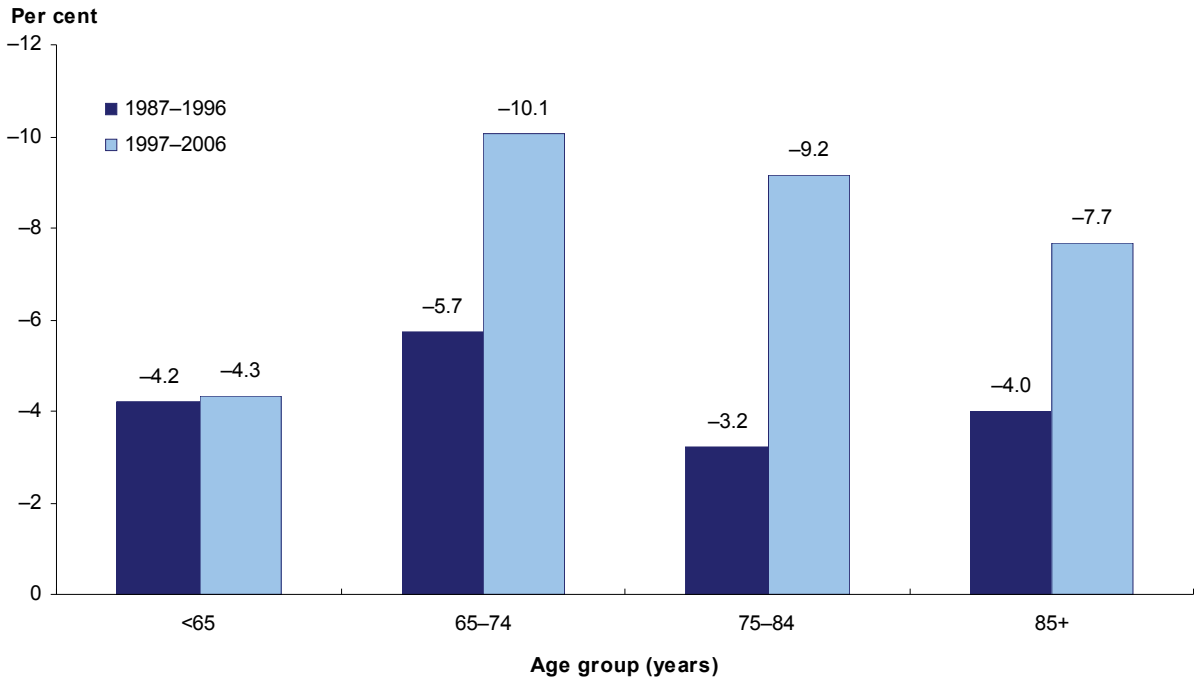
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.79 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 4.9: Age-specific death rates for ischaemic stroke in men, as a percentage of the 1987 value



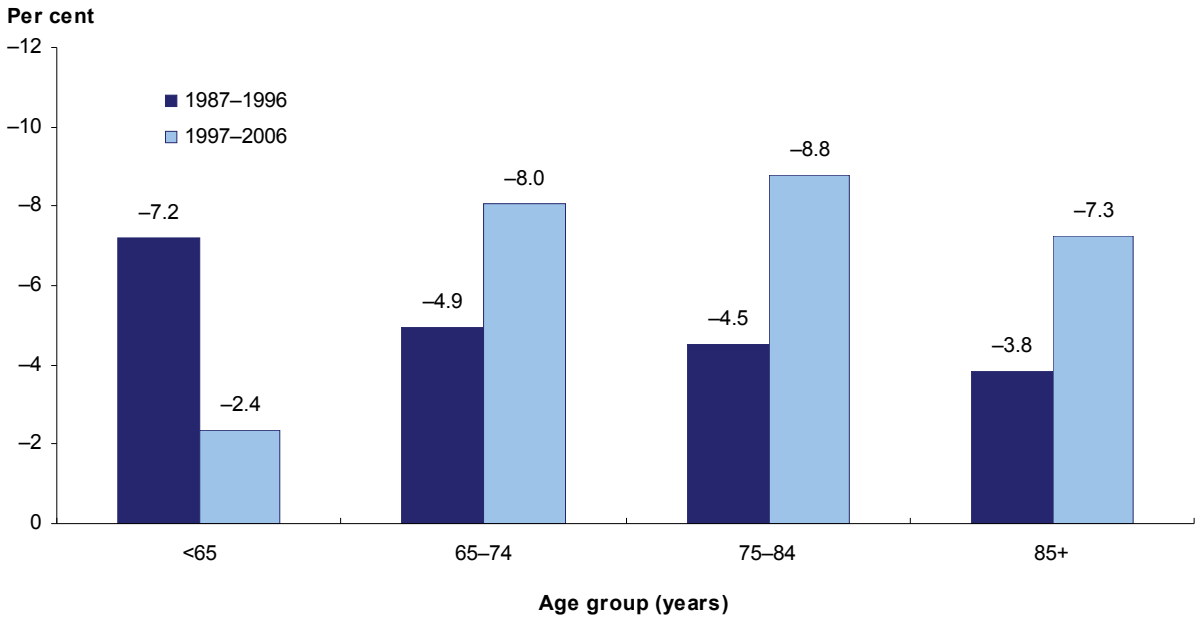
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.79 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 4.10: Age-specific death rates for ischaemic stroke in women, as a percentage of the 1987 value



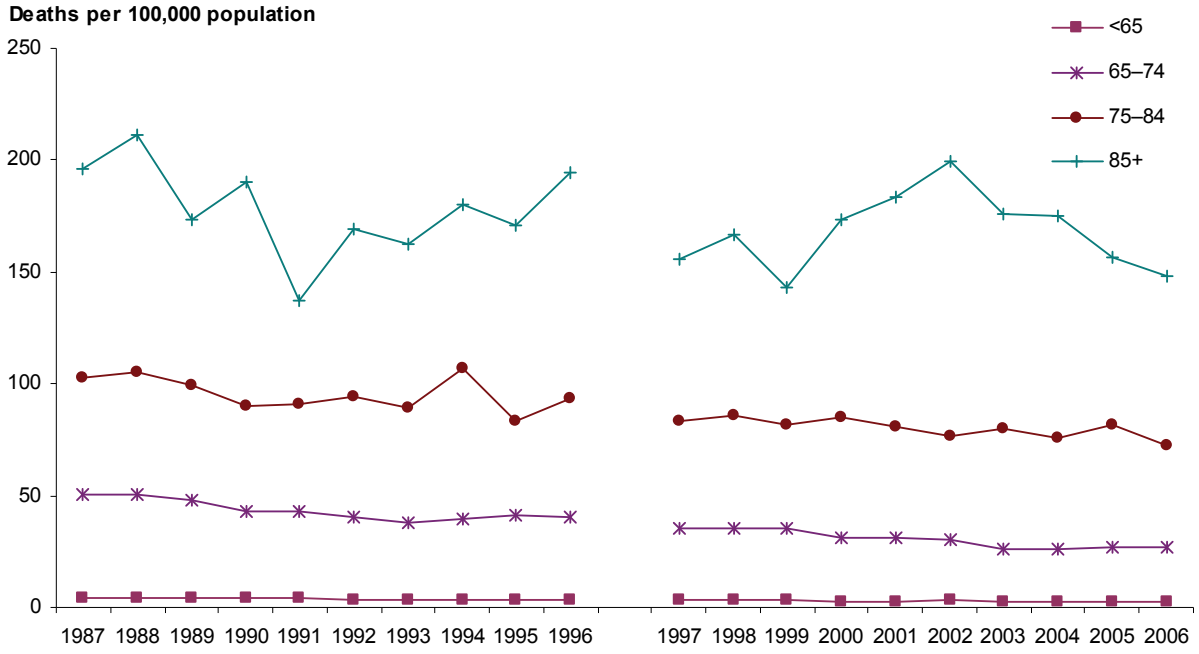
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 4.11: Average annual change in ischaemic stroke death rates in men, 1987–1996 and 1997–2006



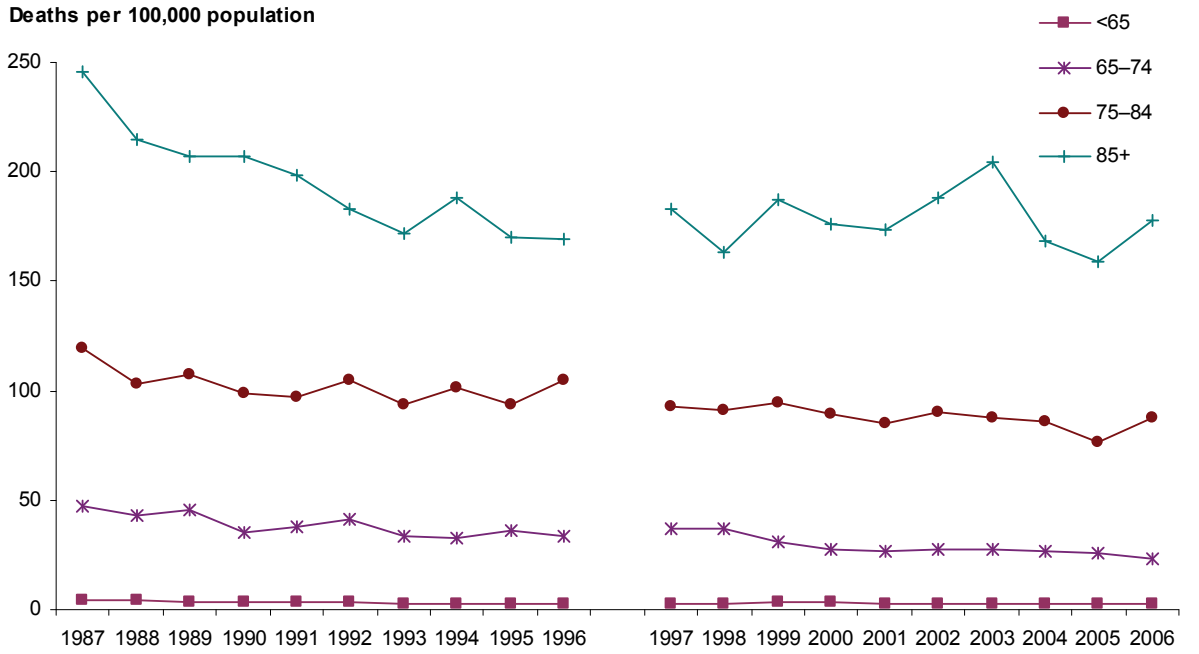
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 4.12: Average annual change in ischaemic stroke death rates in women, 1987–1996 and 1997–2006



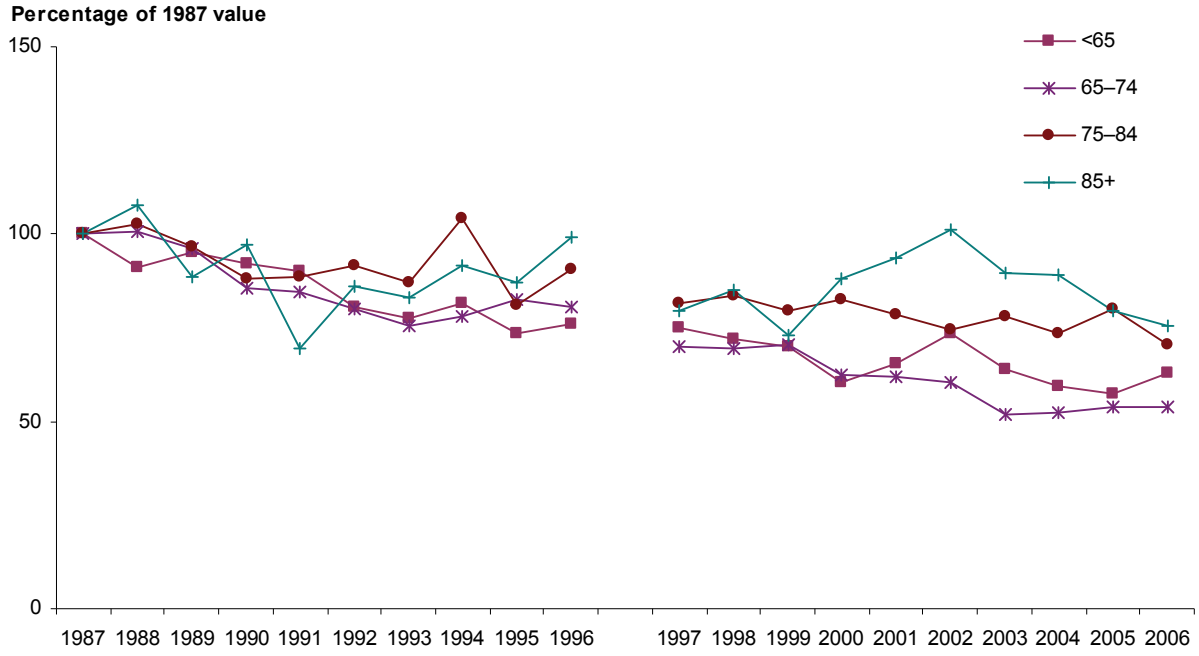
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.89 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A9 for data points and ASRs.

Figure 4.13: Trends in age-specific death rates from haemorrhagic stroke in men, 1987–2006



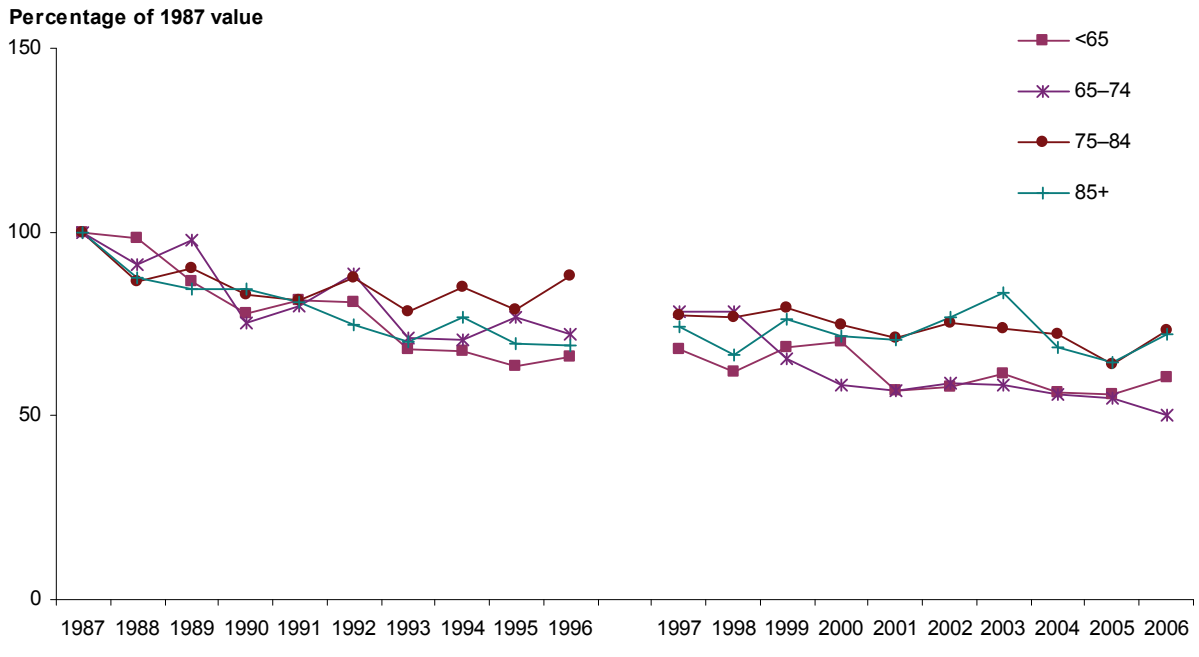
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.89 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A10 for data points and ASRs.

Figure 4.14: Trends in age-specific death rates from haemorrhagic stroke in women, 1987–2006



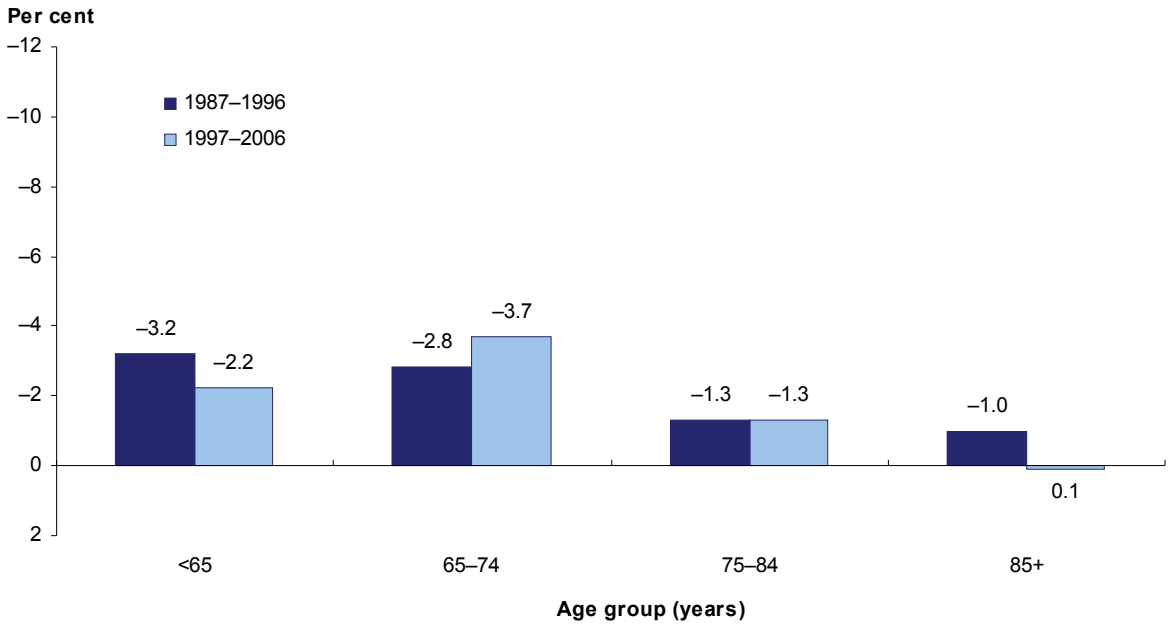
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.89 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 4.15: Age-specific death rates for haemorrhagic stroke in men, as a percentage of the 1987 value



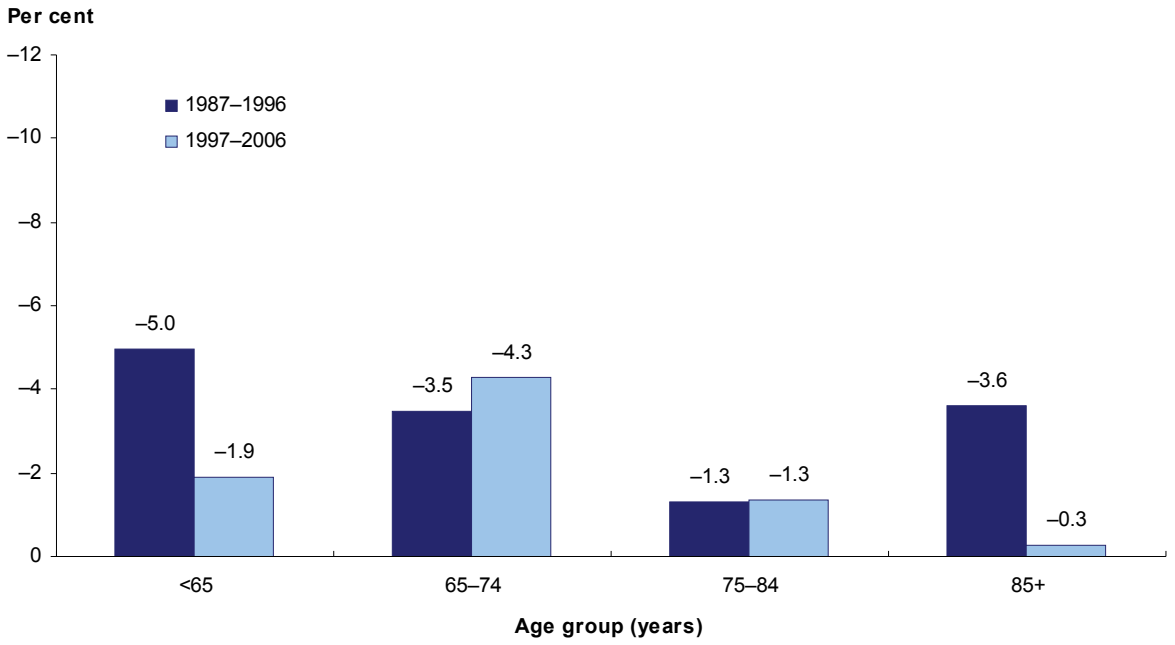
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.89 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 4.16: Age-specific death rates for haemorrhagic stroke in women, as a percentage of the 1987 value



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 4.17: Average annual change in haemorrhagic stroke death rates in men, 1987–1996 and 1997–2006



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 4.18: Average annual change in haemorrhagic stroke death rates in women, 1987–1996 and 1997–2006

5 Trends in heart failure/cardiomyopathy

5.1 What is heart failure/cardiomyopathy?

Heart failure occurs when the heart functions less effectively in pumping blood around the body. It can result from a variety of diseases and conditions that impair or overload the heart, notably heart attack, high blood pressure or a damaged heart valve. It usually develops slowly, often over many years, although it can occur suddenly. People with mild heart failure may have very few symptoms, but in more severe cases it can result in chronic tiredness, reduced capacity for physical activity and shortness of breath. Once diagnosed, survival rates are low.

Congestive heart failure is a specific type of heart failure characterised by 'congestion' or build-up of fluid in the lungs, liver or legs. It often occurs in people with untreated heart failure. Chronic heart failure refers to the length of duration of heart failure, usually where the heart muscle has been irreversibly damaged. Not all heart failure is chronic, however. In some cases, acute (new onset or acute worsening of) heart failure is caused by particular impairments, such as heart valve defects or after a heart attack, and can sometimes be reversed.

In this report, cardiomyopathy has been included with heart failure. Cardiomyopathy is a disease of the heart muscle when it becomes dilated or enlarged, thickened, restrictive or stiff. Warning symptoms or complaints include shortness of breath, fatigue and a feeling of lethargy, palpitations, fainting attacks and sometimes chest pains.

Risk factors

The most important risk factors for heart failure are CHD and high blood pressure. Other common causes are diseases of the heart muscle (cardiomyopathy) due to alcohol abuse or infections, diseases of the heart valves (such as with chronic rheumatic heart disease), diabetes and obesity (AIHW 2004).

5.2 Deaths from heart failure/cardiomyopathy

Age-standardised death rates

The decline in mortality from heart failure/cardiomyopathy increased from about 2.5% per year during 1987–1996 to 6.7% during 1997–2006 (Table A15). Overall, the rate of decline was similar for men and women.

