Heart, stroke and vascular diseases

Australian facts
2004

Contents

Preface

The prevention and control of heart, stroke and vascular diseases remain a significant challenge for Australia. Despite major falls in death rates over the past 30 years and advances in treatment and care, heart, stroke and vascular diseases collectively are still Australia's leading cause of premature death and disability. They are also the most expensive disease group in Australia in terms of health expenditure. Some groups within the community have much higher rates of illness and death from these diseases than others, especially Aboriginal and Torres Strait Islander peoples and those who are at a socioeconomic disadvantage.

There is a continuing need to inform the public, health professionals and policy makers about the considerable scope for prevention, progress in treatment and care, and those people who may need extra attention.

Heart, Stroke and Vascular Diseases—Australian Facts 2004 is the third report in a series by the National Centre for Monitoring Cardiovascular Disease. It aims to present information and statistics about:

- patterns and trends in heart, stroke and vascular diseases
- contributing risk factors and associated conditions
- treatment and care.

A major theme in this edition is health inequalities. A table summarising available data on health inequalities is provided for each of the diseases and risk factors.

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The report is available on the Institute's web site <http://www.aihw.gov.au>

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Highlights

The epidemic of heart, stroke and vascular diseases continues…

- Heart, stroke and vascular diseases kill more Australians than any other disease group—50,294 deaths (37.6% of all deaths) in 2002.
- Around 3.67 million Australians are affected by heart, stroke and vascular diseases.
- 1.10 million Australians are disabled long-term by heart, stroke and vascular diseases.
- The prevalence of heart, stroke and vascular conditions increased by 18.2% over the last decade.
- The total burden of heart, stroke and vascular diseases is expected to increase over the coming decades due to the growing number of elderly Australians, among whom these diseases are most common.

Some Australians are more likely to suffer from heart, stroke and vascular diseases than others.

- Aboriginal and Torres Strait Islander peoples compared with other Australians are:
  - 2.6 times as likely to die from heart, stroke and vascular diseases
  - 19 times as likely to die from acute rheumatic fever and chronic rheumatic heart disease
  - two to three times as likely to be hospitalised for coronary heart disease and heart failure
  - six to eight times as likely to be hospitalised for acute rheumatic fever and chronic rheumatic disease
  - more likely to smoke have high blood pressure, be obese, have diabetes, drink alcohol at harmful levels, and have end-stage renal disease.
- Australians in the most disadvantaged groups compared with those in the most advantaged groups are:
  - more likely to die from heart, stroke and vascular diseases
  - more likely to smoke daily, be obese and have diabetes.

Coronary heart disease and stroke are Australia's first and second biggest killers—not surprising given that:

- 90% of Australian adults have at least one modifiable risk factor for heart, stroke and vascular diseases and 25% have three or more risk factors.
- The proportion of Australian adults with risk factors is high:
  - 60% are overweight—7.42 million adults
  - 54% are not sufficiently active to achieve health benefits—7.27 million adults
  - 51% have high blood cholesterol—6.40 million adults
  - 30% have high blood pressure—3.69 million adults
  - 20% smoke daily—3.06 million adults
  - 10% drink at levels considered harmful to their health—1.54 million adults
  - 8% have diabetes—945,600 adults.
- Some risk factors continue to show unfavourable trends:
  - the prevalence of obesity has doubled over the last 20 years
  - the prevalence of diabetes has doubled over the last 20 years
  - the prevalence of people doing insufficient physical activity for health benefits increased by 10% between 1997 and 2000
  - the prevalence of high blood cholesterol has not fallen over the last 20 years.

However, death rates from heart, stroke and vascular diseases are falling, coinciding with:

- a 21% and 16% fall in smoking rates for males and females over the last decade
- a 50% fall in the prevalence of high blood pressure since the 1980s
- a 25% fall in the incidence of coronary events over the last decade
- falls in coronary heart disease deaths in hospital, suggesting better survival of those with the disease
- rapid increases between 1997 and 2000 in the community use of prescription drugs to lower blood pressure, drugs to lower blood cholesterol and antiplatelet drugs.

1

Introduction

1

Background

Significant progress has been made in recent years in improving the cardiovascular health of Australians. Death rates have fallen markedly, levels of some risk factors have improved and there have been major advances in treatment.