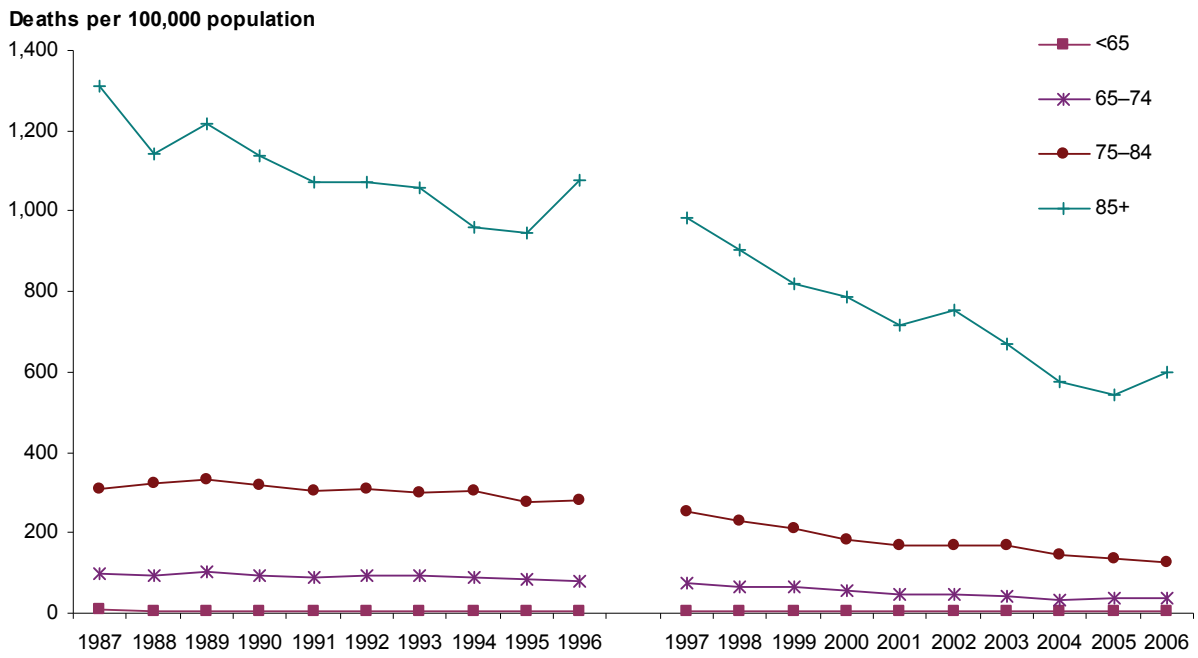
Age-specific death rates

Age-specific death rates from heart failure/cardiomyopathy for men and women separately are shown in figures 5.1 and 5.2. The rates of change of heart failure/cardiomyopathy death rates for each age group are shown in figures 5.3 to 5.6.

They show a steady decline during the two decades to 2006 for each age group and for both genders. The rate of decline has accelerated during the most recent years, and has been greatest among men and women aged 65–74 years at well over 8% per year (figures 5.5 and 5.6).

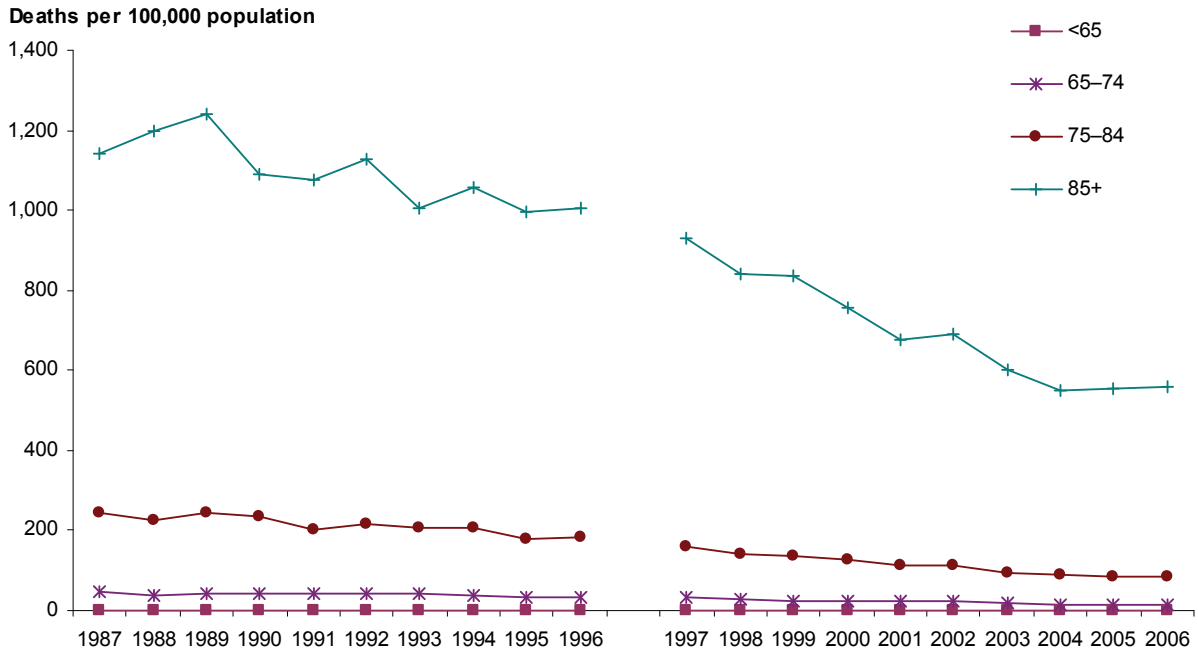
Heart failure/cardiomyopathy is more likely to be listed as an associated cause of death than as an underlying cause. In 2006, it was mentioned as an underlying cause of death in more than 3,500 cases and an associated cause of death in more than 15,800 cases. Heart failure occurs often as an associated cause of death when the underlying cause of death is kidney failure, CHD, diabetes or chronic lower respiratory disease. Trends were similar whether death rates were based on heart failure/cardiomyopathy as an underlying cause of death only, or as an underlying or associated cause of death.

The age-standardised death rates for heart failure/cardiomyopathy as an underlying cause of death or as an underlying or associated cause of death fell by more than 30% for both men and women between 1997 and 2006. This may reflect a fall in disease incidence as a result of reduced incidence of CHD or improved care of people with CHD, or as a result of better management of people with heart failure/cardiomyopathy resulting in fewer deaths.



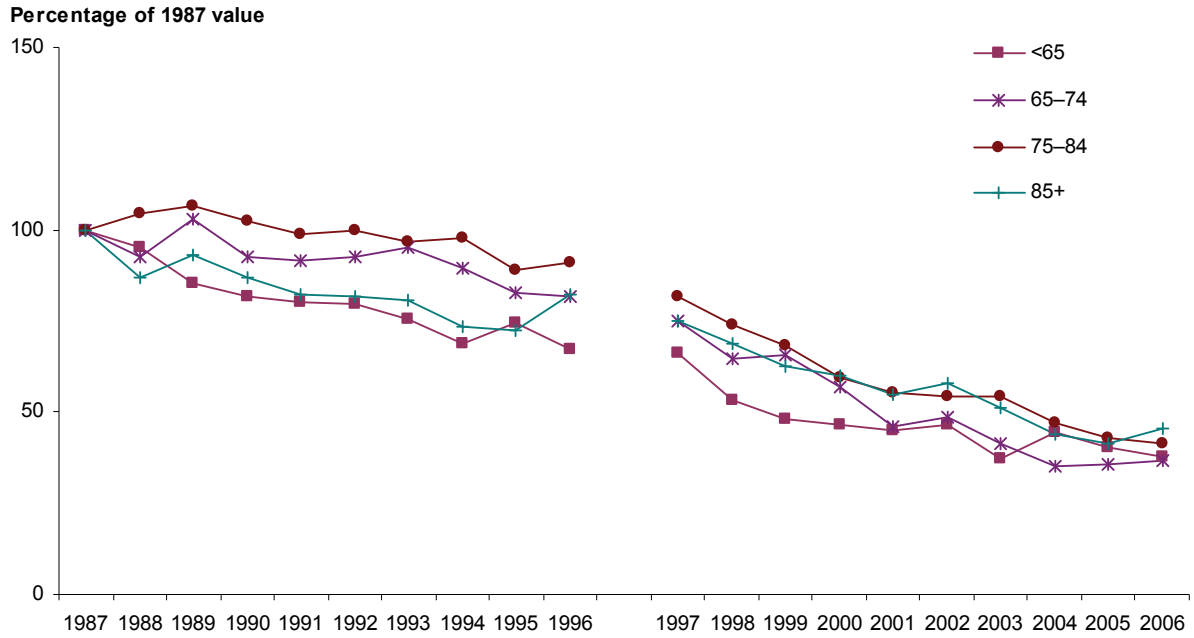
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Table A11 for data points and ASRs.

Figure 5.1: Trends in age-specific death rates from heart failure/cardiomyopathy in men, 1987–2006



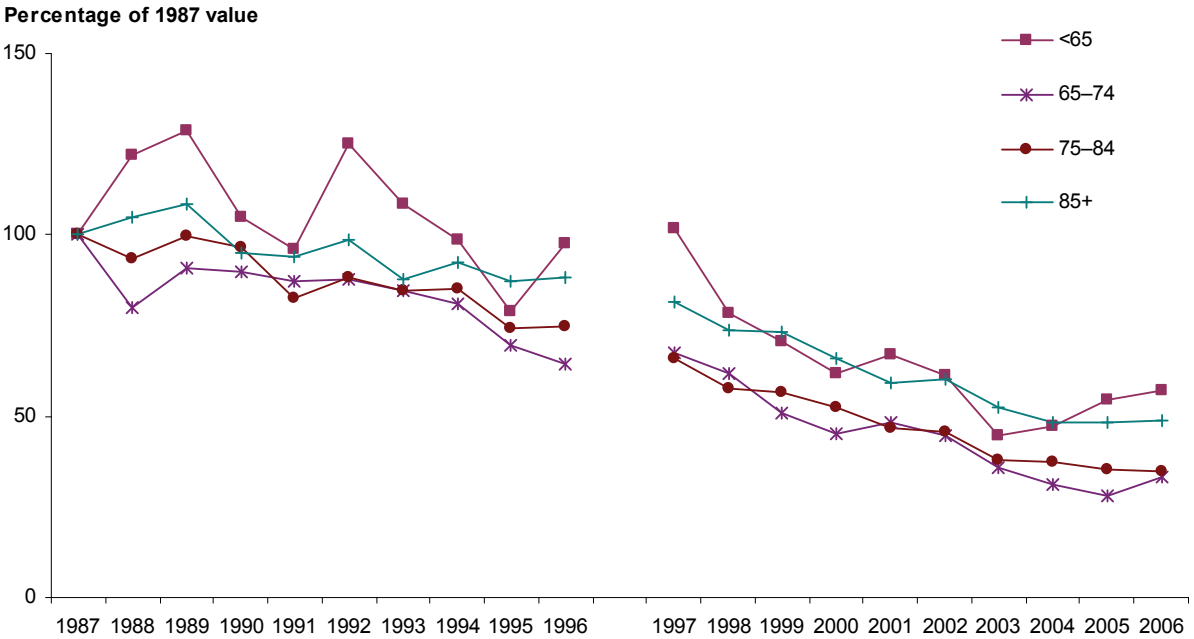
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Table A12 for data points and ASRs.

Figure 5.2: Trends in age-specific death rates from heart failure/cardiomyopathy in women, 1987–2006



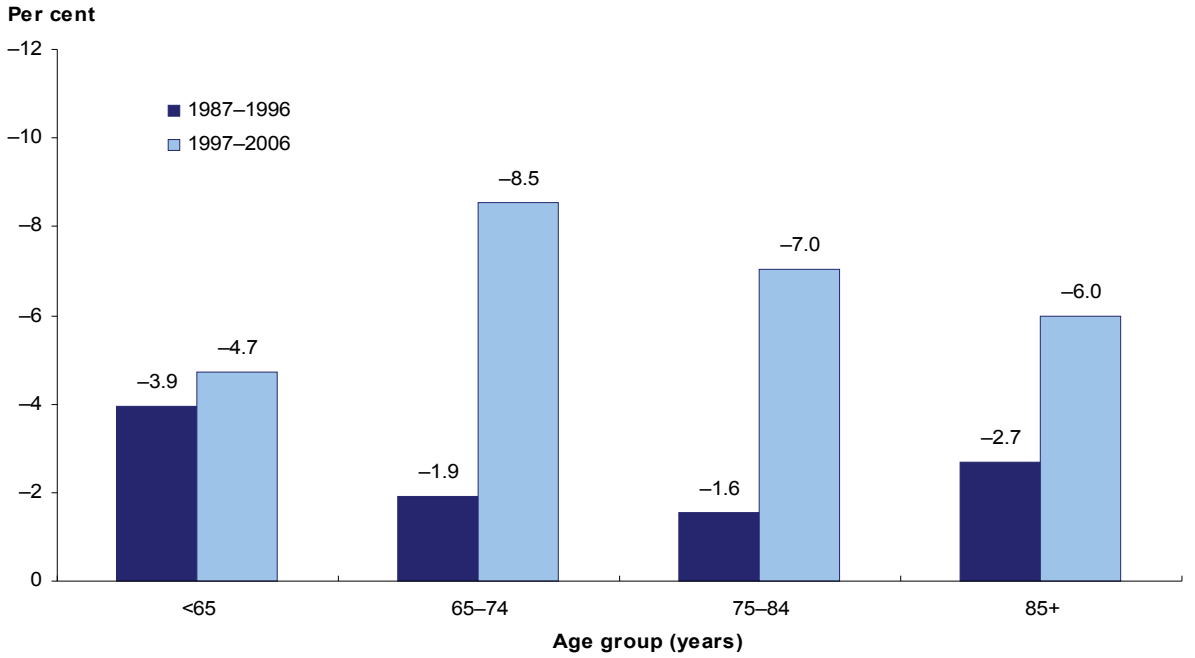
Note: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10.

Figure 5.3: Age-specific death rates for heart failure/ cardiomyopathy in men, as a percentage of the 1987 value



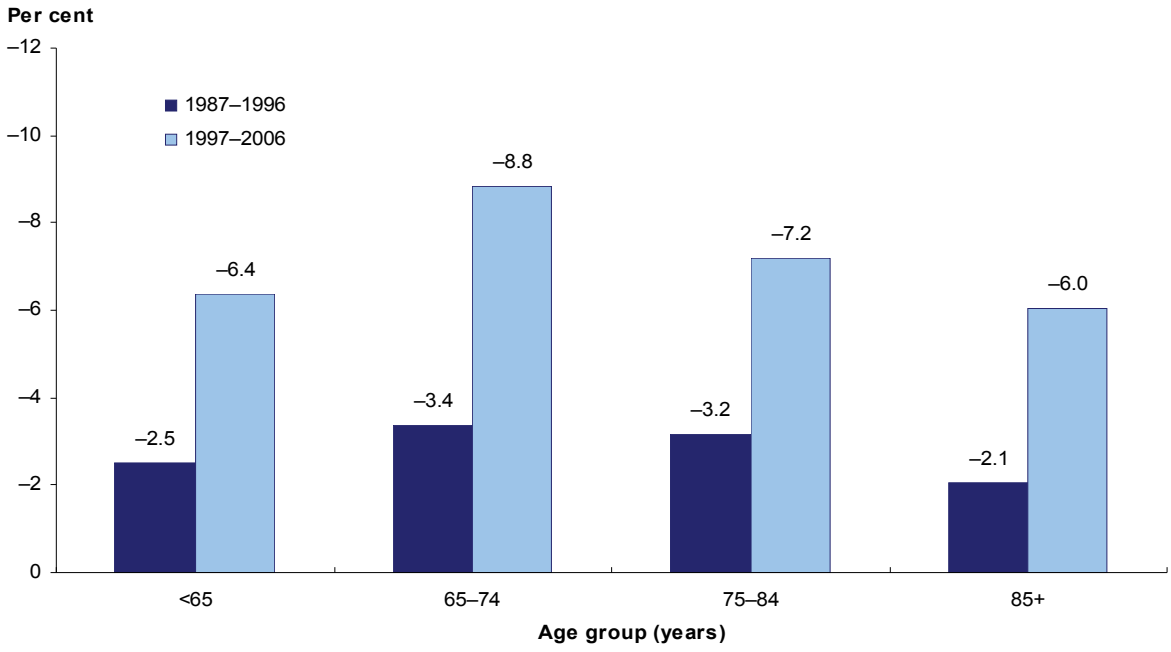
Note: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10.

Figure 5.4: Age-specific death rates for heart failure/ cardiomyopathy in women, as a percentage of the 1987 value



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 5.5: Average annual change in heart failure/cardiomyopathy death rates in men, 1987–1996 and 1997–2006



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 5.6: Average annual change in heart failure/cardiomyopathy death rates in women, 1987–1996 and 1997–2006

6 Trends in rheumatic fever and rheumatic heart disease

6.1 What are rheumatic fever and rheumatic heart disease?

Acute rheumatic fever is a delayed complication of untreated throat infection from Group A streptococcus bacteria, but may also follow streptococcal skin sores. It can be difficult to diagnose, but the more common manifestations include fever, joint pain and swelling, movement disorders and heart valve damage. The infection and illness occur mainly in children and young adults. Rheumatic heart disease is caused by the long-term damage done to the heart muscle or heart valves by acute rheumatic fever. Both diseases are preventable.

Rheumatic fever and rheumatic heart disease are major problems in the Aboriginal and Torres Strait Islander population of northern and central Australia, but are relatively uncommon among other Australians (AIHW 2008; AIHW: Field 2004). The incidence of acute rheumatic fever has been particularly high among Aboriginal and Torres Strait Islander children in these areas.

In this chapter, death rates for rheumatic fever and rheumatic heart disease are based on mortality data from all states and territories, and expressed in relation to the total Australian population. As such, they are comparable with the death rates for other cardiovascular diseases given in previous chapters.

Risk factors

Poverty, overcrowding, poor sanitary conditions, lack of education and limited access to medical care for adequate diagnosis and treatment are recognised as contributing factors to rheumatic fever (AIHW 2004).

6.2 Deaths from rheumatic fever and rheumatic heart disease

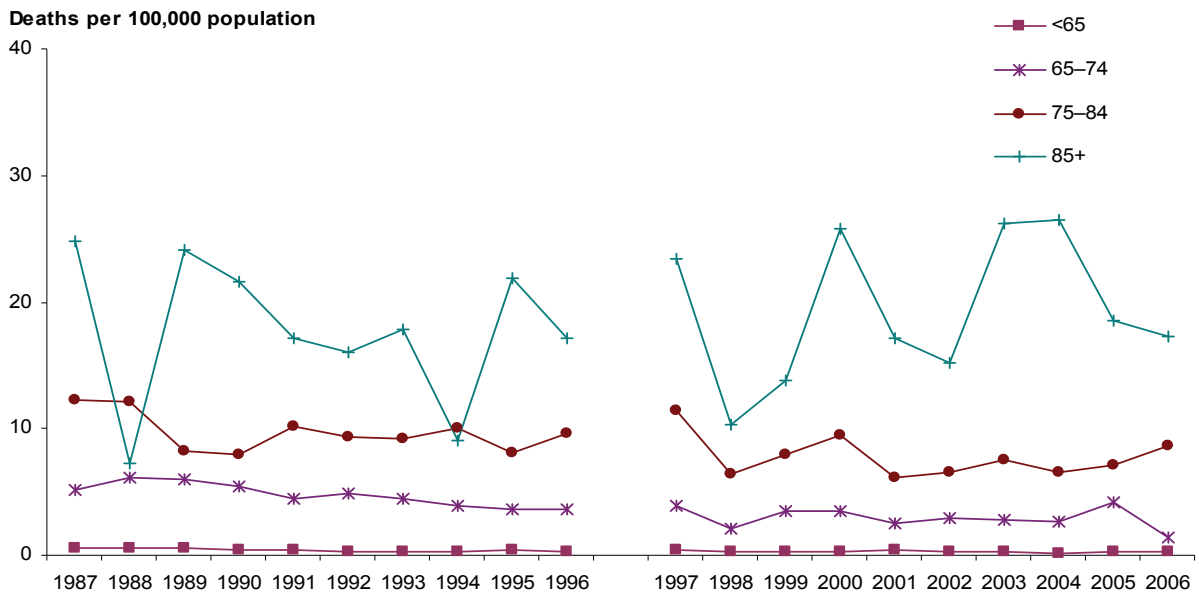
Age-standardised death rates

The average annual decline in the death rate from rheumatic fever and rheumatic heart disease was about 4% during 1987–1996 and 2% during 1997–2006 (Table A15).

Age-specific death rates

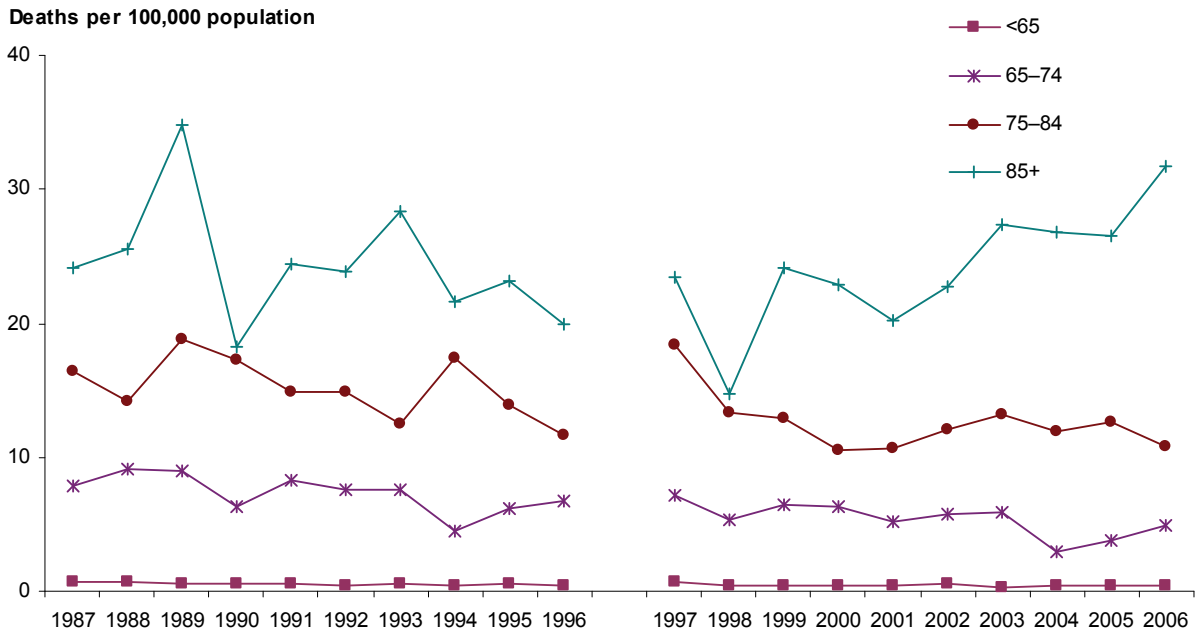
With one exception, death rates have fallen for men and women in all age groups over the two decades to 2006. The exception is people aged 85 years and over for whom the downward trend may have slowed and perhaps reversed. For this age group, the death rate over recent years has been increasing at about 5% per year among women (Figure 6.6).

In 2006, there were 285 deaths with acute rheumatic fever and rheumatic heart disease recorded as the main cause of death, and a further 395 deaths as an associated cause of death. The upward mortality trend for underlying deaths between 1997 and 2006 for people aged 85 years and over was also apparent when underlying and associated causes of death were considered together.



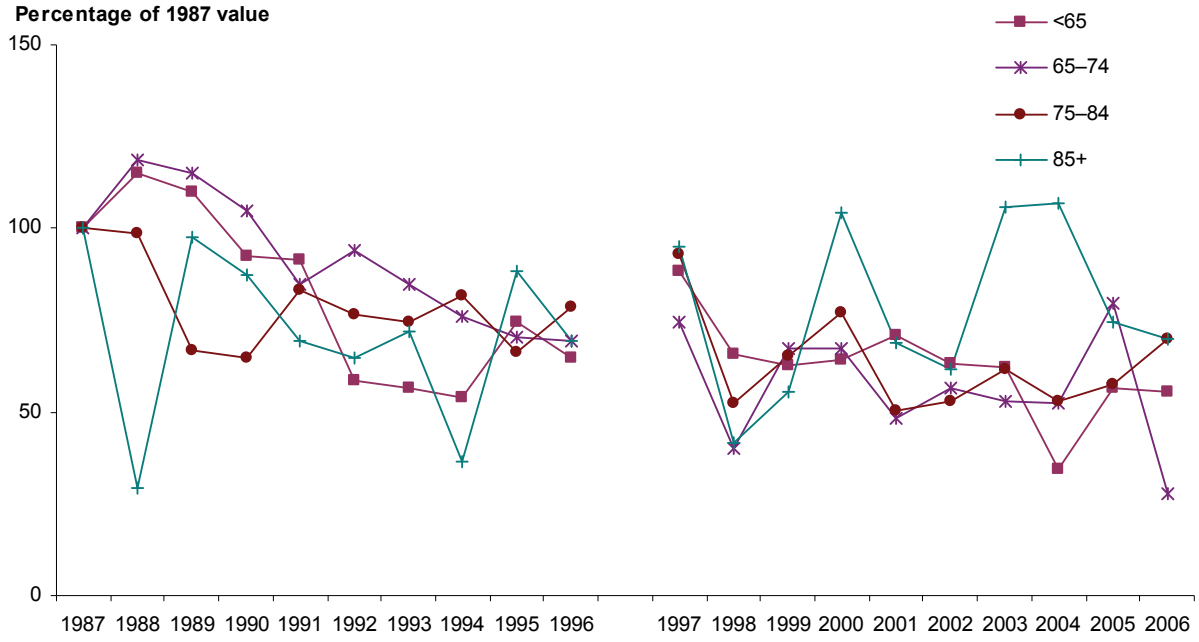
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.69 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A13 for data points and ASRs.

Figure 6.1: Trends in age-specific death rates from rheumatic fever and rheumatic heart disease in men, 1987–2006



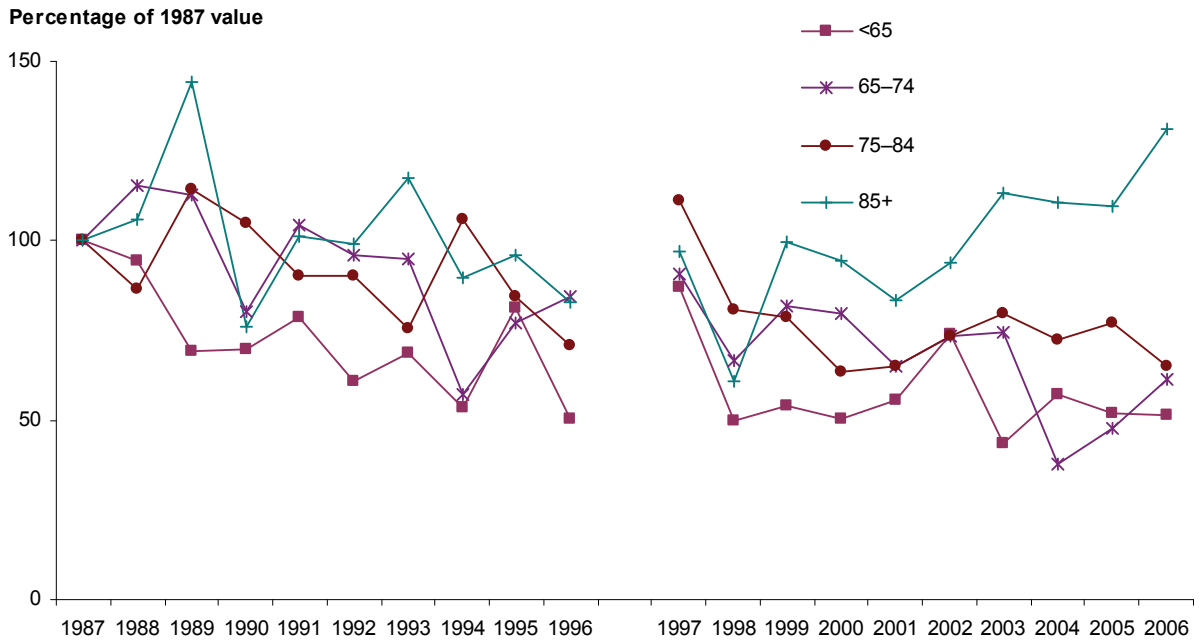
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.69 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice. See Table A14 for data points and ASRs.

Figure 6.2: Trends in age-specific death rates from rheumatic fever and rheumatic heart disease in women, 1987–2006



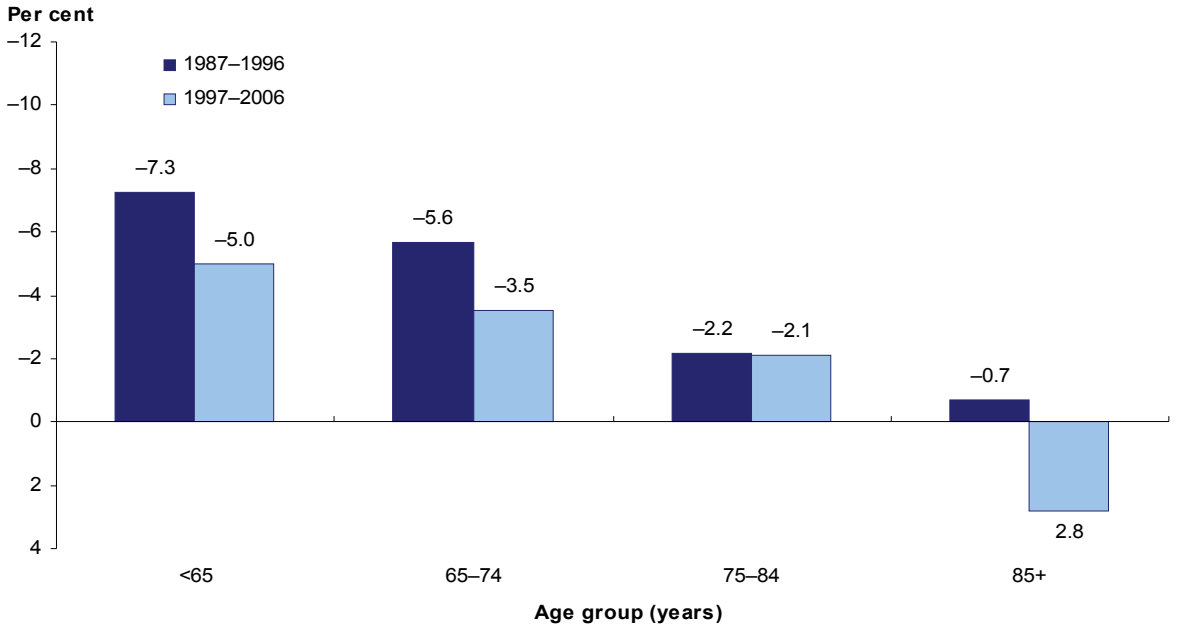
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.69 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 6.3: Age-specific death rates for rheumatic fever and rheumatic heart disease in men, as a percentage of the 1987 value



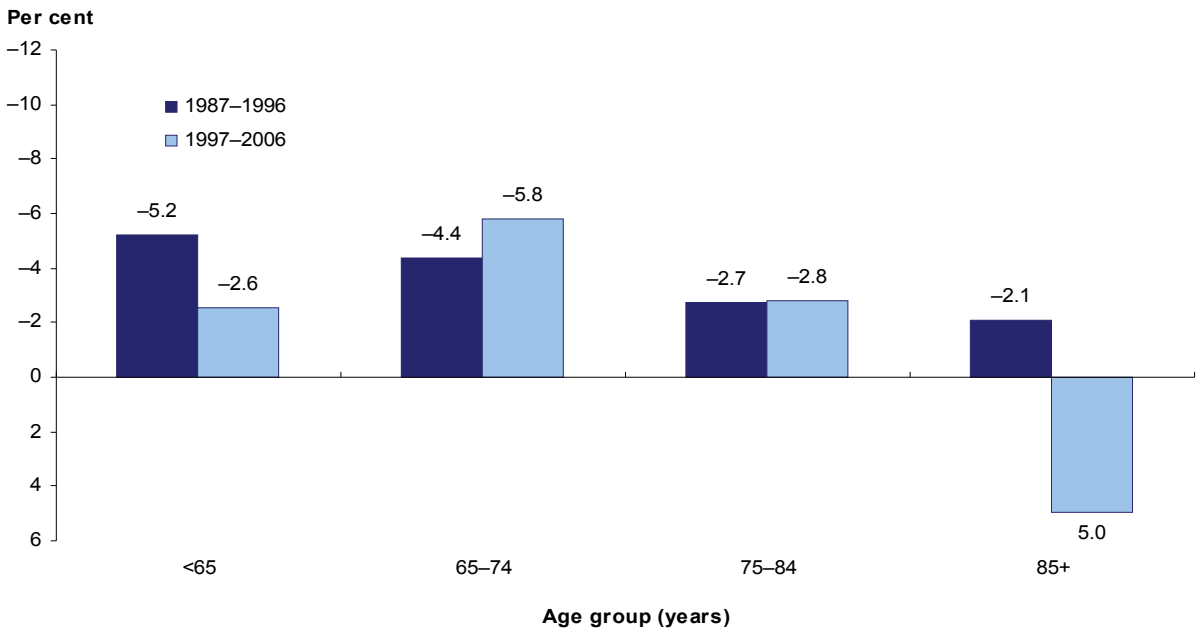
Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. A comparability factor of 0.69 was applied to deaths for the period 1987–1996 to adjust for changes in coding practice.

Figure 6.4: Age-specific death rates for rheumatic fever and rheumatic heart disease in women, as a percentage of the 1987 value



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 6.5: Average annual change in rheumatic fever and rheumatic heart disease death rates in men, 1987–1996 and 1997–2006



Notes: Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. See Section 1.3 'Methods—Interpretation of figures showing average annual change'.

Figure 6.6: Average annual change in rheumatic fever and rheumatic heart disease death rates in women, 1987–1996 and 1997–2006

7 Trends in key risk factors

This chapter provides an overview of trends in the prevalence of some of the major risk factors for cardiovascular disease, as background to the analyses of trends in cardiovascular mortality. Not all risk factors are covered—the focus is on risk factors for which there are time series data, which are mainly modifiable risk factors. A note of caution—the link between risk factors and mortality trends for cardiovascular disease and its components is complex and not well established, and mortality trends may be influenced by factors other than risk factors, such as changes in the detection, treatment and management of people with these diseases.

Risk factors

A risk factor for a disease is a characteristic that increases the chance of a person developing that disease. Some risk factors are generally fixed, such as age, sex and genetics. Other risk factors are health behaviours such as tobacco smoking, while others are biomedical factors such as blood pressure. The risk factors for cardiovascular disease that are looked at for trends in this chapter are:

- age
- tobacco smoking
- physical inactivity
- high blood pressure
- high blood cholesterol
- overweight and obesity
- diabetes.

While diabetes is a disease in its own right, it is included here as a risk factor because an individual with diabetes is more at risk of other diseases, particularly cardiovascular disease. Nutrition is a known contributor to three of these risk factors: high blood pressure, high blood cholesterol and overweight and obesity, through the effects of salt, saturated and trans fats, and surplus energy intake, respectively. Some dietary components also provide a protective effect on the cardiovascular risk factors, such as fruit and vegetable consumption and poly- and mono-unsaturated fats. The importance of nutrition to cardiovascular disease is acknowledged here but not discussed further. Other influences on health include social, economic, psychological, environmental and cultural factors (AIHW 2008). These are also not considered here.

Data quality

In Australia, national surveys of cardiovascular risk factors have been done at irregular intervals using different survey methods and different risk factor definitions. As a result, the available data are often sketchy, and can cover various periods, age groups and geographical areas. But it is possible to construct some time series based on repeat cross-sectional surveys that have used reasonably consistent methods and definitions. However, different time series

can be constructed using different data sources, and these can, at times, appear to be contradictory. The data sources that have formed the basis for the commentary on risk factor trends in this report are shown in Table 7.1. Where trend estimates are available from alternative data sources these are also mentioned in the text.

Estimates of risk factor prevalence may be based on measured or self-reported information. Trends of risk factor behaviour, such as tobacco and physical inactivity, are estimated from self-reported survey information. For biomedical risk factors, such as high blood pressure and diabetes, trend estimates may be based on measured data or self-reported information. Measured data provide a more accurate assessment for an individual, and do not rely on the knowledge of the respondent. However, surveys that collect only self-reported information are done more regularly, provide more recent information, and are useful for looking at trends. The accuracy of estimates from surveys depends on both the collection method—such as measured data or self-reported information—and other factors including the response rate achieved.

Data sources and indicators

The main time series for each risk factor has been constructed taking into account these issues, the length of the time series and the availability of recent estimates. Table 7.1 shows the indicator used for each risk factor and the main sources of time series data.

As might be expected with time series analysis, methods and questions evolved over time and were not always identical between one survey and the next. Sometimes the method or question changed little between data sources, at other times definitions were quite different, as was the case with the definition of sedentary (see Box 7.1).

For blood pressure and blood cholesterol, there have been no nationwide measurement surveys of the prevalence of biomedical risk factors in Australia since 1999–2000.

Details of the data sources are provided in 'Data sources and classifications' at the end of this report.

Table 7.1: Risk factor data sources and indicators for time series analysis

Tobacco smoking	Indicator	Proportion of people who were daily smokers (ages 14+) Based on self-report
	Source	National Drug Strategy Household Surveys 1985, 1988, 1991, 1993, 1995, 1998, 2001, 2004, 2007
Physical inactivity (Box 7.1)	Indicator	Proportion of people who are sedentary (ages 18–75) Based on self-report
	Source	National Physical Activity Surveys 1997, 1999, 2000
		National Health Surveys 2001, 2004–05, 2007–08
High blood pressure (Box 7.2)	Indicator	Proportion of people with high blood pressure (25–64 years, urban areas) Based on measurement
	Source	Risk Factor Prevalence Surveys 1980, 1983, 1989
		National Nutrition Survey 1995
		Australian Diabetes, Obesity and Lifestyle Study 1999–2000
High blood cholesterol (Box 7.2)	Indicator	Proportion of people with high blood cholesterol (25–64 years, urban areas) Based on measurement
	Source	Risk Factor Prevalence Surveys 1980, 1983, 1989
		Australian Diabetes, Obesity and Lifestyle Study 1999–2000
Overweight and obesity (Box 7.2)	Indicator	Proportion of people who were obese (18 years and over) Based on measurement
	Source	National Nutrition Survey 1995
		National Health Survey 2007–08
Diabetes (Box 7.2)	Indicator	Proportion of people with diagnosed diabetes (all ages) Based on self-report
	Source	National Health Surveys 1989–90, 1995, 2001, 2004–05, 2007–08

7.1 Age

Australia, as well as many other developed countries, has an ageing population—that is, the number and proportion of older people in the population is increasing. Two major contributors to this have been declining fertility and declining mortality. Population ageing is not a new phenomenon in Australia, but has been occurring over most of the 20th century (except during the high-fertility post-war baby boom).

Over the 20 years to 2006, the number of Australians aged 65 years and over has increased from 1.7 million to 2.7 million, an increase of 55% (Table 7.2). People in this age group represented 10.7% of the total population in 1987 and 13.0% in 2006. The fastest growing age group is Australians aged 85 years and over, who increased by more than 140% during this period.

Table 7.2: Population increase 1987–2006, by age group

	1987		2006		
Age group (years)	Population (number)	Population distribution (per cent)	Population (number)	Population distribution (per cent)	Population increase (per cent)
<35	9,074,000	55.8	9,831,000	47.5	8.3
35–44	2,358,000	14.5	3,057,000	14.8	29.7
45–54	1,621,000	10.0	2,856,000	13.8	76.2
55–64	1,471,000	9.0	2,261,000	10.9	53.7
65–74	1,075,000	6.6	1,412,000	6.8	31.4
75–84	531,000	3.3	958,000	4.6	80.6
85+	133,000	0.8	322,000	1.6	141.4
Total 65+	**1,739,000**	**10.7**	**2,693,000**	**13.0**	**54.8**
Total	**16,264,000**	**100.0**	**20,698,000**	**100.0**	**27.3**

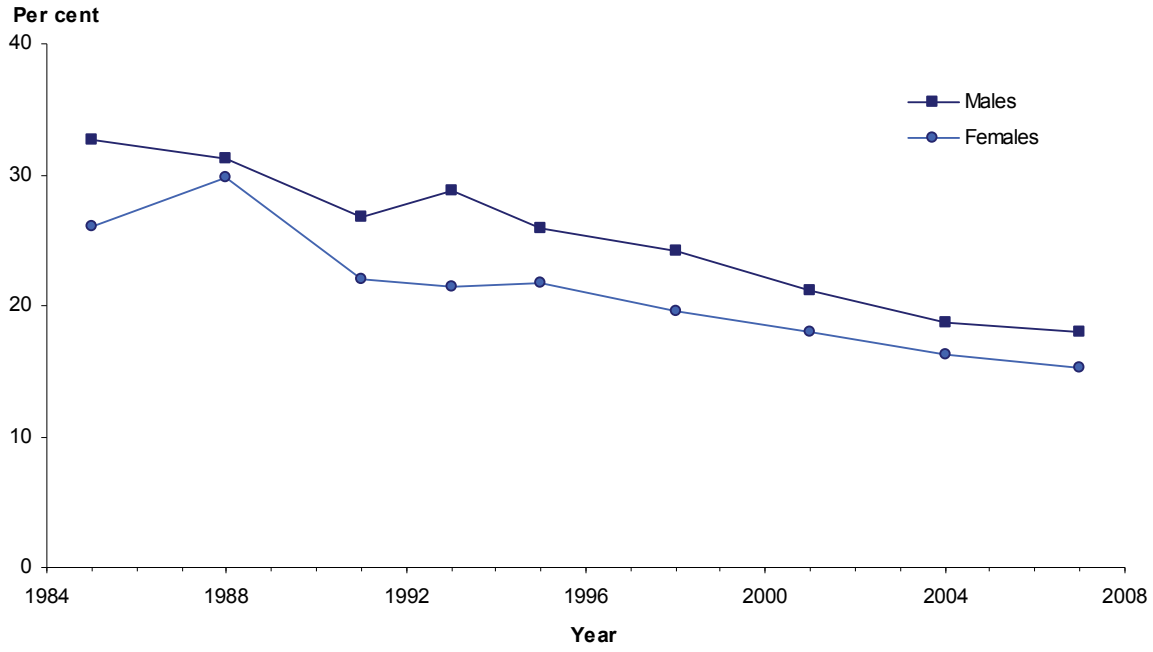
Note: Percentages may not add to 100.0 because of rounding.

Source: AIHW population database

The ageing of the population is projected to continue. In the next 30 years, the number of Australians aged 65 years and over is projected to increase to 6.3 million, when it will represent 24% of the population. The number of people aged 85 years and over, among whom the need for services and assistance is greatest, is projected to increase more rapidly than other age groups during this time, from 1.6% to 4.2% of the total population (AIHW 2007).

7.2 Tobacco smoking

The overall smoking rate has been declining since the 1950s when 70% of males and 30% of females smoked. Between 1985 and 2007, the prevalence of daily smoking declined by almost 15 percentage points for males aged 14 or older, and almost 11 percentage points for females (Figure 7.1). This general trend is corroborated by general practice data, which shows daily smoking among patients aged 18 years and over declining from just over 19% in 1998–99 to just over 16% in 2006–07 (Britt et al. 2008).



Note: People aged 14 years and over.

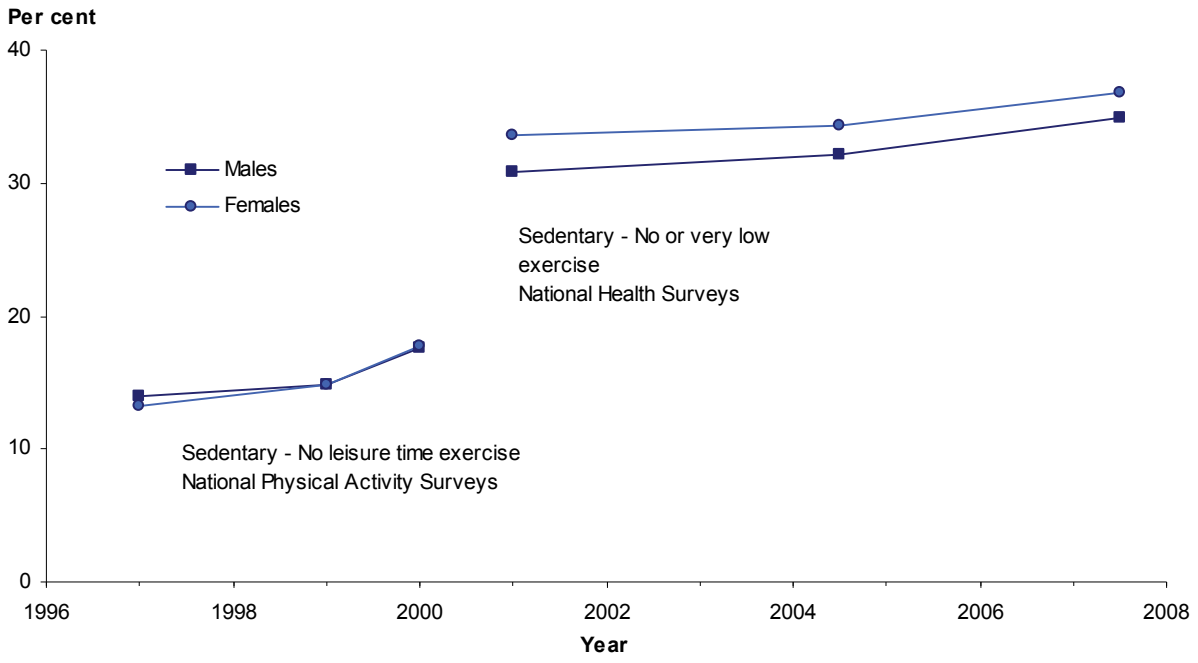
Source: AIHW analysis of 1985, 1988, 1991, 1993, 1995, 1998, 2001, 2004, 2007 National Drug Strategy Household Surveys.