Nevertheless, heart, stroke and vascular diseases[1] continue to impose a heavy burden on Australians in terms of illness, disability and death, and the associated direct health care expenditure exceeds that of any other disease group. The total burden is expected to increase over the coming decades due to the growing number of elderly Australians, among whom heart, stroke and vascular diseases are most common.

Some groups within the community have much higher rates of illness and death from these diseases than others, especially Aboriginal and Torres Strait Islander peoples and those who are at a socioeconomic disadvantage.

A large part of the deaths, disability and illness caused by these diseases is preventable. Many Australians remain at higher risk of the diseases through tobacco smoking, being physically inactive, eating a diet high in saturated fats and being overweight. Levels of blood pressure and blood cholesterol among many Australians are also higher than recommended, as is the intake of alcohol. Psychosocial factors, such as depression, social isolation and lack of quality social support can also affect the development of heart, stroke and vascular diseases. Risk factors themselves are strongly influenced by wider circumstances. The importance of factors such as people's economic resources, education, living and working conditions, social support, and access to health care and social services is widely recognised.

National Strategy

A National Strategy for Heart, Stroke and Vascular Health in Australia has been developed 'to improve the cardiovascular health status of the Australian population to be among the best in the world'. The strategy is an initiative of the National Heart, Stroke and Vascular Health Strategies Group of the National Health Priority Action Council.

In broad terms the strategy sets out to:

- progressively reduce the inequalities in health outcomes associated with heart, stroke and vascular disease, particularly through a focus on preventive and management practices for Aboriginal and Torres Strait Islander peoples;
- improve care and management of heart, stroke and vascular diseases across the continuum of care, and optimise the outcomes by identifying and promoting proven interventions;
- support the dissemination and uptake of best preventive practices for heart, stroke and vascular diseases, and promote consistency in these practices; and
- enhance the role of consumers in maintaining and managing their own vascular health.

The strategy identifies the following seven 'arenas for national action' where there is most potential for improvement, and identifies goals and priorities for national action against each arena:

- heart, stroke and vascular diseases in Aboriginal and Torres Strait Islander peoples
- consumer engagement and information
- prevention of heart, stroke and vascular diseases
- cardiac emergency and acute care
- stroke emergency and acute care
- chronic heart failure
- rehabilitation after an acute heart, stroke or vascular event.

Copies of the strategy can be obtained electronically through the web site of the Australian Government Department of Health and Ageing (DoHA) at <http://www.health.gov.au>.

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1   Heart, stroke and vascular diseases cover all diseases and conditions of the heart and blood vessels (also known as cardiovascular or circulatory diseases).

Purpose and structure of this report

The National Centre for Monitoring Cardiovascular Disease at the Australian Institute of Health and Welfare (AIHW) produced this report in collaboration with the DoHA and the National Heart Foundation of Australia (NHFA). The report aims to provide the community, health professionals and policy makers with a concise summary of the latest available data and trends in heart, stroke and vascular diseases in Australia. As such, there are many medical details it does not cover. It is not designed to be a source of personal medical advice.

The report includes three main chapters, on diseases, risk factors and associated conditions, and treatment and care. Within these chapters are sections on the main diseases and on selected risk factors. There are also sections on general practice care, drug treatment, procedures in hospital, and rehabilitation and secondary prevention. The focus section for this report is on Aboriginal and Torres Strait Islander peoples.

Methods and data sources are included at the back of the report. More detailed statistical tables can be found in the National Cardiovascular Disease Database on AIHW's web site at <http://www.aihw.gov.au>.

New in the 2004 edition

In the 2004 edition of this report, there is a new section on congenital heart diseases, which account for a large proportion of malformations present at birth. In the chapter on risk factors and associated conditions, there are new sections on alcohol consumption—a risk factor for particular types of stroke—and kidney failure. The treatment and care chapter includes a new section on general practice care.

The overarching theme of this report is health inequalities, one of the major contemporary issues for heart, stroke and vascular health in Australia. To focus on inequalities, a table at the end of each of the disease and risk factor sections summarises available information on health inequalities.

Historical perspective

Before looking at the sections which contain the latest information, it is useful to look at the history of heart, stroke and vascular diseases in Australia.