Figure 7.1: Trends in daily smokers, 1985 to 2007

7.3 Physical inactivity

Broadly, there was little change in physical activity patterns during the 1980s and much of the 1990s, but an increase in inactivity during the late 1990s, which has continued throughout the decade to 2008.

There is no long-term time series for physical inactivity using the one definition and consistent method. A composite picture of the proportion of people who were 'sedentary' between 1997 and 2008 is shown in Figure 7.2.



Notes: Age-standardised to the 2001 Australian population. National Physical Activity Survey estimates relate to ages 18–75 years; National Health Survey estimates relate to those aged 18 years and over. See Box 7.1 for definitions of 'sedentary'.

Sources: AIHW analysis of 1997, 1999, 2000 National Physical Activity Surveys and 2001, 2004–05, 2007–08 National Health Surveys.

Figure 7.2: Trends in the proportion of people who are sedentary, 1997 to 2007–08

Although the two time series used different methods and definitions, together they suggest a steady increase in the proportion of people classified as 'sedentary' (see Box 7.1). Since the National Health Survey definition is broader, it captures more people and results in a higher prevalence.

Box 7.1: Definitions of sedentary

In the 1997, 1999 and 2000 National Physical Activity Surveys, 'sedentary' was defined as 'no physical activity at all during the previous week' and related to people aged 18–75 years.

In the 2001, 2004–05 and 2007–08 National Health Surveys, 'sedentary' included people who reported that they did not do any, or did very low levels of exercise for recreation, sport or fitness in the 2 weeks before interview and related to people aged 18 years and over.

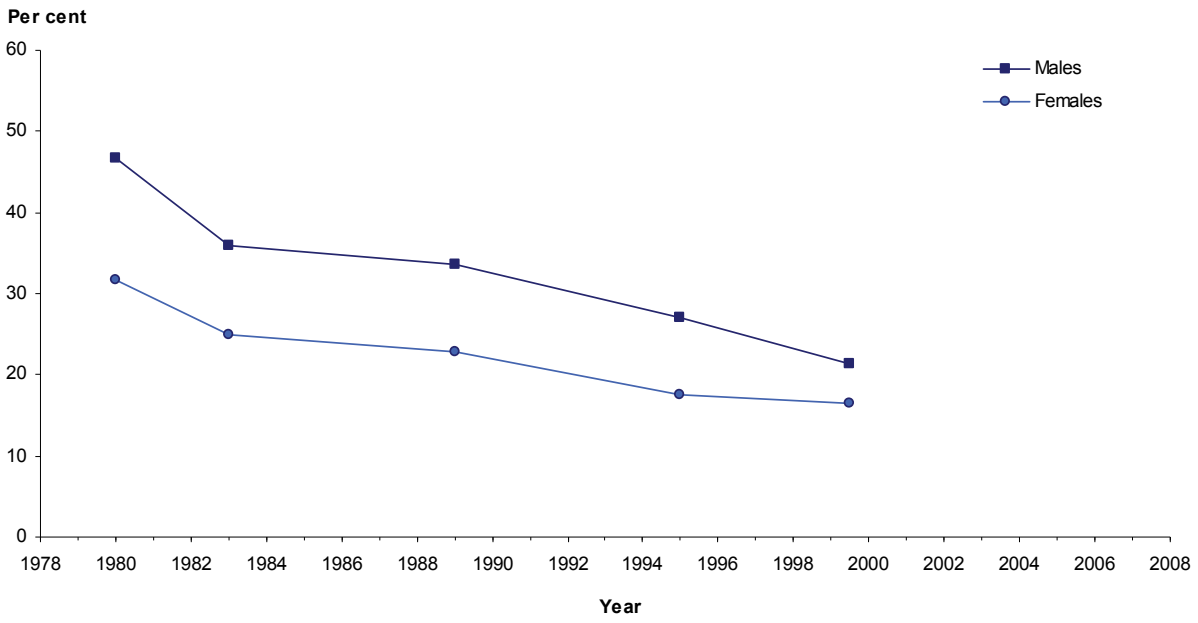
7.4 High blood pressure

For urban Australians aged 25–64 years—the population for which longer-term trends are available—the prevalence of high blood pressure has declined appreciably since 1980, for both men and women (Figure 7.3).

The proportion of urban men aged 25–64 years with high blood pressure more than halved, from 47% in 1980 to 21% in 1999–2000. For urban women, the prevalence of high blood pressure halved, falling from 32% to 16%. Average blood pressure also decreased in this group over this period. Average systolic blood pressure decreased by 6mmHg, and average diastolic blood pressure by 11 mmHg, in both men and women.

However, re-analysing the 1995 and 1999–00 data sets for a broader geographical and age group suggests little change in the prevalence of high blood pressure among Australians during the late 1990s. Among all Australians aged 25 years and over (not just urban Australians aged 25–64 years), the prevalence of high blood pressure remained about the same between 1995 and 1999–2000, at 31% and 30%, respectively.

There are no national data on the prevalence of high blood pressure since 2000.



Notes: Age-standardised to the 2001 Australian population. Based on World Health Organization definition of high blood pressure (See Box 7.2).

Sources: AIHW analysis of 1980, 1983, 1989 Risk Factor Prevalence Surveys; 1995 National Nutrition Survey; 1999–2000 Australian Diabetes Obesity and Lifestyle Study.

Figure 7.3: Trends in high blood pressure, people aged 25–64 years in major urban areas only, 1980 to 1999–2000

Box 7.2: Definitions of biomedical risk factors

High blood pressure

- systolic blood pressure of 140mmHg or more, or
- diastolic blood pressure of 90mmHg or more, or
- receiving medication for high blood pressure

High blood cholesterol

- total cholesterol level of 5.5mmol/L or more

Overweight and obesity

- overweight (but not obese): body mass index (BMI) of 25 or more but less than 30
- obese: BMI of 30 or more

where BMI is calculated by dividing weight in kilograms by the square of height in metres (kg/m^2).

Diabetes

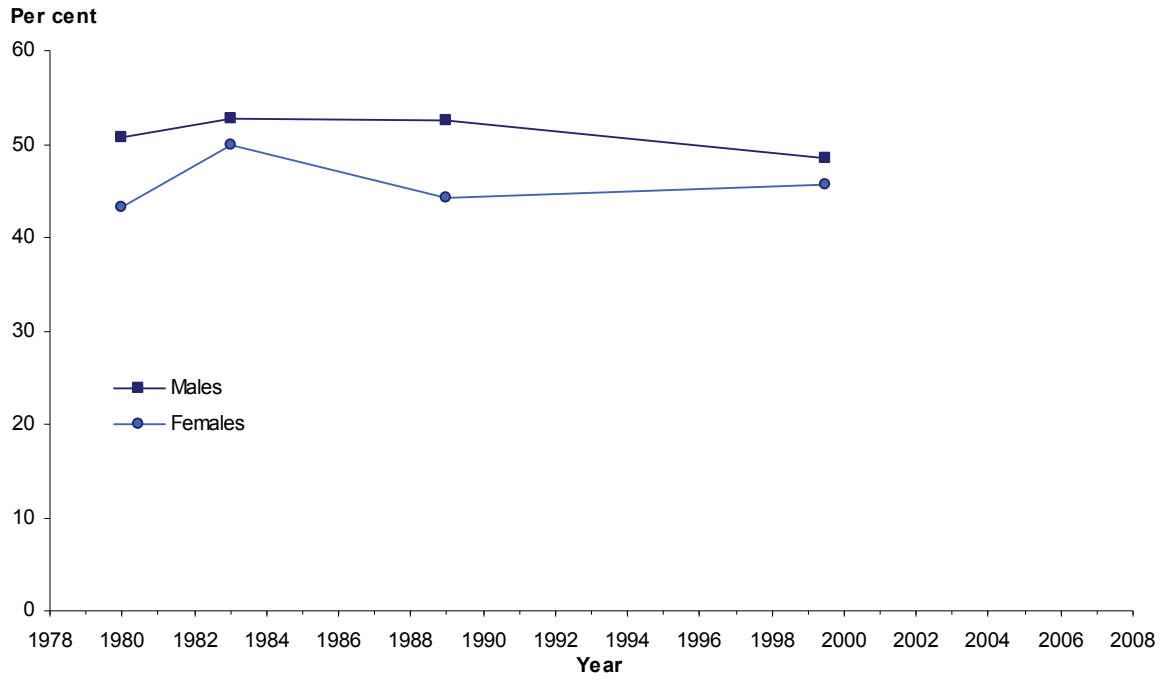
Includes any type of diabetes including type 1, type 2 and gestational diabetes—based on self-reports

Although some continuous risk factors are categorised according to cut-off values, the relationship between risk factor level and risk of disease tends to be continuous—for example, as blood pressure or blood cholesterol increases so too does the risk of developing CVD.

7.5 High blood cholesterol

Data on Australia-wide trends in average blood cholesterol and high blood cholesterol prevalence are available intermittently, and only to the year 2000 and for people aged 25–64 years living in capital cities. Average blood cholesterol levels of adults in 1999–2000 were very similar to those 20 years earlier. Consistent with trends in average levels, there was no appreciable change in the prevalence of people with high blood cholesterol over that period (Figure 7.4). There are no national data on the prevalence of high blood cholesterol since 2000.

There is evidence that average cholesterol levels and the prevalence of high cholesterol fell significantly in Perth between 1980 and 1999 in both men and women aged 35–64 years (Hobbs et al. 2008). The time trends were different for different age and sex groups.



Notes: Age-standardised to the 2001 Australian population. See Box 7.2 for definition.

Sources: AIHW analysis of 1980, 1983, 1989 Risk Factor Prevalence Surveys and 1999–2000 Australian Diabetes, Obesity and Lifestyle Study.

Figure 7.4: Trends in high blood cholesterol, people aged 25–64 years in major urban areas only, 1980 to 1999–2000

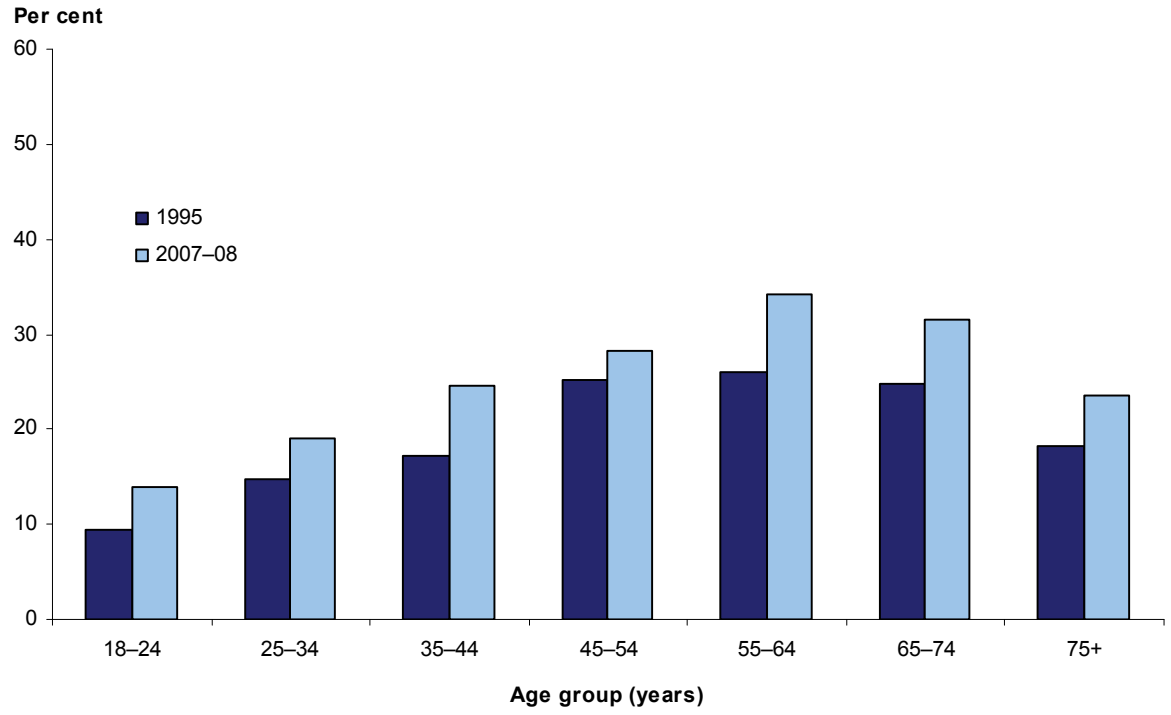
7.6 Overweight and obesity

The prevalence of overweight and obesity has been increasing over at least the 30 years to 2007–08 across all age groups.

The earliest estimates show that a weight increase occurred equally across all age groups during the 1980s and 1990s, of about 6.5 kilograms on average for men and 7.1 kilograms for women (AIHW: Bennett et al. 2004). As a consequence, the prevalence of obesity also increased, being most prevalent for those aged 50–59 years, at about 24% for men and 30% for women.

More recent estimates, also based on measured data, are available from the 1995 and 2007–08 National Health Surveys. The prevalence of overweight and obesity increased over this period from 56% to 61%, among people aged 18 years and over (ABS 2009). The prevalence of overweight (but not obese) people changed little, but the prevalence of obese people increased from 19% to 25%. The increase in obesity prevalence occurred in all age groups (Figure 7.5).

This general trend is confirmed by general practice data, which show a steady increase in the prevalence of overweight and obesity among adult patients, from 51% in 1998–99 to more than 58% in 2006–07 (Britt et al. 2008).



Source: Derived from ABS 2009. See Box 7.2 for definition.

Figure 7.5: Trends in obesity prevalence by age group, 1995 to 2007–08

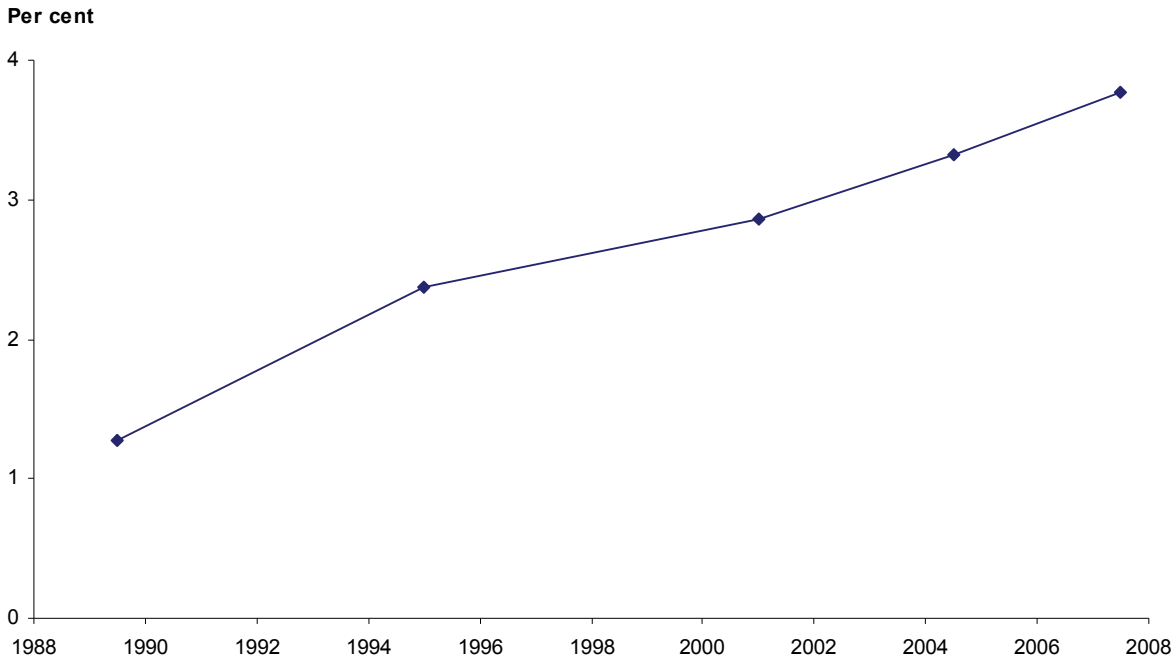
7.7 Diabetes

The prevalence of diagnosed diabetes in Australia based on self-reported information almost tripled between 1989–90 and 2007–08 (Figure 7.6). Self-reported data are easier to collect than measured data, but have certain limitations: undiagnosed cases cannot be identified, and self-report relies on the respondent accurately reporting that they have been diagnosed with diabetes.

Although less recent, estimates of diabetes prevalence from measured data show a similar trend; the prevalence of diabetes in 1999–2000 was more than double that estimated in 1981 (Dunstan et al. 2002).

Based on measured data from the Australian Diabetes, Obesity and Lifestyle Study, it has been estimated that 880,000 Australians aged 25 years and over had diabetes in 1999–2000, or 7.4% of adults. About half of these people were not aware that they had diabetes.

Thus, whether based on measured or self-reported data, the prevalence of people with diabetes has increased substantially in recent years. Although an increase in the incidence of diabetes may play a major role in trends in diabetes prevalence, rising awareness in the community, better detection and better survival may also have contributed (AIHW 2008).



Notes: Age-standardised to the 2001 Australian population. All ages. Based on self-reported data. See Box 7.2 for definition.

Sources: AIHW analysis of the 1989–90, 1995, 2001, 2004–05 and 2007–08 National Health Surveys.

Figure 7.6: Trends in diabetes prevalence, 1989–90 to 2007–08

7.8 Summary of risk factor trends

Although the risk factor data have limitations, it is possible to make some broad statements about the trends that have occurred among adult Australians based on the best available evidence:

- Smoking rates have declined steadily.
- Physical inactivity (sedentary) has gradually increased.
- The prevalence of obesity has increased markedly.
- The prevalence of high blood pressure decreased during the 1980s and early 1990s, but changed little during the late 1990s. There are no national data on trends since 2000.
- The prevalence of high blood cholesterol changed little during the 1980s and 1990s, but there are no national data on trends since 2000. There is evidence that cholesterol levels fell in Perth over the 1980s and 1990s.
- Diabetes prevalence has increased substantially.

In summary, there have been very favourable trends in smoking rates and blood pressure levels, little evidence of national change in blood cholesterol levels, and unfavourable trends in physical inactivity, obesity, and diabetes prevalence.

It is not possible to say how these trends have combined to affect the overall population risk of cardiovascular disease; that is, whether or not these trends are heading toward a reduced risk of CVD for Australians. The probability that an individual will develop CVD within a given period depends on the combination and intensity of all identified risk factors, rather than on the presence of any single risk factor. There are currently no data in Australia on population trends in the level of absolute risk of a cardiovascular event.

As well as risk factor trends, trends in death rates will also have been affected by changes in the treatment and care of people with cardiovascular diseases. Some of the important changes that have occurred in areas such as drug treatment, general practice, specialist care, emergency care, acute care, rehabilitation and long-term care are mentioned in the discussion.

8 International trends

This chapter provides an international context by comparing the level and trends observed in Australia for cardiovascular diseases and their risk factors with those observed in other OECD member countries. The data available for international comparison of trends are:

- **mortality**
  - deaths from coronary heart disease
  - deaths from cerebrovascular disease
- **risk factors**
  - age
  - tobacco smoking
  - overweight and obesity.

The data are those published by OECD and are based on data provided by individual countries. Care needs to be taken when interpreting data for risk factors, as collection methods and scope vary between countries. Note that data for Australia may not match those presented elsewhere in this report due to differences in definitions and in the population used to age-standardise.

Some broad observations

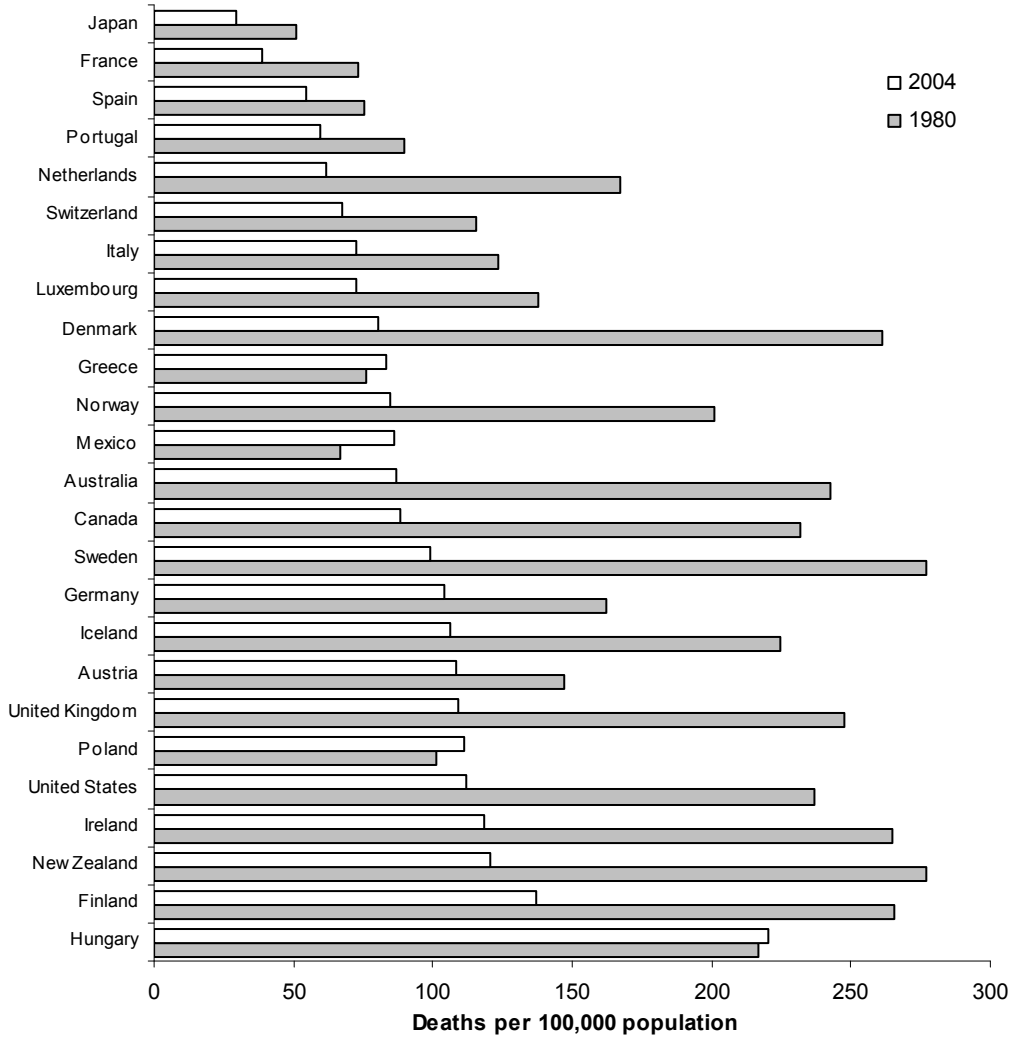
As mentioned above, international comparisons need to be made cautiously as there are many differences in data methods that may be confounding 'true' differences, and data are not always available for comparable years or age groups. Nevertheless some broad observations can be made:

- Australia's decline in CHD death rates since 1980 has been one of the largest of all OECD countries; however, its current death rate ranks in the middle of OECD countries, with many countries having substantially lower rates, including Japan, France, Spain, Portugal and the Netherlands (Figure 8.1; Table A16).
- The substantial fall in cerebrovascular disease death rates since 1980 places Australia among the OECD countries with the lowest death rates, but still behind countries such as Switzerland, France and Canada (Figure 8.2; Table A17).
- The proportion of Australia's population aged 65 years and over is less than the OECD average, and the rate of population ageing has been close to the OECD average (Figure 8.3; Table A18).
- Australia has one of the lowest smoking rates, and, while most OECD countries have experienced a decline in smoking rates, the decline in Australia has been one of the greatest (Figure 8.4; Table A19).
- While the prevalence of overweight and obesity has increased in most OECD countries (Figure 8.5; Table A20), the increase in Australia has been one of the largest—Australia is one of the few OECD countries where obesity prevalence is above 20% (OECD 2009).

Coronary heart disease mortality

Since 1980, CHD death rates have declined in nearly all OECD countries. The decline has been most remarkable in Denmark, Australia, Sweden, the Netherlands and Canada, with CHD death rates falling by more than 60%. In Australia, the fall has been similar in males and females (OECD 2009). Australia's death rate for coronary heart disease now ranks in the middle of OECD countries (Figure 8.1; Table A16).

The OECD cites declining tobacco consumption and significant improvements in medical care for treating CHD as contributing to the fall (OECD 2007). Death rates have increased in Mexico, Greece, Poland and Hungary over this period (Figure 8.1).



Notes: Mexico (1981, 2004), Italy, Portugal (1980, 2003). Age-standardised to the 1980 total OECD population. Uses ICD-9 codes 410–414 and ICD-10 codes I20–I25. Excludes Belgium, Korea, Czech Republic, Slovak Republic and Turkey due to missing data.

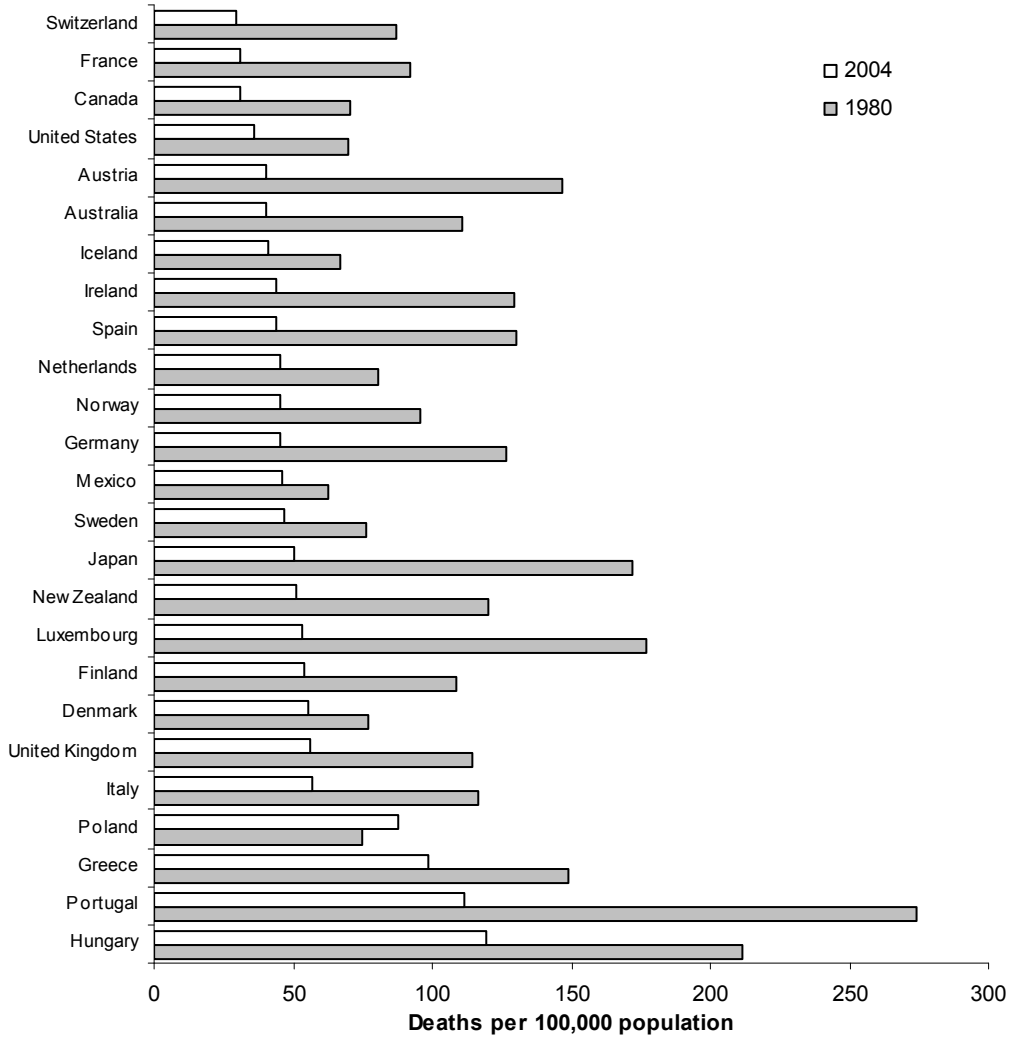
Source: OECD 2009. See Table A16 for data points.

Figure 8.1: Death rates from coronary heart disease, OECD countries, 1980 and 2004

Cerebrovascular disease mortality

Australia's death rate from cerebrovascular disease has declined by more than 60% since 1980, which places it among OECD countries with the lowest mortality (Figure 8.2; Table A17). The fall has been identical in females and males (OECD 2009).

Death rates from cerebrovascular disease have decreased in all OECD countries since 1980, except Poland. OECD attributes this reduction at least partly to a reduction in risk factors and notes that tobacco smoking and hypertension are the main modifiable risk factors for stroke (OECD 2007). Improvements in medical treatment for stroke have also increased survival rates.



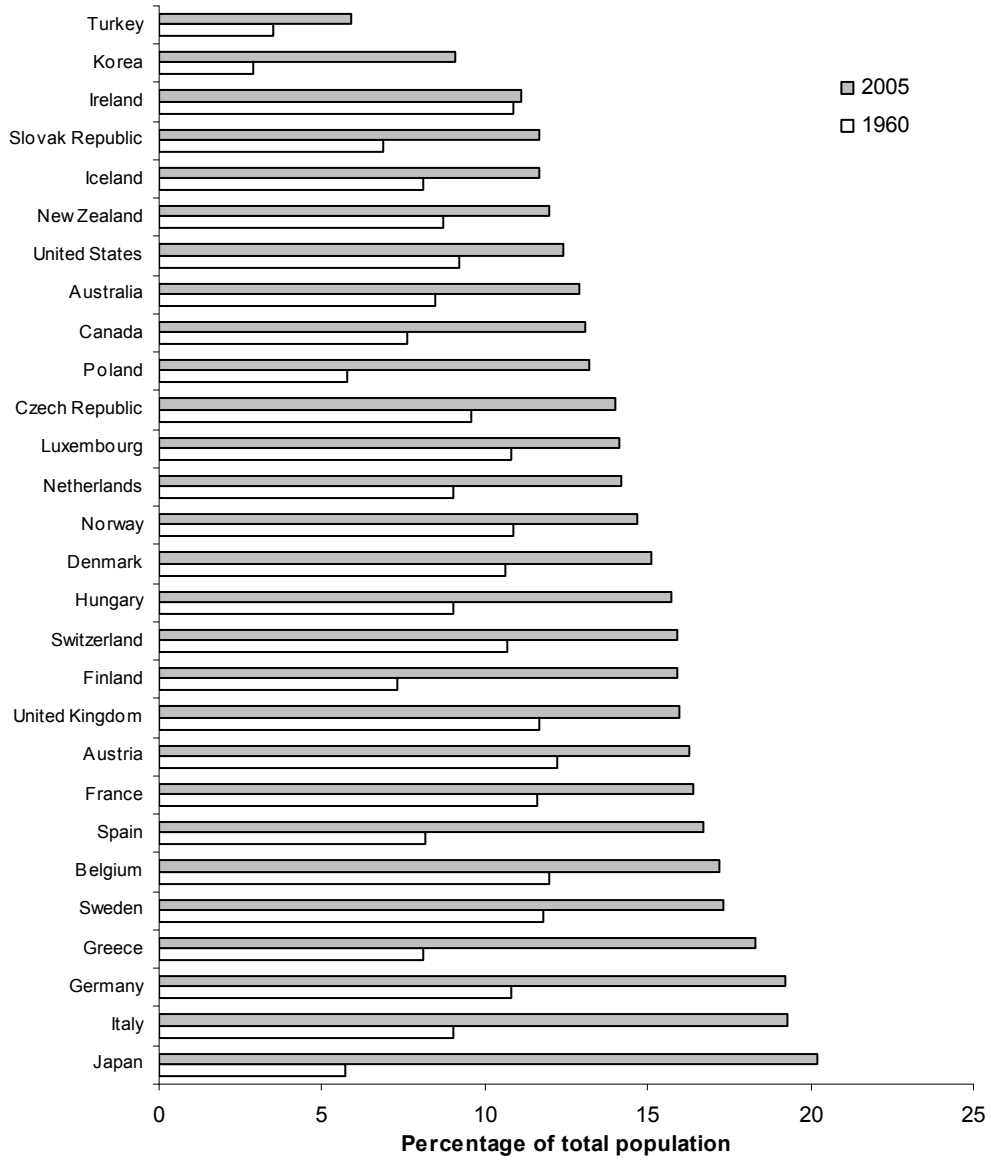
Notes: Mexico (1981, 2004), Italy, Portugal (1980, 2003). Age-standardised to the 1980 total OECD population. Uses ICD-9 codes 430–438 and ICD-10 codes I60–I69. Excludes Belgium, Korea, Czech Republic, Slovak Republic and Turkey due to missing data.

Source: OECD 2009. See Table A17 for data points.

Figure 8.2: Death rates from cerebrovascular disease, OECD countries, 1980 and 2004

Age

The population proportion aged 65 years and over has risen in almost all OECD countries (Ireland is the exception), and this is expected to continue over coming decades. In 2007, 13% of Australia's population was aged 65 years or over, which was less than the OECD average of 15% (Figure 8.3; Table A18). Japan, Italy and Germany were close to having 20% of their population above this age. Conversely, Turkey, Korea and Ireland still had about 10% or less of their population aged 65 years and over. Population ageing has been fastest in Japan, Korea, Poland, Greece, Finland and Italy, and close to the OECD average in Australia (Table A18).

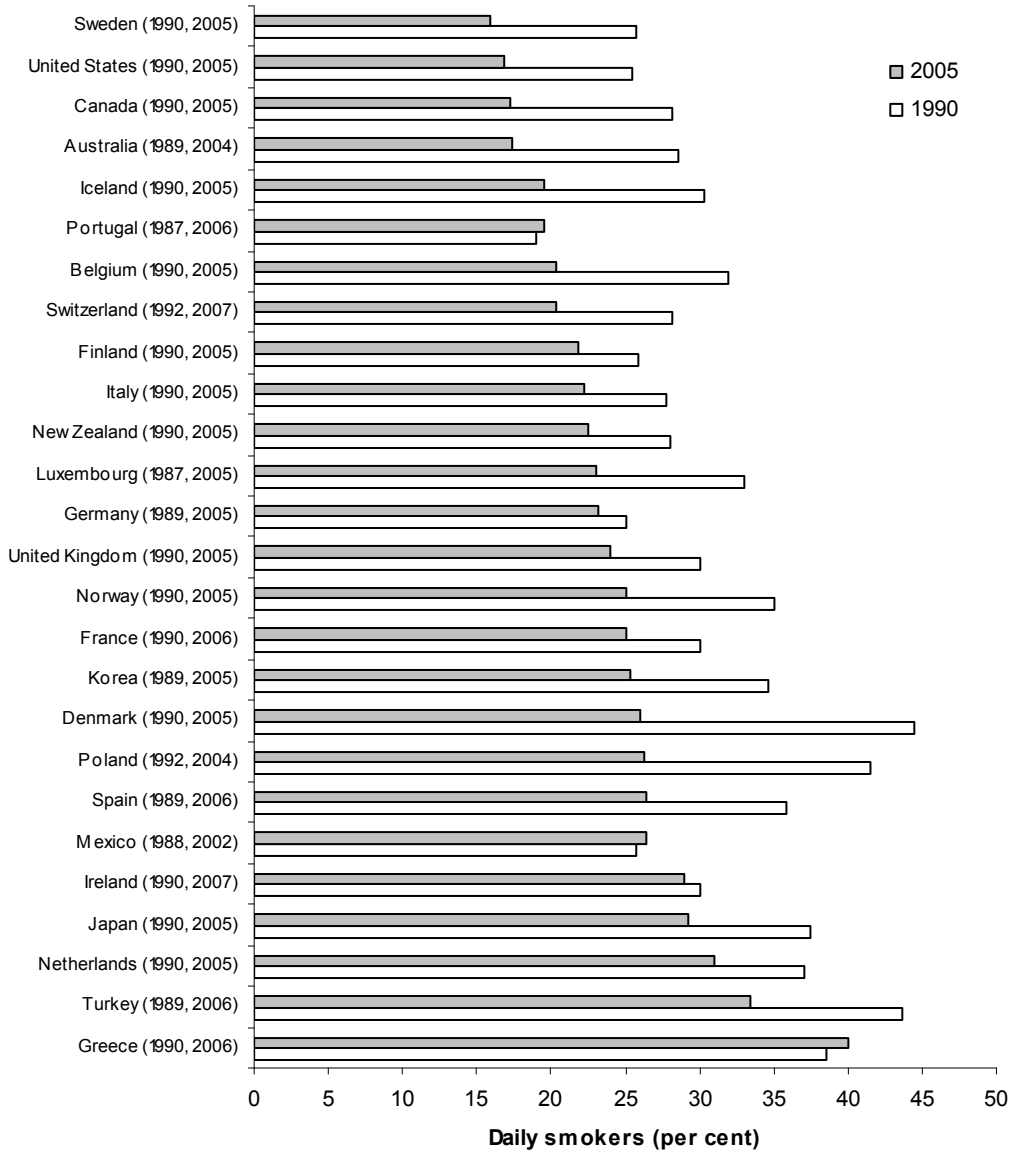


Source: OECD 2009. See Table A18 for data points.

Figure 8.3: Proportion of population aged 65 years and over, OECD countries, 1960 and 2007

Tobacco smoking

Smoking rates across most OECD countries have shown a marked decline in recent decades, although large disparities in smoking prevalence remain. Australia has one of the lowest smoking rates, along with Sweden, United States, New Zealand and Canada. The decline observed in Australia since 1990 (42%) is among the largest and on a par with that observed in Denmark and Sweden. Smoking rates appear to have changed little in Portugal, Greece, Mexico and Ireland (Figure 8.4; Table A19).



Notes: The proportion of daily smokers is defined as the percentage of the population reporting smoking every day. Care should be taken, as methods and scope vary between countries. For example, the survey population is generally 15 years or more but differs between countries. Data for the nearest available years have been taken when data for 1990 and 2005 are not available.

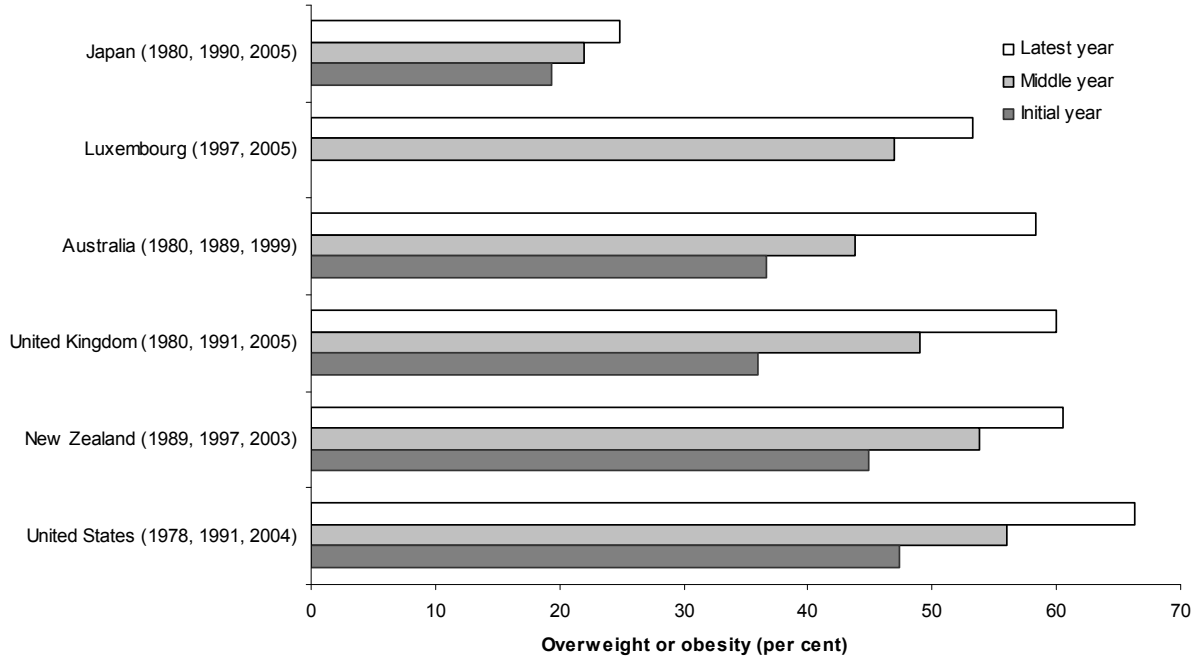
Source: OECD 2009. See Table A19 for data points.

Figure 8.4: Proportion of population who are daily smokers, OECD countries, various years

Overweight and obesity

Australia is one of eight OECD countries for which estimates of the prevalence of overweight or obese people are based on measured rather than self-reported data. In common with most of these countries Australia has well over half its population overweight or obese. Each of these countries is experiencing an increase in the prevalence of overweight or obesity, including Japan where prevalence is much lower. In fact all OECD countries with trend data have reported an increasing prevalence of overweight or obesity, regardless of whether their estimates are based on self-reported or measured data (Figure 8.5; Table A20).

The prevalence of obesity, which presents greater health risks than being overweight, has increased in most OECD countries. Australia is among those countries where the increase has been greatest, and it is now included among the countries where obesity prevalence is above 20% (OECD 2009).



Notes: Overweight or obesity is defined as a body mass index (BMI) of 25 or above. Only countries with measured BMI data (not self-reported) are included in this figure. Care should be taken, as methods and scope vary between countries. The survey population is 'adults' but the age range surveyed varies between countries.

Source: OECD 2009. See Table A20 for data points.

Figure 8.5: Proportion of population who are overweight or obese, OECD countries, various years

9 Comment and discussion

This report set out to look at recent trends over time in cardiovascular disease and its main component diseases, across different age and sex groups. The six key questions raised in the *Introduction* can now be answered as follows:

Q1 What are the overall mortality trends in cardiovascular diseases?

Death rates for total CVD and its component diseases: CHD, stroke, heart failure/cardiomyopathy, rheumatic fever and rheumatic heart disease, have each fallen over recent years. The falls for CHD and stroke have been continuing for several decades and are the most substantial.

Q2 Are there differences in the trends for the main cardiovascular component diseases?

Yes. The main contributors to the overall trend for CVD are CHD and stroke, which have each exhibited substantial annual falls over the 20 years to 2006. Mortality trends for stroke mainly reflect those for ischaemic stroke—average annual falls for haemorrhagic stroke have been smaller. The annual decline in death rates for heart failure/cardiomyopathy has been accelerating. The annual decline in rheumatic fever and rheumatic heart disease has been smaller than for CHD and stroke (Table 9.1; see Table A15 for trend estimates).

Table 9.1: Changing trends in age-specific death rates for cardiovascular diseases

Disease	Comment on mortality trends
Cardiovascular disease	• Decline has accelerated in older people (65+ years)
	• Decline has slowed in younger people (35–54 years)
Coronary heart disease	• Decline has accelerated in older people (65+ years)
	• Decline has slowed in younger people (35–54 years)
Stroke	• Decline has accelerated in older people (65+ years)
	• Decline has slowed in younger women (35–54 years)
Ischaemic stroke	• Decline has accelerated in older people (65+ years)
	• Decline has slowed in younger women (<65 years)
Haemorrhagic stroke	• Decline has virtually ceased in oldest age group (85+ years)
	• Suggestion that decline has slowed in younger people (<65 years)
Heart failure/cardiomyopathy	• Decline has accelerated in all older age groups (65+ years)
Rheumatic fever and rheumatic heart disease	• Decline has changed to an increase in oldest age group (85+ years)

Note: A summary of the average annual percentage change in age-specific death rates for each cardiovascular disease is given in Table A15. 'Decline has accelerated' means that the magnitude of the annual rate of decline during 1997–2006 was greater than the magnitude of the annual rate of decline during 1987–1996. 'Decline has slowed' means that the magnitude of the annual rate of decline during 1997–2006 was less than the magnitude of the annual rate of decline during 1987–1996.

Q3 Are there differences in trends among different age and sex groups?

Yes. For CHD and stroke mortality, recent declines have been greatest among people aged 55–74 years. The average annual rate of decline has accelerated among older people and

slowed among younger people (CHD) and younger women (stroke). For haemorrhagic stroke the decline has virtually ceased in the oldest age group (85 years and over) and slowed in people younger than 65 years. For rheumatic fever and rheumatic heart disease, the downward trend in death rates has reversed among people aged 85 years and over (Table 10.1; see Table A15 for trend estimates).

Q4 Are the observed trends consistent with trends in CVD risk factors?

The overall improvements in death rates for CHD are consistent with the very favourable declines reported in smoking rates and blood pressure levels. Falling blood cholesterol levels may have played a part in some localities. Increasing physical inactivity, and strongly unfavourable trends in overweight and obesity prevalence and diabetes prevalence will have been working against these improvements in mortality, and may have been contributing to the slowing rate of decline among younger men and women.