Age-standardised death rates associated with the 20th century epidemic of coronary heart disease and stroke peaked in 1968 and have since fallen by around 70%. These falls are dramatic, especially when compared with declines of around 36% in deaths from other diseases.

The dramatic decline in deaths from heart, stroke and vascular diseases is illustrated by the percentage of all age-standardised deaths that are due to these diseases. In 1968, heart, stroke and vascular diseases accounted for 56% of all deaths in Australia. By 2002, this figure had fallen to 38%. However, these diseases were still the leading cause of death in Australia in 2002, followed by cancers which accounted for 29% of all deaths.

Despite these declines, death rates remain higher than those in many other developed countries, indicating the potential for further declines in death rates from heart, stroke and vascular diseases in Australia.

Death rates from CHD and stroke, 1950–2002

Number per 100,000 population
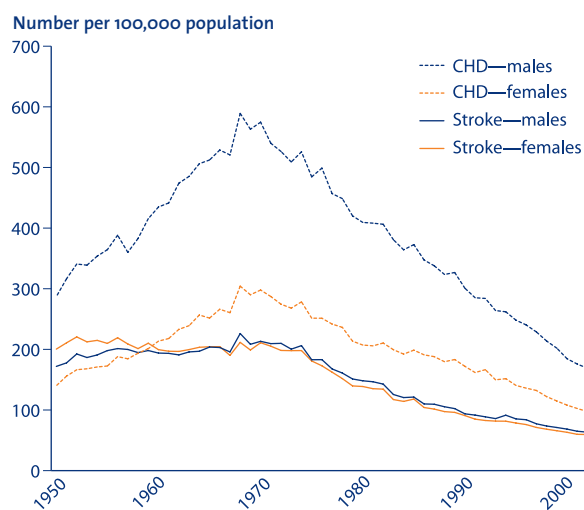
Notes

1. CHD = coronary heart disease.

2. Age-standardised to the 2001 Australian population.

Source: AIHW National Mortality Database.

The fall in death rates from coronary heart disease may be due to the reduced occurrence of heart attacks and/ or better survival of those who do have a heart attack.

For stroke, a decline in attack rates is likely to have been the main reason for the fall in stroke death rates.

The declines in heart attack and stroke rates suggest that levels of risk factors in the population may have improved. Consistent with this, blood pressure levels, tobacco smoking and saturated fat in the diet have declined. However, the proportion of Australians doing sufficient physical activity to provide a health benefit has fallen, and the proportion of Australians who are overweight and obese has risen sharply. Blood cholesterol levels have remained relatively constant since the 1980s.

Improved survival rates after heart attack suggest that emergency interventions are becoming more effective, along with better long-term treatment for these patients, including the increased use of particular drugs such as angiotensin-converting enzyme (ACE) inhibitors, statins, thrombolytics and antiplatelet agents.

The increased use and effectiveness of drugs to lower blood pressure and a dramatic increase in the use of cholesterol-lowering drugs would have also played a role in reducing the risk of heart attacks. The rise in coronary revascularisation (procedures used to restore good blood supply to the heart) from the 1980s would also be expected to have reduced death rates.

For stroke, it is likely that the increased use of blood pressure-lowering drugs, antiplatelet agents (such as aspirin) and anticoagulant therapy (warfarin) have contributed to the decline in death rates. Stroke units are known to improve survival and reduce dependency after stroke, and their increased use in recent years will have contributed to the decline.

In summary, the evidence suggests that the declines in death rates from coronary heart disease and stroke have been influenced by changes in some risk factors, drug use, emergency care, medical and surgical treatment, rehabilitation and follow-up care.

Where data are available, these factors are considered in more detail in the sections that form the main body of this report.

Current situation

The latest national information on heart, stroke and vascular disease deaths, prevalence and disability, and risk factor prevalence is shown in the table. These diseases and risk factors are described in the following chapters.