The net effect of these changes in risk factor levels is difficult to assess. It is not possible to say, for example, whether the net effect of these risk factor trends is consistent with an increase or decrease in the overall population risk of a cardiovascular event. This would require absolute risk calculations for survey participants on the basis of their individual risk factor profiles. There are no data in Australia at present on trends in the population distribution of absolute risk of a cardiovascular event.

Q5 What are the trends in CVD in other countries and how does Australia compare?

While most OECD countries have experienced a decline in CHD death rates since 1980, the decline in Australia has been one of the most remarkable of all OECD countries. Despite these declines, death rates from CHD remain higher than those in many other developed countries, indicating the potential for further declines. The situation is similar for cerebrovascular disease (mainly stroke). The fall in cerebrovascular disease death rates in Australia since 1980 has also been substantial but several other countries continue to have lower death rates.

Among those OECD countries that have experienced a fall in death rates from CHD and stroke, the reduction can be attributed at least partly to a reduction in tobacco smoking (OECD 2007). In Australia, the fall in population blood pressure levels will also have played a part. Across OECD countries, significant improvements in medical care for treating CHD have contributed to the mortality declines, and improvements in medical treatment for stroke have increased survival rates (OECD 2007).

The role of medical care and treatment

Apart from primary changes in risk factors, declines in death rates from CHD and stroke also result from improvements in medical care and treatment—in areas such as medicines use, emergency care, medical and surgical treatment, rehabilitation and follow-up care. For example, the World Health Organization MONICA Study found that advances and improvements in acute coronary care accounted for nearly two-thirds of the decline in CHD death rates (Tunstall-Pedoe et al. 2000).

Within Australia, emergency intervention after a heart attack has become more effective, along with long-term treatment of such patients, including the increased use of particular medicines such as angiotensin-converting enzyme inhibitors, statins, thrombolytics and

antiplatelet agents. More generally, the increased use and effectiveness of medicines to lower blood pressure, and a dramatic increase in the use of cholesterol-lowering medicines among the population at risk will have also played a part in reducing the likelihood of heart attacks. There has also been a rise in the use of coronary revascularisation dating from the 1980s.

For stroke, it is likely that the increased use of blood pressure-lowering medicines, antiplatelet agents (such as aspirin) and anticoagulant therapy (warfarin) has contributed to the decline in death rates. The advent of stroke units, which are known to improve survival and reduce dependency after a stroke, will have also contributed to the decline (AIHW 2004; AIHW: Senes 2006).

The slowing decline in CHD death rates among younger people

A slowing in the rate of decline in CHD death rates among younger men and women (35–54 years), shown in this report for Australia, has also been reported recently for England and Wales (Allender 2008; 2008) and the United States (Ford & Capewell 2007). This adverse trend—a slowing in the rate of decline—has occurred despite the increasingly wide use of the evidence-based therapies used in medical care and treatment. This suggests that the criteria for beginning of treatment regimes may need to be revised, and the targeting of screening for risk factors and appropriate counselling may need to begin earlier.

Stroke mortality declines not slowing

There is no suggestion of a flattening in Australia of the stroke trend, as has been documented for the United States (Jemal et al. 2005). In Australia, the rate of decline in older age groups has increased. In younger age groups the rate of decline has remained steady or possibly slowed in younger women. This pattern is largely a reflection of what has been happening in ischaemic stroke. At each age group, average annual declines for haemorrhagic stroke are lower than for ischaemic stroke. Among men and women aged 85 years or older, the average annual change in haemorrhagic stroke death rates was virtually zero between 1997 and 2006.

Australian heart failure gains confirmed

A previous Australian analysis reported a large decline in the mortality rate for heart failure from 1997 to 2003, contrary to reports from several comparable countries of an 'epidemic' of heart failure (Najafi et al. 2006). The authors conclude that the decline probably reflects a real change in the epidemiology of the disease and advocate studies to determine accurately the contributions of changes in incidence, survival and demographic factors. The present analysis, for heart failure/cardiomyopathy, demonstrates that the average rate of decline in Australia was greater from 1997 to 2006 than from 1987 to 1996 for each age and sex group; that is, that the rate of decline has been accelerating across all age groups.

Heart failure is often a fatal consequence of several other cardiovascular diseases, including CHD. With the ageing of the population and declines in mortality from other forms of CVD, it is likely that heart failure will increase in public health importance over time, despite its current declining death rate.

Who has benefited the most?

The decline in death rates for CVD and CHD has resulted both in substantial savings of lives and gains in years of life for the Australian population. Australians aged 55–64 years gained

most in terms of lives saved, while those aged 55–69 years benefited most in 'years of life extended' (AIHW 2009). The present analysis complements these results, and shows that falls in death rates for CVD, and for CHD, have been greatest in the age groups 55–64 and 65–74 years, and that the falling death rates have accelerated over recent years.

Ageing of the population

Australia's population is ageing, meaning that the number and proportion of older people in the population is increasing. Over the next 30 years, the older population will also continue to change in its internal structure. The number of older Australians aged 85 years or older is projected to increase more rapidly than other age groups (AIHW 2007). One consequence of an ageing population and falling cardiovascular death rates is the growing importance of health and health care needs, and the allocation of resources for preventative, medical and care services.

Handling the transition from ICD-9 to ICD-10

This report has presented age- and sex-stratified death rates over some 20 years that span two revisions of the International Classification of Diseases. The transition from ICD-9 to ICD-10 represented a shift in disease coding, which means that comparisons between the periods 1987–1996 and 1997–2006 should be made cautiously. To help with visually understanding trends around the transition period for ICD codes, an 'adjustment factor' was applied to deaths between 1987 and 1996 to adjust for differences in coding between ICD-9 and ICD-10 for some cardiovascular diseases.

In this analysis, trends were calculated solely within the periods covered by the respective ICD revisions. No trends were calculated that spanned different ICD revisions. In this way, the comparison of trends between the two periods is unaffected by changes to the ICD or by the application of 'adjustment factors'.

Concluding remarks

This report intends to provide a current picture of cardiovascular mortality trends in Australians of different ages at the beginning of the 21st century. It has shown that:

- the rate of decline in death rates from CHD has been slowing in younger men and women
- the rate of decline in heart failure/cardiomyopathy death rates has been accelerating
- the decline in haemorrhagic stroke death rates among the oldest men and women appears to have stopped.

It has also demonstrated that the rate of decline has increased among older Australians for both CHD and for stroke. This fact, combined with an ageing population, has important implications for the allocation of health resources.

Data sources and classifications

Mortality trends

The National Mortality Database

The AIHW National Mortality Database contains information about all deaths registered in Australia. Deaths are certified by a medical practitioner or the coroner and registered by the Registrar of Births, Deaths and Marriages in each state or territory. The information is provided to the Australian Bureau of Statistics for coding of the cause of death using the latest version of the International Classification of Diseases (ICD). Multiple causes of death, including the underlying and all associated causes of death recorded on the death certificate, are available from 1997 onwards.

Cause of death statistics are usually based on the 'underlying cause', which is the disease or injury that initiated the train of events leading directly to an individual's death—the condition believed to be the primary cause of death. Any other condition or event that is not the underlying cause, but is still considered to contribute to the death, is known as an associated cause. In Australia, the underlying cause is derived from information on death certificates, using an automated process.

In this publication, death data are assembled based on the year of registration and not the year of death. While for the most part, year of death and its registration coincide, deaths at the end of each calendar year may be held over until the following year, as will deaths in which the cause requires further examination by a coroner. In recent years, less than 5% of deaths were held over from one year to the next for processing.

ICD mortality codes

Cause of death is coded according to rules set forward in various versions of the ICD published by the World Health Organization. The relevant codes for deaths during the period covered by this report are:

ICD codes for various cardiovascular diseases

Condition	ICD-10 Codes	ICD-9 Codes
Cardiovascular disease	I00–I99	390–459
Coronary heart disease	I20–I25	410–414
Stroke	I60–I64	430–434, 436
Ischaemic stroke	I63	434
Haemorrhagic stroke	I60–I62	430–432
Heart failure/cardiomyopathy	I50, I25.5, I42.0, I42.5–142.9, I43	4148, 4280, 4281, 4289,4252, 4254, 4255, 4257, 4258, 4259
Rheumatic fever and rheumatic heart disease	I00–I09	390–398

Comparability factors

In processing deaths registered from 1 January 1997, Australia adopted the use of the automated coding system and introduced ICD-10 codes. As a result, there is a break in the underlying cause of death series between 1996 and 1997. Comparability factors have been calculated that can be applied to death counts before 1997 to make them comparable with data from 1997 onwards. Comparability factors close to 1.0 indicate there were no significant coding differences between automated ICD-10 and manual ICD-9 coding.

Comparability factors for the ICD-9 to ICD-10 transition for various cardiovascular diseases

Condition	Comparability factor
Cardiovascular disease	1.00
Coronary heart disease	1.01
Stroke	0.83
Ischaemic stroke	0.79
Haemorrhagic stroke	0.89
Heart failure/cardiomyopathy	0.98
Rheumatic fever and rheumatic heart disease	0.69

No adjustment was made to the number of deaths where the comparability factor was close to 1.0 (> 0.95). Thus, comparability factors of 0.83, 0.79, 0.89 and 0.69 were applied to the observed numbers of deaths from stroke, ischaemic stroke, hemorrhagic stroke, and rheumatic fever and rheumatic heart disease, respectively, for the period 1987–1996. These comparability factors were calculated at the population level not at the sex and age group level. That is, the same comparability factor was applied to the number of deaths for each sex and age group combination.

Risk factor trends

Australian Diabetes, Obesity and Lifestyle Study 1999–2000

Done by the International Diabetes Institute, the Australian Diabetes, Obesity and Lifestyle (AusDiab) Study was designed to provide estimates of the prevalence of diagnosed and undiagnosed diabetes and self-reported chronic conditions, such as heart disease and high blood pressure. It also provided national measurements of blood pressure, blood lipids, blood glucose, body fat, height and weight, and waist and hip circumference, as well as self-reported information on diet, smoking, alcohol consumption, physical activity, and general health and wellbeing. The study collected information in urban and non-urban areas in all states and the Northern Territory, and sampled more than 20,000 people aged 25 years and over, of whom more than 11,000 underwent a physical examination. In this report, AusDiab provided prevalence estimates of high blood pressure and high blood cholesterol based on measured data.

National Drug Strategy Household Surveys 1985, 1988, 1991, 1993, 1995, 1998, 2001, 2004 and 2007

This survey is done by the AIHW at 3-yearly intervals. It collects comprehensive information about people's use of and attitudes towards tobacco, alcohol and illicit drugs: experiences of alcohol- and other drug-related harm; and physical and mental health. The latest survey was the ninth in a series that began in 1985. People living in non-private dwellings and institutions are not included in the sample. From 2004 onwards, the survey includes people aged 12 years and over; previously the scope was 14 years and over. These surveys provided trend estimates of the prevalence of daily smoking.

National Health Surveys 1989–90, 1995, 2001, 2004–05 and 2007–08

Now done every 3 years by the Australian Bureau of Statistics, this survey obtains national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. The survey is community-based and does not include information from people living in non-private dwellings or institutions (such as nursing homes, hospitals or prisons). These surveys provided trend estimates of the prevalence of diabetes based on self-reported data. The 2007–08 National Health Survey collected measured height and weight, and was used, in conjunction with the 1995 National Nutrition Survey, to estimate the prevalence of obesity, based on measured data.

National Nutrition Survey 1995

Done by the Australian Bureau of Statistics, this survey was the largest and most comprehensive Australian survey of food and nutrient intake, dietary habits and body measurements. The survey collected information from a sub-sample of respondents from the 1995 National Health Survey, about 13,800 people from urban and rural areas of Australia. The National Nutrition Survey was done over a 13-month period from February 1995 to March 1996. This survey provided prevalence estimates of high blood pressure and obesity based on measured data.

National Physical Activity Surveys 1997, 1999 and 2000

The 2000 survey was done to give an assessment of physical activity patterns and knowledge of the benefits of physical activity among adult Australians after the Olympics in Sydney (September 2000). The survey collected information from a national sample of 3,590 people aged 18-75 years during November and December 2000. This survey followed on from the 1997 (the Active Australia Baseline Survey) and 1999 National Physical Activity Surveys. The 1997 survey collected information from a national sample of 4,821 people in November and December of that year. The 1999 survey collected information from a national sample of 3,841 people in November and December of that year. These surveys provided estimates of the proportion of people who were sedentary.

Risk Factor Prevalence Surveys 1980, 1983 and 1989

This series of surveys were done by the National Heart Foundation of Australia to get national information on biomedical and behavioural risk factors in Australia and to monitor trends. The overall study collected information from a sample of about 22,000 adults living in capital cities of Australia (Canberra and Darwin were not included in the 1980 and 1883 surveys) between May/June and December of the survey year. These surveys provided prevalence estimates of high blood pressure and high blood cholesterol based on measured data.

Statistical methods

Population data

The estimated resident population as at 30 June was used to calculate age-specific death rates for any year. Age-standardised death rates were calculated using the direct method of standardisation and based on the Australian population as at 30 June 2001.

Rates

While the primary focus of this report is on age-specific rates, age-standardised rates have been used to look at international trends.

Age-specific rates

In this report, age-specific rates are calculated for deaths and risk factor levels. Age-specific death rates, for example, are calculated for age groups by:

- dividing the number of male or female deaths in the specific age–sex group by the respective population in that same age–sex group
- then expressing the result as a number per 100,000.

For example, if there were 2,000 female deaths among 500,000 females aged 75–84 years, the age-specific death rate would be calculated as 100,000 x 2,000/500,000.

This would then be expressed as, for example, 'among females aged 75–84 years the death rate was 400 per 100,000'.

For trend analysis, the relevant age–sex population estimate from the Australian Estimated Resident Population at 30 June for each year was used as the denominator.

Age-standardised rates

In the method known as direct age-standardisation, age-specific rates are calculated for each of the populations being compared. These age-specific rates are applied to a standard population age structure to give an overall 'age-standardised' rate. The standardised rates allow the populations to be compared on an equal age basis. In addition, male and female standardised rates are calculated by using the same standard population, so that the respective rates of the sexes can be compared.

In this report, age-standardised rates in the chapters on mortality trends and 'Trends in key risk factors' used the structure of the Australian population as at 30 June 2001 as the standard population. The 1980 OECD population structure was used in the calculation of age-standardised rates for Chapter 8 'International trends'.

Average annual percentage change

Log linear modelling is used to estimate the average annual percentage change. This is preferable to taking the (geometric) mean, which is derived from the first and last points in

the time series and takes no account of points in between. Modelling the natural logarithm of the rates takes all points in the time series into account and ensures that a rate of zero will never be predicted, which is a more realistic result. The log linear model has the form:

$\log_e(R_t)$ = constant + αt, where t is the time period (years), R_t is the observed rate in year t, and α is the estimated average annual rate of increase or decrease.

Statistical tables

Table A1: Deaths, age-specific and age-standardised death rates from cardiovascular disease, males

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	182	210	216	220	187	166	161	200	175	185
35–44	465	562	493	476	472	449	436	386	457	419
45–54	1,523	1,433	1,339	1,349	1,249	1,273	1,187	1,199	1,215	1,249
55–64	4,397	4,093	4,001	3,745	3,468	3,320	3,036	2,810	2,735	2,629
65–74	8,427	8,283	8,283	7,715	7,453	7,541	7,419	7,389	7,052	6,753
75–84	9,166	9,300	9,782	9,492	9,658	9,834	9,461	9,887	9,420	9,769
85+	3,912	3,896	4,262	4,036	4,080	4,493	4,670	5,158	5,205	5,541
Total	28,081	27,779	28,376	27,033	26,571	27,079	26,372	27,031	26,261	26,550
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	207	183	184	170	196	164	210	169	179	161
35–44	423	428	415	439	399	409	399	396	410	410
45–54	1,234	1,107	1,133	1,079	1,123	1,107	1,061	1,017	1,050	991
55–64	2,576	2,356	2,289	2,103	2,253	2,212	2,104	2,114	2,032	1,921
65–74	6,392	5,998	5,667	5,139	4,749	4,663	4,332	4,133	3,645	3,446
75–84	9,535	9,363	9,092	8,734	8,541	8,643	8,587	8,430	8,134	7,821
85+	5,751	5,721	6,039	6,087	6,336	6,773	6,706	6,660	6,506	6,811
Total	26,121	25,159	24,824	23,756	23,602	23,988	23,399	22,921	21,957	21,562

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	3.9	4.5	4.6	4.6	3.9	3.5	3.4	4.2	3.7	3.9
35–44	38.8	45.4	38.9	36.7	35.8	33.8	32.6	28.5	33.2	29.9
45–54	183.2	167.6	150.8	146.0	130.1	126.3	112.9	109.9	107.4	106.6
55–64	597.6	555.8	543.7	509.7	472.4	450.6	409.4	375.1	359.8	339.8
65–74	1,713.5	1,640.3	1,595.4	1,451.1	1,358.5	1,336.6	1,278.2	1,239.2	1,165.2	1,100.6
75–84	4,405.9	4,286.4	4,311.9	4,033.8	3,967.9	3,926.9	3,688.5	3,776.2	3,461.8	3,422.3
85+	10,790.5	10,283.8	10,660.3	9,709.9	9,226.6	9,489.7	9,275.3	9,680.7	9,168.7	9,188.9
ASR	546.1	524.2	523.0	483.9	461.9	459.1	435.8	438.6	411.5	403.3
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	4.3	3.8	3.8	3.5	4.1	3.4	4.3	3.4	3.6	3.2
35–44	29.7	29.7	28.5	29.9	27.0	27.6	26.8	26.5	27.3	27.0
45–54	102.1	88.8	88.8	82.9	84.6	82.9	78.5	74.2	75.4	70.0
55–64	323.5	286.9	268.0	236.0	243.1	226.6	206.2	199.8	185.4	169.7
65–74	1,031.9	961.5	901.8	813.6	743.0	720.0	661.1	621.7	538.7	499.6
75–84	3,191.6	3,005.8	2,799.2	2,579.8	2,401.8	2,337.6	2,232.6	2,114.5	1,986.5	1,867.3
85+	8,999.2	8,386.5	8,295.2	7,852.4	7,734.2	7,935.8	7,625.2	7,347.8	6,675.4	6,525.5
ASR	384.0	357.2	340.9	315.4	302.0	298.3	283.3	270.0	248.5	236.1

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. No comparability factor was applied to the number of deaths. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A2: Deaths, age-specific and age-standardised death rates from cardiovascular disease, females

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	98	127	100	111	99	110	106	92	100	92
35–44	167	161	176	145	154	165	162	168	168	158
45–54	463	422	466	402	387	425	385	368	371	370
55–64	1,617	1,575	1,491	1,379	1,243	1,335	1,158	1,064	992	997
65–74	5,065	4,941	4,889	4,684	4,442	4,311	4,142	4,024	3,858	3,661
75–84	10,391	10,288	10,700	10,435	9,965	10,547	10,111	10,407	9,930	9,852
85+	9,793	9,787	10,631	10,096	10,149	10,939	10,804	11,733	11,727	12,308
Total	27,597	27,301	28,453	27,252	26,439	27,833	26,868	27,857	27,146	27,440
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	111	124	109	97	95	88	106	98	91	119
35–44	153	177	150	173	184	156	164	152	185	133
45–54	355	369	351	385	350	339	383	370	356	365
55–64	969	877	890	809	799	794	767	698	697	659
65–74	3,497	3,282	2,950	2,808	2,626	2,449	2,271	2,065	1,892	1,792
75–84	9,734	9,349	9,051	8,499	8,381	8,447	8,080	7,825	7,355	7,122
85+	12,695	12,450	12,977	13,159	13,288	14,026	13,665	13,508	13,597	13,918
Total	27,515	26,628	26,479	25,931	25,724	26,306	25,436	24,716	24,177	24,108

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	2.2	2.8	2.2	2.4	2.1	2.4	2.3	2.0	2.2	2.0
35–44	14.4	13.4	14.2	11.4	11.8	12.5	12.1	12.4	12.2	11.2
45–54	58.6	51.9	55.1	45.7	42.3	44.1	38.2	35.1	34.0	32.5
55–64	219.8	214.7	203.8	189.0	170.6	182.5	157.5	143.3	131.9	130.5
65–74	868.3	827.9	803.2	756.5	701.2	667.8	628.6	599.0	569.7	537.0
75–84	3,220.5	3,071.8	3,069.5	2,898.5	2,686.6	2,771.7	2,603.7	2,634.9	2,446.8	2,343.5
85+	10,075.7	9,805.3	10,300.6	9,559.8	9,224.1	9,459.9	8,866.9	9,201.9	8,729.9	8,692.2
ASR	369.7	355.5	359.7	335.9	316.0	322.3	300.9	303.0	285.1	277.3
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	2.4	2.7	2.3	2.1	2.0	1.9	2.2	2.1	1.9	2.5
35–44	10.7	12.2	10.2	11.6	12.3	10.4	10.9	10.0	12.2	8.6
45–54	30.1	30.1	27.8	29.7	26.3	25.2	28.1	26.7	25.2	25.4
55–64	123.5	108.8	106.3	93.0	88.4	83.1	76.6	66.9	64.1	58.4
65–74	513.6	482.6	434.2	413.7	385.2	356.5	327.9	294.7	266.1	248.0
75–84	2,230.9	2,073.6	1,950.9	1,779.0	1,697.2	1,672.0	1,560.9	1,480.1	1,373.7	1,320.2
85+	8,499.8	7,942.7	7,812.5	7,512.9	7,248.8	7,405.5	7,046.8	6,814.6	6,547.8	6,392.1
ASR	267.3	249.6	238.2	224.3	214.3	212.4	200.7	190.4	180.0	173.5

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths 1987–1996 were coded to ICD-9; deaths 1997–2006 were coded to ICD-10. No comparability factor was applied to the number of deaths. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A3: Deaths, age-specific and age-standardised death rates from coronary heart disease, males

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	65	64	53	63	53	55	46	62	59	58
35–44	316	388	318	321	309	289	285	250	288	269
45–54	1,123	1,064	1,022	946	906	940	852	871	864	858
55–64	3,256	3,052	2,947	2,724	2,487	2,381	2,198	1,955	1,934	1,841
65–74	5,755	5,714	5,633	5,291	5,073	5,106	4,976	4,899	4,663	4,471
75–84	5,538	5,516	5,949	5,742	5,832	5,894	5,587	5,826	5,597	5,738
85+	1,930	1,939	2,210	2,099	2,089	2,395	2,391	2,652	2,726	2,852
Total	17,988	17,737	18,132	17,186	16,753	17,063	16,337	16,515	16,133	16,092
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	52	59	55	56	72	50	62	51	51	57
35–44	282	278	267	273	256	242	238	236	251	236
45–54	856	785	813	769	778	753	732	706	740	672
55–64	1,794	1,673	1,625	1,483	1,564	1,520	1,454	1,460	1,374	1,274
65–74	4,252	3,963	3,714	3,317	3,122	2,937	2,737	2,622	2,234	2,095
75–84	5,560	5,544	5,275	5,039	4,852	4,846	4,789	4,629	4,447	4,269
85+	2,992	2,951	3,111	3,110	3,257	3,494	3,522	3,447	3,335	3,582
Total	15,791	15,256	14,865	14,052	13,906	13,855	13,534	13,152	12,433	12,186