Number of deaths and number of people with a risk factor in Australia

Number of deaths in Australia[a]	Males	Females
Coronary heart disease	13,855	12,208
Stroke	4,969	7,564
Peripheral vascular disease	1,347	1,234
Heart failure	1,033	1,696
Acute rheumatic fever and chronic rheumatic heart disease	83	191
Other heart, stroke and vascular diseases	2,701	3,413
Total heart, stroke and vascular diseases	*23,988*	*26,306*
Congenital heart and vascular diseases	125	99
All causes of death	**68,885**	**64,822**

Number of Australians with a risk factor	Men	Women
Daily smoking[b]	1,627,000	1,429,100
Insufficient physical activity for health[c]	3,581,500	3,684,400
'Risky' or 'high risk' alcohol consumption[b]	790,700	747,200
High blood pressure[d]	1,895,500	1,794,000
High blood cholesterol[d]	3,133,300	3,264,400
Overweight[d]	4,120,400	3,299,300
Diabetes[d]	497,700	447,800

(a) Data are from 2002 and include people of all ages.

(b) Data are from 2001 and include those aged 14 years and over.

(c) Data are from 2000 and include those aged 18–75 years.

(d) Data are from 1999–00 and include those aged 25 years and over.

Sources: AIHW National Mortality Database; 1999–00 AusDiab Study; 2000 National Physical Activity Survey; 2001 National Drug Strategy Household Survey.

Number of people with heart, stroke and vascular diseases and associated disabilities in Australia, all ages, 1998 and 2001

Disease	Prevalence (2001)	Disability (1998)	
		Need assistance with daily activities	Total disability[a]
Coronary heart disease	355,600	86,000	224,400
Stroke	217,500	139,200	230,300

(a) Total disability includes those who need assistance or have difficulties with activities of daily living, have a schooling or employment restriction, or have no difficulty with these activities but use aids or equipment.

(b) Care should be taken in comparing the prevalence and disability data as they are obtained from separate surveys conducted over different time periods and with different scopes.

Sources: 1998 Disability, Ageing and Carers Survey; 2001 National Health Survey.

Health inequalities

Certain sections of the Australian population experience a greater burden of ill health due to heart, stroke and vascular diseases than others, reflecting broader social and economic disadvantages.

Indigenous Australians have higher rates of death and illness from heart, stroke and vascular diseases. Death rates are 2.6 times and hospitalisation rates 1.4 times those of other Australians. These are likely to be underestimates due to the under-identification of Indigenous people in hospital and death records. Indigenous Australians have one of the highest rates of acute rheumatic fever and chronic rheumatic heart disease in the world, with death rates from these conditions 19 times those of other Australians. Indigenous Australians are also more likely to smoke, undertake no physical activity, have high blood pressure, be overweight, be obese, have diabetes, drink alcohol at harmful levels and have kidney failure.

Australians who are at a socioeconomic disadvantage are also more likely to die from heart, stroke and vascular diseases than other Australians. There are also differences in risk factor profile, with daily smoking, obesity and diabetes all more prevalent among the most disadvantaged.

Further reading

ABS 1999. 1998 disability, ageing and carers: summary of findings, Australia. ABS Cat. No. 4430.0. Canberra: ABS.

AIHW 2004 (forthcoming). Health system expenditure on disease and injury in Australia, 2000–01. Preliminary estimates. Canberra: AIHW.

AIHW 2003. GRIM (General Record of Incidence of Mortality) books. Canberra: AIHW.

AIHW 2002. Australia's health 2002. AIHW Cat. No. AUS 25. Canberra: AIHW.

DoHA 2004 (forthcoming). National strategy for heart, stroke and vascular health in Australia. Canberra: DoHA.

Aboriginal and Torres Strait Islander peoples

2

Key points

- Indigenous Australians have higher rates of death and illness from heart, stroke and vascular diseases than other Australians. In 2000–02, death rates were 2.6 times as high and hospitalisation rates 1.4 times as high in 2001–02 as for other Australians.

- These rates underestimate the extent of death and illness among Indigenous Australians due to the under-identification of Indigenous people in hospital and death records.

- Based on self-reports from the National Health Survey, around one in five Indigenous Australians (46,600 people) had heart, stroke and vascular conditions in 2001. The age-standardised prevalence in Indigenous Australians (19%) was not significantly different from that of other Australians (17%).

- Indigenous Australians have one of the highest rates of acute rheumatic fever and chronic rheumatic heart disease in the world.

- Tobacco smoking, high blood pressure, overweight, obesity, harmful alcohol consumption, poor nutrition, diabetes and kidney failure are all more prevalent among Indigenous Australians.

Aboriginal and Torres Strait Islander peoples continue to suffer a substantially greater burden of ill health than other Australians. This health disadvantage begins at an early age and continues throughout adult life. It reflects the broader social and economic disadvantages faced by Indigenous Australians.

Indigenous Australians experience higher rates of death and illness from heart, stroke and vascular diseases than other Australians. In 2001–02, death rates were 2.6 times as high and hospitalisation rates 1.4 times as high as for other Australians. These rates are likely to underestimate the extent of death and illness among Indigenous Australians due to the under-identification of Indigenous people in hospital and death records. Indigenous Australians continue to have less favourable risk factor profiles than other Australians, notably tobacco smoking, overweight, harmful alcohol consumption and poor nutrition. Furthermore, depression, social isolation and lack of quality social support are recognised as significant risk factors for heart, stroke and vascular diseases.

Data quality

The availability and quality of data about Indigenous Australians are limited by a number of factors that include:

- uncertainties in the estimation of the size and composition of the Indigenous Australian population;

- incomplete identification of Indigenous Australians in administrative data collections such as hospital records, and birth and death registrations; and

- issues related to the collection of individual and household survey data about Indigenous Australians living in remote areas and the relevance of the questions and concepts used.

In addition, changes over time in the availability and quality of data make the assessment of trends difficult and potentially misleading (see **Methods and data sources** for further information).

The AIHW and the Australian Bureau of Statistics (ABS), in partnership with state and territory authorities, are making considerable efforts to improve the completeness of Indigenous identification in a number of key data collections.

Age structure

The Indigenous Australian population has a younger age structure than other Australians. At 30 June 2001, the median age of Indigenous Australians was around 21 years, compared with 36 years for other Australians.

How many Aboriginal and Torres Strait Islander peoples have heart, stroke and vascular diseases?

Based on self-reports from the National Health Survey, around one in five Aboriginal and Torres Strait Islander peoples had long-term heart, stroke and vascular conditions in 2001. This corresponds to an estimated 46,600 people affected. The age-standardised prevalence of these conditions among Indigenous Australians (19%) was not significantly different from that of other Australians (17%).

Since 1995, the prevalence of these conditions in non-remote areas declined by 33% for Indigenous Australians and 19% for other Australians.

The prevalence of heart, stroke and vascular conditions for Indigenous Australians was similar among males and females (18% and 21% respectively). The prevalence of these conditions increased rapidly from 35 years of age, rising from 16% among 35–44-year-olds to 31% among 45–54-year-olds, and to 47% for those aged 55 years and over. Indigenous Australians living in remote areas were more likely to report heart, stroke and vascular conditions than those living in non-remote areas (24% compared with 18%).

Despite the apparent similar overall prevalence rate among Indigenous and other Australians, age-standardised hospitalisation and death rates from heart, stroke and vascular diseases for Indigenous Australians were 1.4 and 2.6 times as high, respectively, as for other Australians in 2000–02. Also, Indigenous Australians have one of the highest rates of acute rheumatic fever and chronic rheumatic heart disease in the world.

Incidence of acute rheumatic fever

Acute rheumatic fever is frequently misdiagnosed or underreported and, therefore, the true incidence is underestimated.

In 2002, there were 58 people identified with acute rheumatic fever in the Top End of the Northern Territory and 27 in Central Australia—all were Aboriginal and Torres Strait Islander peoples. In the Top End most cases (83%) required hospitalisation and 35% were for recurrences. In Central Australia, 30% were recurrences. Recurrences are defined as cases diagnosed in someone with established rheumatic heart disease three months or more after the most recent episode of acute rheumatic fever. Children aged 5–14 years accounted for the majority of cases (55%), with an incidence rate of 346 per 100,000 population in the Top End of the Northern Territory and 365 per 100,000 population in Central Australia. While the peak age group is 5–14 years, cases do occur in adults but are rare in children under four years of age. Females accounted for over two-thirds of acute rheumatic fever in the Top End of the Northern Territory.