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	1.4	1.4	1.1	1.3	1.1	1.2	1.0	1.3	1.2	1.2
35–44	26.4	31.4	25.1	24.8	23.4	21.7	21.3	18.5	20.9	19.2
45–54	135.1	124.5	115.1	102.4	94.3	93.3	81.0	79.8	76.4	73.2
55–64	442.5	414.4	400.5	370.7	338.8	323.1	296.4	261.0	254.4	238.0
65–74	1,170.2	1,131.6	1,085.0	995.2	924.7	905.0	857.3	821.6	770.5	728.7
75–84	2,662.0	2,542.3	2,622.3	2,440.2	2,396.0	2,353.6	2,178.1	2,225.2	2,056.9	2,010.2
85+	5,323.6	5,118.1	5,527.8	5,049.8	4,724.1	5,058.5	4,748.9	4,977.4	4,801.9	4,729.6
ASR	333.8	319.8	322.0	296.9	281.3	280.8	261.3	260.3	246.3	238.2
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	1.1	1.2	1.1	1.2	1.5	1.0	1.3	1.0	1.0	1.1
35–44	19.8	19.3	18.3	18.6	17.3	16.3	16.0	15.8	16.7	15.5
45–54	70.8	62.9	63.7	59.1	58.6	56.4	54.2	51.5	53.2	47.4
55–64	225.3	203.8	190.3	166.4	168.7	155.7	142.5	138.0	125.4	112.6
65–74	686.4	635.3	591.0	525.2	488.5	453.5	417.7	394.4	330.2	303.8
75–84	1,861.1	1,779.8	1,624.0	1,488.4	1,364.4	1,310.7	1,245.1	1,161.1	1,086.1	1,019.2
85+	4,681.9	4,325.9	4,273.3	4,012.0	3,975.7	4,093.9	4,004.8	3,803.0	3,421.8	3,431.9
ASR	226.6	211.6	199.7	182.9	174.6	169.5	161.5	152.6	138.9	132.2

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. No comparability factor was applied to the number of deaths. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A4: Deaths, age-specific and age-standardised death rates from coronary heart disease, females

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	15	11	14	13	13	14	19	11	12	18
35–44	64	52	55	62	46	63	59	53	61	57
45–54	250	222	230	187	170	196	170	174	182	161
55–64	993	934	885	833	743	776	692	617	563	553
65–74	3,167	3,067	2,980	2,932	2,685	2,587	2,475	2,344	2,222	2,059
75–84	5,479	5,433	5,752	5,503	5,413	5,758	5,186	5,525	5,119	5,084
85+	4,136	4,128	4,591	4,458	4,500	5,024	4,824	5,335	5321	5,611
Total	14,105	13,847	14,507	13,988	13,570	14,419	13,425	14,060	13,480	13,545
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	18	18	22	12	11	15	15	19	17	13
35–44	53	64	51	59	61	53	49	60	60	37
45–54	163	165	144	175	151	141	166	147	151	124
55–64	553	486	462	417	416	404	390	326	341	309
65–74	2,009	1,791	1,617	1,581	1,407	1,270	1,114	1,010	907	841
75–84	4,972	4,738	4,534	4,177	4,148	4,039	3,940	3,639	3,431	3,228
85+	5,897	5,781	5,913	6,048	6,134	6,283	6,231	6,223	6,227	6,245
Total	13,666	13,043	12,744	12,469	12,328	12,208	11,905	11,424	11,137	10,797

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.2	0.3	0.4
35–44	5.5	4.3	4.4	4.9	3.5	4.8	4.4	3.9	4.4	4.0
45–54	31.7	27.3	27.2	21.3	18.6	20.4	16.9	16.6	16.7	14.2
55–64	135.0	127.3	121.0	114.1	102.0	106.1	94.1	83.1	74.8	72.4
65–74	542.9	513.9	489.6	473.5	423.8	400.8	375.6	348.9	328.1	302.0
75–84	1,698.1	1,622.2	1,650.1	1,528.5	1,459.4	1,513.2	1,335.5	1,398.8	1,261.4	1,209.3
85+	4,255.4	4,135.7	4,448.3	4,221.2	4,089.9	4,344.7	3,959.1	4,184.1	3,961.1	3,962.6
ASR	187.5	179.0	182.2	171.3	161.4	166.5	150.1	152.9	141.8	137.2
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	0.4	0.4	0.5	0.3	0.2	0.3	0.3	0.4	0.4	0.3
35–44	3.7	4.4	3.5	4.0	4.1	3.5	3.2	4.0	3.9	2.4
45–54	13.8	13.5	11.4	13.5	11.3	10.5	12.2	10.6	10.7	8.6
55–64	70.5	60.3	55.2	47.9	46.0	42.3	38.9	31.2	31.4	27.4
65–74	295.1	263.3	238.0	232.9	206.4	184.9	160.8	144.1	127.6	116.4
75–84	1,139.5	1,050.9	977.3	874.3	840.0	799.5	761.1	688.3	640.8	598.4
85+	3,948.3	3,688.1	3,559.8	3,453.0	3,346.2	3,317.3	3,213.2	3,139.4	2,998.7	2,868.1
ASR	133.2	122.7	115.1	108.4	103.1	99.0	94.1	88.0	82.9	77.5

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. No comparability factor was applied to the number of deaths. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A5: Deaths, age-specific and age-standardised death rates from stroke, males

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	24	45	52	44	38	33	26	39	23	27
35–44	60	69	66	64	66	66	54	56	67	58
45–54	163	119	129	165	144	134	132	121	139	153
55–64	494	415	416	415	399	340	327	351	321	290
65–74	1,161	1,151	1,177	1,033	1,006	1,050	1,018	998	1,015	974
75–84	1,649	1,732	1,654	1,658	1,716	1,746	1,711	1,837	1,745	1,808
85+	776	770	812	764	800	846	911	1,055	1,038	1,117
Total	4,328	4,301	4,306	4,143	4,169	4,215	4,179	4,457	4,348	4,427
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	34	22	36	24	24	27	32	23	29	23
35–44	55	61	48	55	44	55	40	47	48	46
45–54	154	116	113	104	123	135	116	117	90	128
55–64	283	277	268	227	253	248	246	218	223	223
65–74	813	781	747	712	634	602	573	557	507	482
75–84	1,488	1,450	1,419	1,423	1,369	1,397	1,481	1,410	1,364	1,338
85+	918	981	1,042	1,093	1,083	1,110	1,117	1,138	1,086	1,107
Total	3,745	3,688	3,673	3,638	3,530	3,575	3,605	3,510	3,347	3,347

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	0.4	0.8	0.9	0.8	0.7	0.6	0.5	0.7	0.4	0.5
35–44	4.2	4.6	4.3	4.1	4.2	4.1	3.3	3.4	4.0	3.4
45–54	16.3	11.6	12.1	14.8	12.4	11.0	10.4	9.2	10.2	10.8
55–64	55.7	46.8	46.9	46.9	45.1	38.3	36.6	38.9	35.0	31.1
65–74	195.9	189.2	188.2	161.3	152.2	154.5	145.6	138.9	139.2	131.8
75–84	657.9	662.6	605.1	584.8	585.1	578.7	553.7	582.3	532.3	525.7
85+	1,776.6	1,686.9	1,685.7	1,525.6	1,501.6	1,483.1	1,501.8	1,643.5	1,517.6	1,537.5
ASR	74.7	72.0	69.5	64.9	63.4	62.1	60.3	63.2	59.0	58.1
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	0.7	0.5	0.8	0.5	0.5	0.6	0.7	0.5	0.6	0.5
35–44	3.9	4.2	3.3	3.7	3.0	3.7	2.7	3.1	3.2	3.0
45–54	12.7	9.3	8.9	8.0	9.3	10.1	8.6	8.5	6.5	9.0
55–64	35.5	33.7	31.4	25.5	27.3	25.4	24.1	20.6	20.3	19.7
65–74	131.2	125.2	118.9	112.7	99.2	93.0	87.4	83.8	74.9	69.9
75–84	498.1	465.5	436.9	420.3	385.0	377.8	385.1	353.7	333.1	319.4
85+	1,436.5	1,438.1	1,431.3	1,410.0	1,322.0	1,300.6	1,270.1	1,255.5	1,114.3	1,060.6
ASR	56.4	53.9	51.8	49.6	46.2	45.2	44.3	42.2	38.5	37.0

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.83 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A6: Deaths, age-specific and age-standardised death rates from stroke, females

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	29	42	25	28	28	32	25	22	24	22
35–44	45	48	57	45	54	49	46	45	48	39
45–54	125	109	115	112	123	127	113	103	102	116
55–64	345	332	312	268	259	255	209	199	186	205
65–74	979	971	984	904	847	803	821	810	843	800
75–84	2,394	2,429	2,359	2,469	2,312	2,334	2,464	2,452	2,372	2,372
85+	2,348	2,286	2,443	2,448	2,463	2,531	2,634	2,828	2,880	3,021
Total	6,265	6,217	6,295	6,274	6,086	6,131	6,312	6,459	6,455	6,575
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	31	25	22	20	19	20	17	21	13	27
35–44	44	45	39	52	42	53	44	35	50	33
45–54	95	92	86	105	86	89	93	102	89	119
55–64	168	164	187	168	166	135	153	135	135	146
65–74	647	651	567	508	493	458	462	419	404	392
75–84	1,950	1,946	1,917	1,816	1,767	1,848	1,753	1,741	1,536	1,626
85+	2,446	2,468	2,648	2,698	2,621	2,798	2,879	2,783	2,621	2,794
Total	5,381	5,391	5,466	5,367	5,194	5,403	5,401	5,236	4,848	5,137

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<35	0.5	0.8	0.5	0.5	0.5	0.6	0.4	0.4	0.4	0.4
35–44	3.2	3.3	3.8	2.9	3.4	3.1	2.9	2.8	2.9	2.3
45–54	13.1	11.1	11.3	10.6	11.1	10.9	9.3	8.1	7.7	8.5
55–64	38.9	37.6	35.4	30.5	29.5	28.9	23.6	22.2	20.5	22.3
65–74	139.3	135.0	134.2	121.2	111.0	103.3	103.4	100.1	103.3	97.4
75–84	615.8	602.0	561.7	569.2	517.4	509.1	526.7	515.3	485.1	468.3
85+	2,005.1	1,900.9	1,964.7	1,923.9	1,858.0	1,816.7	1,794.2	1,840.9	1,779.5	1,770.8
ASR	70.0	67.5	66.2	64.5	60.7	59.1	58.8	58.3	56.2	55.1
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<35	0.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.6
35–44	3.1	3.1	2.6	3.5	2.8	3.5	2.9	2.3	3.3	2.1
45–54	8.1	7.5	6.8	8.1	6.5	6.6	6.8	7.4	6.3	8.3
55–64	21.4	20.3	22.3	19.3	18.4	14.1	15.3	12.9	12.4	12.9
65–74	95.0	95.7	83.5	74.8	72.3	66.7	66.7	59.8	56.8	54.3
75–84	446.9	431.6	413.2	380.1	357.8	365.8	338.6	329.3	286.9	301.4
85+	1,637.7	1,574.5	1,594.2	1,540.4	1,429.8	1,477.3	1,484.6	1,404.0	1,262.2	1,283.2
ASR	52.3	50.6	49.2	46.4	43.4	43.7	42.6	40.5	36.3	37.4

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.83 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A7: Deaths, age-specific and age-standardised death rates from ischaemic stroke, males

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	103	83	85	108	81	72	60	81	81	73
65–74	233	181	212	195	164	185	188	168	163	156
75–84	347	328	346	308	330	296	316	383	323	335
85+	184	182	186	147	164	152	190	209	205	197
Total	867	774	829	758	739	705	754	841	772	761
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	81	77	58	63	59	53	57	54	55	62
65–74	153	138	126	138	85	99	89	85	78	60
75–84	275	276	236	239	225	234	241	211	167	150
85+	165	151	193	208	171	184	152	175	135	124
Total	674	642	613	648	540	570	539	525	435	396

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	1.1	0.9	0.9	1.1	0.8	0.7	0.6	0.8	0.8	0.7
65–74	37.4	28.3	32.3	29.0	23.6	25.9	25.6	22.3	21.3	20.1
75–84	131.8	119.4	120.5	103.4	107.1	93.4	97.3	115.6	93.8	92.7
85+	400.9	379.5	367.5	279.4	293.0	253.6	298.1	309.9	285.3	258.1
ASR	14.9	13.2	13.4	11.4	11.1	10.0	10.7	11.6	10.2	9.6
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	1.0	0.9	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.7
65–74	24.7	22.1	20.1	21.8	13.3	15.3	13.6	12.8	11.5	8.7
75–84	92.0	88.6	72.7	70.6	63.3	63.3	62.7	52.9	40.8	35.8
85+	258.2	221.4	265.1	268.3	208.7	215.6	172.8	193.1	138.5	118.8
ASR	10.2	9.3	8.8	8.9	7.1	7.3	6.6	6.3	5.0	4.3

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.79 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A8: Deaths, age-specific and age-standardised death rates from ischaemic stroke, females

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	47	50	60	54	47	44	33	34	32	34
65–74	150	162	145	126	136	105	137	117	112	124
75–84	490	455	457	443	397	389	463	414	423	388
85+	592	558	570	528	498	529	580	557	562	609
Total	1,279	1,225	1,232	1,151	1,078	1,067	1,213	1,122	1,129	1,155
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	33	38	26	30	39	33	24	31	32	30
65–74	76	95	92	80	74	68	50	62	48	46
75–84	308	343	280	269	268	280	236	224	204	157
85+	399	446	443	421	422	406	373	381	354	283
Total	816	922	841	800	803	787	683	698	638	516

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	0.5	0.5	0.6	0.6	0.5	0.5	0.3	0.3	0.3	0.3
65–74	20.3	21.4	18.8	16.1	17.0	12.9	16.4	13.8	13.1	14.4
75–84	120.0	107.3	103.6	97.2	84.6	80.8	94.2	82.8	82.3	72.9
85+	481.2	441.6	436.3	395.0	357.6	361.4	376.0	345.1	330.5	339.8
ASR	13.7	12.7	12.4	11.3	10.2	9.8	10.7	9.6	9.3	9.1
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	0.4	0.5	0.3	0.4	0.5	0.4	0.3	0.4	0.4	0.3
65–74	11.2	14.0	13.5	11.8	10.9	9.9	7.2	8.8	6.8	6.4
75–84	70.6	76.1	60.4	56.3	54.3	55.4	45.6	42.4	38.1	29.1
85+	267.1	284.5	266.7	240.4	230.2	214.4	192.3	192.2	170.5	130.0
ASR	7.9	8.6	7.5	6.9	6.7	6.4	5.3	5.4	4.7	3.8

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.79 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A9: Deaths, age-specific and age-standardised death rates from haemorrhagic stroke, males

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	367	340	360	353	348	314	305	324	295	308
65–74	278	287	282	257	263	256	248	263	283	280
75–84	240	257	253	239	249	265	257	314	254	299
85+	80	90	78	89	68	90	92	108	109	132
Total	965	974	973	938	928	925	902	1,009	941	1,019
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	306	296	291	255	278	315	278	260	255	284
65–74	245	245	250	222	224	221	192	196	206	210
75–84	281	300	298	323	323	317	347	339	377	341
85+	112	128	117	151	169	191	174	178	171	174
Total	944	969	956	951	994	1,044	991	973	1,009	1,009

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	4.4	4.0	4.2	4.1	4.0	3.6	3.4	3.6	3.3	3.4
65–74	50.3	50.6	48.3	43.0	42.7	40.4	38.0	39.3	41.6	40.6
75–84	102.7	105.4	99.3	90.4	91.0	94.2	89.2	106.7	83.1	93.2
85+	196.4	211.4	173.6	190.6	136.9	169.2	162.6	180.4	170.9	194.8
ASR	15.0	14.9	14.2	13.6	12.7	12.7	12.1	13.3	11.9	12.7
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	3.3	3.2	3.1	2.7	2.9	3.2	2.8	2.6	2.5	2.8
65–74	35.2	35.0	35.4	31.3	31.2	30.4	26.1	26.2	27.1	27.1
75–84	83.7	85.7	81.7	84.9	80.8	76.3	80.3	75.7	81.9	72.5
85+	156.0	167.0	143.0	173.4	183.6	199.2	176.1	174.8	156.2	148.4
ASR	11.3	11.3	10.7	10.6	10.7	10.9	10.1	9.7	9.7	9.3

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.89 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A10: Deaths, age-specific and age-standardised death rates from haemorrhagic stroke, females

Deaths (number)										
Age	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
<65	352	352	315	286	303	305	259	258	246	260
65–74	307	286	313	245	267	301	246	249	274	259
75–84	432	388	420	401	405	447	408	449	428	496
85+	268	241	240	246	245	238	235	270	257	269
Total	1,359	1,267	1,288	1,178	1,220	1,291	1,148	1,226	1,205	1,284
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	240	220	248	256	210	216	232	216	215	237
65–74	250	249	208	185	182	189	190	184	182	170
75–84	403	412	439	426	420	454	454	454	409	471
85+	273	256	311	309	318	357	397	334	330	387
Total	1,166	1,137	1,206	1,176	1,130	1,216	1,273	1,188	1,136	1,265

Age-specific and age-standardised rates (per 100,000 population)										
	1987	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
<65	4.4	4.3	3.8	3.4	3.6	3.6	3.0	3.0	2.8	2.9
65–74	46.8	42.6	45.8	35.2	37.5	41.5	33.2	33.0	36.0	33.8
75–84	119.2	103.1	107.2	99.1	97.2	104.5	93.5	101.2	93.9	105.0
85+	245.4	214.9	207.0	207.3	198.2	183.2	171.7	188.5	170.3	169.1
ASR	16.1	14.6	14.4	13.0	13.1	13.4	11.6	12.1	11.5	12.0
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	3.0	2.7	3.0	3.1	2.5	2.5	2.7	2.5	2.4	2.7
65–74	36.7	36.6	30.6	27.3	26.7	27.5	27.4	26.3	25.6	23.5
75–84	92.4	91.4	94.6	89.2	85.1	89.9	87.7	85.9	76.4	87.3
85+	182.8	163.3	187.2	176.4	173.5	188.5	204.7	168.5	158.9	177.7
ASR	11.8	11.2	11.5	10.9	10.1	10.6	10.8	9.9	9.3	10.0

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.89 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A11: Deaths, age-specific and age-standardised death rates from heart failure/cardiomyopathy, males

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	538	520	474	459	455	456	436	399	438	400
65–74	488	463	529	488	499	519	549	530	498	496
75–84	644	703	749	747	743	773	768	792	748	804
85+	475	432	487	473	475	508	532	512	537	648
Total	2,146	2,119	2,239	2,167	2,172	2,256	2,285	2,233	2,221	2,348
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	398	323	294	286	281	292	238	288	264	251
65–74	462	401	411	357	292	311	269	233	239	250
75–84	757	713	688	621	607	620	644	578	547	539
85+	627	615	595	611	586	645	590	520	531	624
Total	2,244	2,052	1,988	1,875	1,766	1,870	1,741	1,620	1,581	1,664

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	7.3	6.9	6.2	6.0	5.8	5.8	5.5	5.0	5.4	4.9
65–74	99.2	91.7	101.9	91.8	91.0	92.0	94.6	88.9	82.3	80.8
75–84	309.6	324.0	330.2	317.4	305.3	308.7	299.4	302.5	274.9	281.7
85+	1,310.2	1,140.3	1,218.1	1,137.9	1,074.2	1,073.0	1,056.6	960.9	945.9	1,074.6
ASR	45.5	43.0	44.3	41.7	40.1	40.2	39.4	37.3	35.8	37.2
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	4.8	3.9	3.5	3.4	3.3	3.4	2.7	3.3	3.0	2.8
65–74	74.6	64.3	65.4	56.5	45.7	48.0	41.1	35.0	35.3	36.2
75–84	253.4	228.9	211.8	183.4	170.7	167.7	167.4	145.0	133.6	128.7
85+	981.1	901.5	817.3	788.2	715.3	755.7	670.9	573.7	544.8	597.8
ASR	34.1	30.3	28.1	25.6	23.2	23.8	21.6	19.3	18.1	18.5

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. No comparability factor was applied to the number of deaths. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A12: Deaths, age-specific and age-standardised death rates from heart failure/cardiomyopathy, females

Deaths (number)

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	122	151	162	134	124	163	143	131	106	133
65–74	284	232	269	270	269	275	272	264	230	214
75–84	786	761	845	845	744	816	798	819	734	765
85+	1,111	1,196	1,278	1,149	1,184	1,306	1,224	1,347	1,338	1,426
Total	2,303	2,340	2,554	2,398	2,321	2,560	2,437	2,561	2,408	2,538
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	140	109	99	88	96	89	66	70	82	87
65–74	224	205	169	149	160	150	121	106	97	116
75–84	698	634	640	611	561	561	475	483	457	457
85+	1,387	1,316	1,386	1,324	1,239	1,304	1,164	1,089	1,147	1,215
Total	2,449	2,264	2,294	2,172	2,056	2,104	1,826	1,748	1,783	1,875

Age-specific and age-standardised rates (per 100,000 population)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<65	1.7	2.1	2.2	1.8	1.6	2.1	1.9	1.7	1.3	1.7
65–74	48.7	38.9	44.2	43.6	42.5	42.6	41.3	39.3	34.0	31.4
75–84	243.6	227.2	242.4	234.7	200.6	214.4	205.5	207.4	180.9	182.0
85+	1,143.1	1,198.2	1,238.3	1,088.0	1,076.1	1,129.4	1,004.5	1,056.4	996.0	1,007.1
ASR	31.3	31.0	32.7	29.9	28.0	29.8	27.3	27.8	25.1	25.4
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	1.7	1.3	1.2	1.1	1.1	1.0	0.8	0.8	0.9	1.0
65–74	52.8	46.5	44.3	38.6	34.2	34.5	28.9	24.8	24.2	25.9
75–84	197.9	176.7	168.4	150.9	137.5	135.0	124.0	114.4	106.3	103.9
85+	944.4	858.4	829.2	765.8	688.1	709.4	622.3	557.0	549.9	570.9
ASR	23.6	20.9	20.2	18.4	16.8	16.6	14.0	13.2	13.0	13.2

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. No comparability factor was applied to the number of deaths. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A13: Deaths, age-specific and age-standardised death rates from rheumatic fever and rheumatic heart disease, males