Prevalence of rheumatic heart disease

In 2002, there were 696 people with chronic rheumatic heart disease in the Top End of the Northern Territory and 283 people in Central Australia. Almost all of these (92–94%) were Aboriginal or Torres Strait Islander peoples. The prevalence rate among Aboriginal or Torres Strait Islander peoples was 16.6 per 1,000 population in the Top End of the Northern Territory and 12.5 per 1,000 in Central Australia, compared with 1.7 per 1,000 and 0.6 per 1,000 among other Australians living in the Top End and Central Australia, respectively.

Chronic rheumatic heart disease occurs mainly in those aged 15 years and over. In the Top End of the Northern Territory 8% of cases occur in those aged 5–14 years. Results from Central Australia indicate that over two-thirds of cases occur in the 15–44-year age range.

Hospitalisation for heart, stroke and vascular diseases

In 2001–02, there were 6,836 hospitalisations with a principal diagnosis of heart, stroke and vascular diseases among Aboriginal and Torres Strait Islander peoples. The rate for these conditions was 1.4 times as high as for other Australians.

The largest disparity in hospitalisations exists for acute rheumatic fever and chronic rheumatic heart disease. Indigenous males and females were six and eight times as likely to be hospitalised for these conditions as other Australians. For heart failure and coronary heart disease, hospitalisation rates were also considerably higher among Indigenous Australians than for other Australians (between 1.5 and three times as high).

The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use by Indigenous Australians (see **Methods and data sources** for more information).

Hospitalisations for heart, stroke and vascular diseases[a] for Aboriginal and Torres Strait Islander peoples, 2001–02

	Indigenous Australian males				Indigenous Australian females			
	No.	%[b]	Rate[c]	Rate ratio[d]	No.	%[b]	Rate[c]	Rate ratio[d]
Acute rheumatic fever & chronic rheumatic heart disease	125	0.2	0.5	5.7	216	0.2	0.9	8.1
Coronary heart disease	1,568	1.9	15.9	1.4	1,243	1.1	11.6	2.2
Heart failure	516	0.6	5.9	2.4	507	0.5	5.7	3.1
Peripheral vascular disease	90	0.1	1.3	0.7	50	0.0	0.6	0.7
Stroke	238	0.3	2.8	1.2	304	0.3	3.4	1.9
Other heart, stroke and vascular diseases	951	1.2	8.7	0.9	1,028	0.9	8.3	1.0
Total heart, stroke and vascular diseases	**3,488**	**4.3**	**35.0**	**1.3**	**3,348**	**3.1**	**30.6**	**1.7**

(a) Data are for public and most private hospitals.

(b) Percentage of all Indigenous hospitalisations 2001–02.

(c) Rates are per 1,000 population and are directly age-standardised using the 2001 Australian population.

(d) Rate ratio is equal to the rate of hospitalisations identified as Indigenous divided by the rate of hospitalisations for other Australians.

Source: AIHW National Hospital Morbidity Database.

Sex and age

Indigenous Australian males were more likely to be hospitalised for heart, stroke and vascular diseases than Indigenous Australian females in 2001–02, a similar pattern to that observed for other Australians. However, Indigenous Australian females were 1.7 times as likely to be hospitalised for these conditions as other Australian females, while Indigenous Australian males were 1.3 times as likely.

Indigenous Australians were hospitalised for heart, stroke and vascular diseases at younger ages than other Australians—59% of all these hospitalisations occurred before the age of 65, compared with around 23% for other Australians. Hospitalisation rates for heart, stroke and vascular diseases exceeded those for other Australians in every age group. The greatest difference in age-specific rates occurred in the 35–54-year-old age group, where Indigenous hospitalisation rates were three times those of other Australians.

Hospitalisations for heart, stroke and vascular diseases among Aboriginal and Torres Strait Islander peoples and other Australians, 2001–02