Deaths (number)										
Age	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
<65	53	62	60	51	51	33	32	31	43	38
65–74	37	45	45	42	35	40	37	34	32	32
75–84	37	38	27	27	36	34	34	38	32	40
85+	13	4	14	13	11	11	13	7	18	15
Total	140	149	146	133	133	118	116	111	125	125
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	36	27	26	27	30	27	27	15	25	25
65–74	24	13	22	22	16	19	18	18	28	10
75–84	34	20	26	32	22	24	29	26	29	36
85+	15	7	10	20	14	13	23	24	18	18
Total	109	67	84	101	82	83	97	83	100	89

Age-specific and age-standardised rates (per 100,000 population)										
	1987	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
<65	0.5	0.6	0.5	0.5	0.5	0.3	0.3	0.3	0.4	0.3
65–74	5.2	6.1	6.0	5.5	4.4	4.9	4.4	3.9	3.6	3.6
75–84	12.3	12.1	8.2	7.9	10.2	9.4	9.1	10.0	8.1	9.7
85+	24.7	7.3	24.2	21.6	17.2	16.0	17.8	9.1	21.9	17.2
ASR	1.7	1.6	1.6	1.5	1.4	1.2	1.2	1.1	1.3	1.2
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.3	0.3
65–74	3.9	2.1	3.5	3.5	2.5	2.9	2.7	2.7	4.1	1.4
75–84	11.4	6.4	8.0	9.5	6.2	6.5	7.5	6.5	7.1	8.6
85+	23.5	10.3	13.7	25.8	17.1	15.2	26.2	26.5	18.5	17.2
ASR	1.5	0.9	1.1	1.3	1.0	1.0	1.1	1.0	1.1	0.9

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths from 1987 to 1996 were multiplied by a comparability factor of 0.69 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A14: Deaths, age-specific and age-standardised death rates from rheumatic fever and rheumatic heart disease, females

Deaths (number)										
Age	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
<65	77	74	55	56	64	50	57	45	69	43
65–74	67	79	79	57	76	71	72	44	60	66
75–84	77	69	95	90	80	82	70	100	82	71
85+	34	37	52	28	39	40	50	40	45	41
Total	255	259	281	231	259	243	249	229	256	221
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	52	30	33	31	35	47	28	37	34	34
65–74	49	36	44	43	35	40	41	21	27	35
75–84	80	60	60	50	53	61	68	63	68	58
85+	35	23	40	40	37	43	53	53	55	69
Total	216	149	177	164	160	191	190	174	184	196

Age-specific and age-standardised rates (per 100,000 population)										
	1987	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
<65	0.7	0.7	0.5	0.5	0.6	0.5	0.5	0.4	0.6	0.4
65–74	7.9	9.1	9.0	6.4	8.3	7.6	7.5	4.5	6.1	6.7
75–84	16.5	14.2	18.8	17.2	14.9	14.9	12.4	17.5	13.9	11.7
85+	24.1	25.6	34.8	18.3	24.5	23.9	28.3	21.6	23.1	20.0
ASR	2.3	2.3	2.4	2.0	2.1	1.9	1.9	1.8	1.9	1.6
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
<65	0.6	0.4	0.4	0.4	0.4	0.6	0.3	0.4	0.4	0.4
65–74	7.2	5.3	6.5	6.3	5.1	5.8	5.9	3.0	3.8	4.8
75–84	18.3	13.3	12.9	10.5	10.7	12.1	13.1	11.9	12.7	10.8
85+	23.4	14.7	24.1	22.8	20.2	22.7	27.3	26.7	26.5	31.7
ASR	2.2	1.5	1.7	1.5	1.5	1.7	1.6	1.4	1.5	1.5

Notes: Total deaths include small numbers with no stated age groups, hence age group numbers may not sum to totals. Deaths for 1987–1996 were coded to ICD-9; deaths for 1997–2006 were coded to ICD-10. Deaths for 1987–1996 were multiplied by a comparability factor of 0.69 before age-standardisation. Age-standardised directly to the 2001 Australian population—all ages.

Source: AIHW analysis of AIHW National Mortality Database.

Table A15: Average annual percentage change in age-specific and age-standardised death rates for cardiovascular disease and its key components

	Men		Women	
Condition/age	**1987–1996**	**1997–2006**	**1987–1996**	**1997–2006**
Cardiovascular disease				
35–44	–3.9	–1.3	–2.0	–1.4
45–54	–6.1	–3.4	–6.5	–1.9
55–64	–6.3	–6.3	–6.1	–7.8
65–74	–4.8	–7.6	–5.3	–7.8
75–84	–2.8	–5.6	–3.3	–5.5
85+	–1.7	–3.1	–1.7	–2.8
ASR (all ages)	–3.3	–5.0	–3.2	–4.5
Coronary heart disease				
35–44	–4.6	–2.7	–1.9	–2.8
45–54	–6.7	–3.7	–8.0	–3.9
55–64	–6.9	–6.9	–6.9	–9.6
65–74	–5.2	–8.5	–6.4	–9.9
75–84	–3.1	–6.5	–3.6	–6.7
85+	–1.3	–3.0	–0.8	–3.1
ASR (all ages)	–3.8	–5.6	–3.4	–5.5
Stroke				
35–44	–2.7	–3.1	–3.4	–2.3
45–54	–4.2	–3.3	–5.0	–0.7
55–64	–5.4	–6.6	–7.2	–6.8
65–74	–4.5	–6.9	–4.2	–6.3
75–84	–2.3	–4.5	–2.8	–4.7
85+	–1.3	–3.3	–1.3	–2.7
ASR (all ages)	–2.6	–4.5	–2.6	–3.9
Ischaemic stroke				
35–44	–3.9	–4.8	0.5	–9.4
45–54	–2.5	–4.6	–7.9	–5.1
55–64	–5.4	–7.6	–7.9	–5.9
65–74	–5.7	–10.1	–4.9	–8.0
75–84	–3.2	–9.2	–4.5	–8.8
85+	–4.0	–7.7	–3.8	–7.3
ASR (all ages)	–4.0	–8.5	–4.3	–7.7

(continued)

Table A15 (continued): Average annual percentage change in age-specific and age-standardised death rates for cardiovascular disease and its key components

	Men		Women	
Condition/age	**1987–1996**	**1997–2006**	**1987–1996**	**1997–2006**
Haemorrhagic stroke				
35–44	–2.5	–3.2	–3.8	–1.4
45–54	–3.4	–2.4	–4.5	–0.3
55–64	–4.0	–4.5	–6.8	–5.8
65–74	–2.8	–3.7	–3.5	–4.3
75–84	–1.3	–1.3	–1.3	–1.3
85+	–1.0	0.1	–3.6	–0.3
ASR (all ages)	–2.2	–2.1	–3.3	–2.1
Heart failure/cardiomyopathy				
<65	–3.9	–4.7	–2.5	–6.4
65–74	–1.9	–8.5	–3.4	–8.8
75–84	–1.6	–7.0	–3.2	–7.2
85+	–2.7	–6.0	–2.1	–6.0
ASR (all ages)	–2.5	–6.7	–2.6	–6.7
Rheumatic fever and rheumatic heart disease				
<65	–7.3	–5.0	–5.2	–2.6
65–74	–5.6	–3.5	–4.4	–5.8
75–84	–2.2	–2.1	–2.7	–2.8
85+	–0.7	2.8	–2.1	5.0
ASR (all ages)	–4.6	–2.0	–3.7	–2.2

Note: Ages less than 65 years were combined for heart failure/cardiomyopathy and for rheumatic fever and rheumatic heart disease, because the numbers of deaths in younger age groups were too few for accurate analysis.

Table A16: Death rates from coronary heart disease, OECD countries, 1980 and 2004

OECD country	1980	2004	Change 1980–2004
	Per 100,000 population	Per 100,000 population	Per cent
Japan	50.9	29.5	–42
France	73.5	39.1	–47
Spain	75.1	54.5	–27
Portugal	89.6	59.4	–34
Netherlands	167.2	61.5	–63
Switzerland	115.6	67.5	–42
Italy	123.2	72.2	–41
Luxembourg	137.7	72.5	–47
Denmark	261.2	80.4	–69
Greece	76.3	83.0	9
Norway	200.6	84.6	–58
Mexico	67.0	86.2	29
Australia	**242.5**	**86.8**	**–64**
Canada	231.8	88.4	–62
Sweden	276.8	99.4	–64
Germany	162.2	104.2	–36
Iceland	224.5	106.o	–53
Austria	147.1	108.3	–26
United Kingdom	247.7	108.8	–56
Poland	101.5	110.9	9
United States	237.1	112.2	–53
Ireland	264.9	118.4	–55
New Zealand	277.2	120.8	–56
Finland	265.2	137.2	–48
Hungary	217.0	220.6	2

Notes: Mexico: 1981, 2004; Italy, Portugal: 1980, 2003. Age-standardised to the 1980 total OECD population. Uses ICD-9 codes 410–414 and ICD-10 codes I20–I25. Excludes Belgium, Korea, Czech Republic, Slovak Republic and Turkey due to missing data.

Source: OECD 2009.

Table A17: Death rates from cerebrovascular disease, OECD countries, 1980 and 2004

OECD country	1980	2004	Change 1980–2004
	Per 100,000 population	Per 100,000 population	Per cent
Switzerland	87.4	29.2	–67
France	91.8	30.6	–67
Canada	70.2	31.2	–56
United States	70.0	35.7	–49
Austria	146.7	40.1	–73
Australia	**110.7**	**40.2**	**–64**
Iceland	67.0	41.1	–39
Ireland	129.7	43.7	–66
Spain	130.3	44.0	–66
Netherlands	80.4	45.2	–44
Germany	126.8	45.4	–64
Norway	95.4	45.4	–52
Mexico	62.4	45.9	–26
Sweden	75.9	47.0	–38
Japan	172.3	50.7	–71
New Zealand	120.2	51.1	–57
Luxembourg	177.0	53.4	–70
Finland	108.9	53.7	–51
Denmark	77.0	55.4	–28
United Kingdom	114.1	55.9	–51
Italy	116.7	56.7	–51
Poland	75.1	88.1	17
Greece	148.9	98.6	–34
Portugal	273.9	111.2	–59
Hungary	211.7	119.5	–44

Notes: Mexico: 1981, 2004; Italy, Portugal: 1980, 2003. Age-standardised to the 1980 total OECD population. Uses ICD-9 codes 430–438 and ICD-10 codes I60–I69. Excludes Belgium, Korea, Czech Republic, Slovak Republic and Turkey due to missing data.

Source: OECD 2009.

Table A18: Proportion of population aged 65 years and over, OECD countries, 1960 and 2007

OECD country	1960	2007	Change 1960–2007
		Per cent	
Turkey	3.5	7.1	103
Korea	2.9	9.9	241
Ireland	10.9	10.8	–1
Iceland	8.1	11.5	42
Slovak Republic	6.9	11.9	72
New Zealand	8.7	12.5	44
United States	9.2	12.6	37
Australia	**8.5**	**13.1**	**54**
Canada	7.6	13.4	76
Poland	5.8	13.4	131
Luxembourg	10.8	14.0	30
Czech Republic	9.6	14.5	51
Netherlands	9.0	14.6	62
Norway	10.9	14.6	34
Denmark	10.6	15.5	46
United Kingdom	11.7	16.0	37
Hungary	9.0	16.1	79
Switzerland	10.7	16.3	52
France	11.6	16.4	41
Finland	7.3	16.5	126
Spain	8.2	16.6	102
Austria	12.2	17.0	39
Belgium	12.0	17.1	43
Sweden	11.8	17.4	47
Greece	8.1	18.6	130
Italy	9.0	19.7	119
Germany	10.8	20.2	87
Japan	5.7	21.5	277

Note: Mexico and Portugal have been excluded due to missing 1960 data.

Source: OECD 2009.

Table A19: Proportion of population who are daily smokers, OECD countries, various years

OECD country	Initial year	Latest year	Change over period
		Per cent	
Sweden (1990, 2006)	25.8	14.5	–44
United States (1990, 2007)	25.5	15.4	–40
Australia (1989, 2007)	**28.6**	**16.6**	**–42**
New Zealand (1990, 2007)	28.0	18.1	–35
Canada (1990, 2007)	28.2	18.4	–35
Iceland (1990, 2007)	30.3	19.4	–36
Portugal (1987, 2006)	19.0	19.6	3
Belgium (1990, 2008)	32.0	20.0	–38
Luxembourg (1987, 2008)	33.0	20.0	–39
Switzerland (1992, 2007)	28.2	20.4	–28
Finland (1990, 2007)	25.9	20.6	–20
Norway (1990, 2008)	35.0	21.0	–40
United Kingdom (1990, 2007)	30.0	21.0	–30
Italy (1990, 2008)	27.8	22.4	–19
Germany (1989, 2005)	25.1	23.2	–8
Denmark (1990, 2006)	44.5	25.0	–44
France (1990, 2006)	30.0	25.0	–17
Korea (1989, 2005)	34.6	25.3	–27
Japan (1990, 2008)	37.4	25.7	–31
Poland (1992, 2004)	41.5	26.3	–37
Mexico (1988, 2002)	25.8	26.4	2
Spain (1989, 2006)	35.9	26.4	–26
Turkey (1989, 2008)	43.6	27.4	–37
Ireland (1990, 2007)	30.0	29.0	–3
Netherlands (1990, 2007)	37.0	29.0	–22
Greece (1990, 2008)	38.5	39.7	3

Notes: The proportion of daily smokers is defined as the percentage of the population reporting smoking every day. Care should be taken as methods and scope vary between countries. For example, the survey population is generally 15 years and over but differs between countries. Data for the nearest available years have been taken when data for 1990 and 2007 are not available. Czech Republic, Hungary, Slovak Republic and Austria have been excluded due to missing data.

Source: OECD 2009.

Table A20: Proportion of population who are overweight or obese, OECD countries, various years

OECD country	Initial year	Middle year	Latest year
		Per cent	
		Estimates based on measured data	
Japan (1980, 1990, 2006)	19.4	22.0	25.1
Slovak Republic (2007)			46.2
Czech Republic (2005)			52.0
Luxembourg (1997, 2007)		47.0	54.8
Australia (1980, 1989, 1999)	**36.6**	**43.8**	**58.4**
United Kingdom (1980, 1991, 2007)	36.0	49.0	61.0
New Zealand (1989, 1997, 2007)	44.9	53.8	62.6
United States (1978, 1991, 2006)	47.4	56.0	67.3
		Estimates based on self-reported data	
Korea (2005)			30.5
France (1990, 2006)		29.7	37.0
Switzerland (1992, 2007)		30.3	37.3
Norway (1995, 2005)		32.3	43.0
Turkey (2003)			43.4
Sweden (1998, 2007)		40.4	44.0
Belgium (1997, 2004)		42.0	44.1
Denmark (2005)			44.6
Poland (1996, 2004)		43.1	45.3
Italy (1994, 2007)		38.1	45.5
Netherlands (1981, 1990, 2007)	33.3	34.9	45.5
Canada (1994, 2007)		45.6	46.8
Austria (1991, 2006)		42.0	47.7
Finland (1980, 1990, 2007)	37.2	37.7	48.9
Germany (2005)			49.6
Ireland (1997, 2007)		43.0	51.0
Spain (1993, 2006)		43.1	51.1
Portugal (2006)			51.6
Hungary (2003)			52.8
Greece (2008)			58.9
Iceland (1990, 2007)		36.5	60.2
Mexico (2006)			69.5

Notes: Overweight or obesity is defined as a body mass index (BMI) of 25 or above. Countries with estimates based on measured data are shown separately from those based on self-reported data. Care should be taken as methods and scope vary between countries. The survey population is 'adults' but the age range surveyed varies between countries.

Source: OECD 2009.

Glossary

Aboriginal A person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the community in which he or she lives.

acute Coming on sharply and often brief, intense and severe.

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. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, then the disease rates that would have occurred with that structure are calculated and compared.

angina Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs, as in exercise. See also *unstable angina* and *cardiovascular disease.*

associated cause(s) of death Any condition(s), diseases and injuries—other than the *underlying cause*—considered to contribute to a death. See also *cause of death.*

atherosclerosis A process in which fatty and fibre-like deposits build up on the inner walls of arteries, often forming *plaques* that can then cause blockages. It is the main underlying condition in *heart attack, angina, stroke* and peripheral vascular disease.

atrial fibrillation A condition marked by an irregular, rapid heart beat. It arises because the heart's collecting chambers (atria) stop beating rhythmically and quiver uselessly (fibrillate).

blood cholesterol Fatty substance produced by the liver and carried by the blood to supply the rest of the body. Its natural function is to supply material for cell walls and for steroid hormones, but if levels in the blood become too high this can lead to *atherosclerosis* and heart disease.

body mass index (BMI) The most commonly used method of assessing whether a person is normal weight, underweight, overweight or obese. It is calculated by dividing the person's weight (in kilograms) by their height (in metres) squared; that is, kg ÷ m^2. For both men and women, underweight is a BMI below 18.5, acceptable weight is from 18.5 to less than 25, overweight is 25 and above (includes obese), and obese is 30 and over.

cardiomyopathy Disease of the heart muscle when it becomes dilated or enlarged, thickened, restrictive or stiff.

cardiovascular disease Any disease of the *circulatory system*, namely the heart (cardio) or blood vessels (vascular). Includes *heart attack, angina, stroke* and peripheral vascular disease. Also known as circulatory disease.

carotid stenosis Narrowing of the blood vessels in the neck that supply blood to the brain (the carotid arteries).

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 10th revision of the *International Classification of Diseases*. The underlying cause is defined as the disease that initiated the train of events leading directly to death. Deaths from injury or

poisoning are classified according to the circumstances of the violence that produced the fatal injury, rather than to the nature of the injury. See also *underlying cause of death*.

cerebrovascular disease Any disorder of the blood vessels supplying the brain or its covering membranes. A notable and major form of cerebrovascular disease is stroke.

cholesterol See *blood cholesterol*.

chronic Persistent and long lasting.

chronic diseases Term applied to a diverse group of diseases, such as heart disease, cancer and arthritis, that tend to be long lasting and persistent in their symptoms or development. Although these features also apply to some communicable diseases (infections), the term is usually confined to non-communicable diseases.

circulatory disease See *cardiovascular disease* (alternative name).

circulatory system The heart along with the blood vessels, comprising the system that circulates blood around the body to supply oxygen and nutrients to all body tissues and to carry away waste products from them. Also known as the cardiovascular system.

condition (health condition) A broad term that can be applied to any health problem, including symptoms, diseases, and various risk factors such as high blood cholesterol, obesity and so forth. Often used synonymously with disorder or *problem*.

coronary heart disease Disease due to blockages in the heart's own (coronary) arteries, expressed as *angina* or a *heart attack*. Also known as *ischaemic heart disease*.

coronary revascularisation Procedures used to restore good blood supply to the heart; for example, coronary angioplasty, which involves inserting a catheter with a balloon into a narrowed coronary artery.

crude death rate The number of deaths in a given period divided by the size of the corresponding population indexed to 100,000.

diabetes (diabetes mellitus) A chronic condition in which the body cannot properly use its main energy source, the sugar glucose. This is due to a relative or absolute deficiency in insulin, a hormone produced by the pancreas. Insulin helps glucose enter the body's cells from the bloodstream and then be processed by them. Diabetes is marked by an abnormal build-up of glucose in the blood and it can have serious short- and long-term effects. For the three main types of diabetes see *Type 1 diabetes*, *Type 2 diabetes* and gestational diabetes.

disease A physical or mental disturbance involving *symptoms* (such as pain or feeling unwell), dysfunction or tissue damage, especially if these symptoms and signs form a recognisable clinical pattern.

heart attack Life-threatening emergency 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 functions less effectively in pumping blood around the body. It can result from a wide variety of diseases and conditions that can impair or overload the heart, such as heart attack, other conditions that damage the heart muscle directly (cardiomyopathies), high blood pressure, or a damaged heart valve.

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.

International Classification of Diseases International Statistical Classification of Diseases and Related Health Problems. The World Health Organization's internationally accepted classification of death and disease. The 10th Revision (ICD-10) is currently in use. In this report, causes of death classified before 1979 under previous revisions have been reclassified to ICD-10 by the AIHW.

ischaemic heart disease *Heart attack* and *angina* (chest pain). Also known as *coronary heart disease*.

mortality Death.

myocardial infarction Term still commonly used to mean a *heart attack*, but more correctly refers only to those heart attacks that have caused some death of heart muscle.

non-Indigenous People who have declared that they are not of Aboriginal or Torres Strait Islander descent.

obesity Marked degree of overweight, defined as *body mass index* of 30 or over. See also *overweight*.

Organisation for Economic Co-operation and Development (OECD) An organisation of 30 developed countries, including Australia.

other Australians People who have declared that they are not of Aboriginal or Torres Strait Islander descent, or whose status is not known.

overweight Defined as a body mass index of 25 or over. See also *obesity*.

plaque (atherosclerotic) A localised area of *atherosclerosis*, especially when raised or built up, and which may cause blockages in arteries.

problem (health problem) A poorly defined term often used synonymously with *condition* or disorder. May also be used more specifically to refer to symptoms and other health factors that a person or the doctor perceives as a concern—a problem—that needs attention, and which, for example, the person may record in a survey or their doctor may list in clinical notes to form a 'problem list'.

rheumatic fever An acute, serious disease that affects mainly children and young adults and can damage the heart valves, the heart muscle and its lining, the joints and the brain. It is brought on by a reaction to a throat infection by a particular bacterium. Now very uncommon in the non-Indigenous population, it is still at unacceptably high levels among Indigenous Australians living in remote areas. See *rheumatic heart disease.*

rheumatic heart disease Chronic disease from damaged heart valves caused by earlier attack(s) of *rheumatic fever.*

risk factor Any factor that represents a greater risk of a health disorder or other unwanted condition or event. Some risk factors are regarded as causes of disease, others are not necessarily so. Along with their opposites, protective factors, risk factors are known as determinants.

stroke When an artery supplying blood to the brain suddenly becomes blocked or bleeds. Often causes paralysis of parts of the body normally controlled by that area of the brain, or speech problems and other symptoms.

Torres Strait Islander A person of Torres Strait Islander descent who identifies as a Torres Strait Islander.

transient ischaemic attack A 'mini' *stroke*, with temporary problems in speech or paralysis that last for 24 hours or less, often only minutes. It is a strong warning sign of a more severe stroke.

Type 1 diabetes A form of *diabetes* mostly arising among children or younger adults, marked by a complete lack of insulin and needing insulin replacement for survival.

Type 2 diabetes The most common form of *diabetes*, occurring mostly in people aged 40 years and over, and marked by reduced or less effective insulin.

underlying cause of death The condition, disease or injury initiating the sequence of events leading directly to death; that is, the primary or main cause. Compare with *associated cause(s) of death.*

unstable angina A form of *angina* that is more dangerous than normal angina but less so than a *heart attack*. It can feature chest pain that occurs at rest; in someone who already has angina it can be marked by new patterns of onset with exertion or by pain that comes on more easily, more often or for longer than previously.

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