Number per 100,000 population
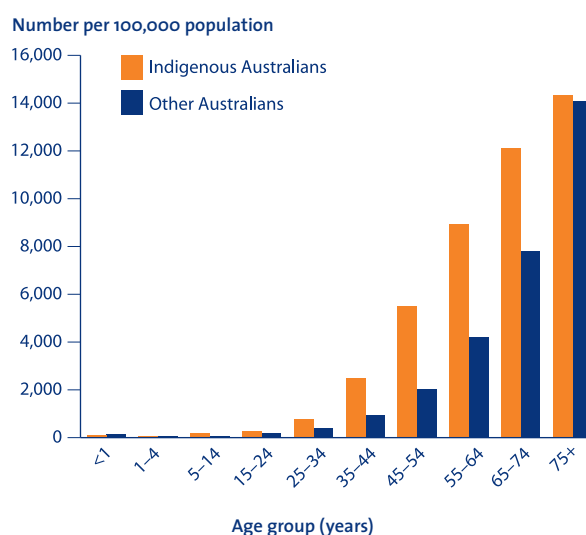
Source: AIHW National Hospital Morbidity Database.

Length of stay

Of patients hospitalised for heart, stroke and vascular diseases, Indigenous Australians had a longer length of stay in hospital as other Australians. Excluding same-day stays, the average length of stay for Indigenous Australians was 7.2 days, and for other Australians, 5.3 days.

Deaths

In 2000–02, heart, stroke and vascular diseases were the leading causes of death among Indigenous Australians in Queensland, Western Australia, South Australia and the Northern Territory[2], accounting for 26% of all deaths among Indigenous Australians in these four jurisdictions. Indigenous Australians experienced higher death rates from heart, stroke and vascular diseases than other Australians— 2.6 times those of other Australians. The largest disparity in death rates was for acute rheumatic fever and chronic rheumatic heart disease, where death rates were 19 times those of other Australians.

Sex and age

Consistent with their younger age structure, Indigenous Australians died from heart, stroke and vascular diseases at younger ages than other Australians—62% of such deaths occurred before the age of 65, compared with around 10% for other Australians. Death rates from heart, stroke and vascular diseases exceeded those of other Australians in every age group up to the age of 75 years. The greatest difference in age-specific death rates occurred in the 25–44-year age group, where death rates in Indigenous Australians were 10 times those of other Australians.

Deaths from heart, stroke and vascular diseases among Aboriginal and Torres Strait Islander peoples and other Australians, 2000–02
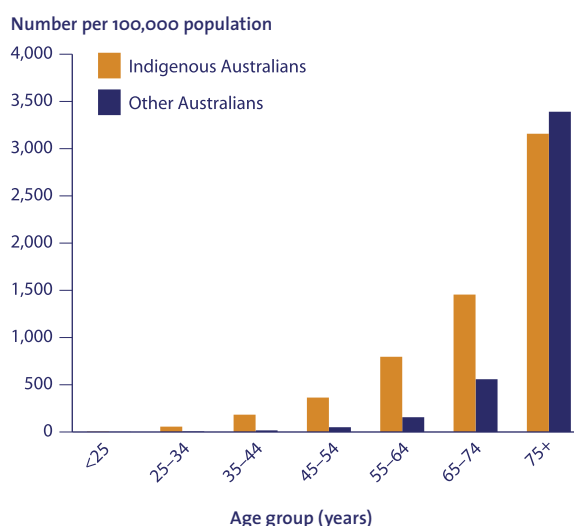
Source: AIHW National Mortality Database.

Deaths from heart, stroke and vascular diseases for Aboriginal and Torres Strait Islander peoples[a], 2000–02

	Males		Females	
	No. deaths[b]	SMR[c]	No. deaths[b]	SMR[c]
Acute rheumatic fever & chronic rheumatic heart disease	6	16.6	12	21.1
Coronary heart disease	139	2.9	89	2.5
Heart failure	9	3.8	8	2.2
Peripheral vascular disease	3	0.8	4	1.3
Stroke	32	2.3	34	1.7
Total heart, stroke and vascular diseases	**222**	**2.8**	**172**	**2.4**

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

(b) The number of deaths have been averaged over the period 2000–02.

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

Source: AIHW National Mortality Database.

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2 These states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

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Risk factors for heart, stroke and vascular diseases

The risk factor profile of Aboriginal and Torres Strait Islander Australians is one reason for the considerably higher heart, stroke and vascular illness and death that this population group experiences when compared with other Australians. Several risk factors for heart, stroke and vascular diseases are more prevalent among Indigenous Australians than other Australians— tobacco smoking, insufficient physical activity, poor nutrition, harmful alcohol consumption, high blood pressure, and overweight and obesity.

Prevalence of risk factors for heart, stroke and vascular diseases among Indigenous Australians is discussed below with further details contained in the individual risk factor sections of this report.

Tobacco smoking

Based on self-reports from the 2001 National Drug Strategy Household Survey, Indigenous Australians aged 14 years and over were twice as likely to smoke compared with other Australians (43% compared with 19%). Indigenous Australians were also less likely than other Australians to be former smokers or to have never smoked.

Insufficient physical activity

Comparable data on levels of insufficient physical activity are not available for Indigenous Australians

Nutrition

There are limited national data on the diet and nutritional status of Indigenous Australians. The diet of Indigenous Australians living in remote communities is typically high in energy and sugars, moderately high in fat and relatively low in complex carbohydrates, fibre, and fruits and vegetables. The limited availability and access to good quality, nutritious food that is affordable contributes to this problem. Bushfoods, once a source of considerable variety and nutrients, are now eaten only in small quantities. The diet of Indigenous Australians living in urban areas is more similar to that of other Australians than that of Aboriginals living in remote parts of Australia.

Alcohol consumption

Based on self-reports from the 2001 National Drug Strategy Household Survey for people aged 14 years and over, around 10.5% of Indigenous males drank alcohol at 'high risk' levels compared with other Australian males (3.3%). Among females, there was no significant difference in the proportions drinking at 'high risk' levels. Indigenous Australians were three times more likely to consume alcohol at 'high risk' levels than other Australians (9.3% compared with 2.7%). However, Indigenous Australians were more likely to abstain from alcohol than other Australians.

High blood pressure

There are no national data on measured blood pressure to assess the prevalence of high blood pressure among Indigenous Australians. However, based on self-reports from the 2001 National Health Survey[3], for people of all ages, 14% of Indigenous Australians reported high blood pressure, compared with 10% of other Australians. Indigenous Australians reported high blood pressure from a younger age compared with other Australians.

High blood cholesterol

There are no national data on measured blood cholesterol levels for Indigenous Australians.

Overweight

Available data show that Indigenous Australians are more likely than other Australians to be overweight. While there are no national data on measured weight for Indigenous Australians, self-reported data are available from the 2001 National Health Survey[3]. Among people aged 18 years and over living in non-remote areas, 64% of Indigenous Australians were overweight compared with 50% of other Australians. The disparity in obesity rates in non-remote areas is even stronger—Indigenous Australians were nearly twice as likely to be obese as other Australians (31% compared with 16%).

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3   Differences between the Indigenous and non-Indigenous populations should be interpreted with caution as the Indigenous population was sampled over a six-month period and other Australians over a 10-month period; seasonal effects may be exaggerated in the Indigenous sample.

Diabetes

Indigenous Australians have one of the highest rates of diabetes, especially Type 2, in the world. There are no national data on measured prevalence of diabetes among Indigenous Australians. However, based on self-reports from the 2001 National Health Survey[3], the age-standardised prevalence of diabetes among Indigenous Australians was almost four times as high as among other Australians (11% compared with 3%). Indigenous Australians from remote areas were almost twice as likely as those from non-remote areas to report having diabetes (16% compared with 9%). Indigenous females were slightly more likely to report diabetes than Indigenous males (12% compared with 9%).

While in both Indigenous and other Australian populations the prevalence of diabetes is higher in older age groups, the prevalence among Indigenous Australians aged 35–44 years is almost as high as among other Australians aged 55 years and over.

Kidney (renal) failure

Kidney failure is more common among Indigenous Australians than among other Australians. At the end of 2001, there were 643 Indigenous Australians with end-stage renal disease (ESRD) on dialysis, which represents seven times the age-standardised rate of all Australians for males and 11 times for females. Among people with ESRD in the ANZDATA registry, 16% of Indigenous Australians had a functioning kidney transplant, but for all Australians the proportion was 44% in 2001. There were 175 Indigenous Australians with ESRD who began kidney replacement treatment in 2001, which is six times the age-standardised rate in the total population for males and 11 times for females.

Indigenous Australians tend to develop ESRD at a younger age than other Australians. In 2001, nearly 90% of new Indigenous patients receiving treatment for ESRD were aged 64 years or under, compared with 49% in this age group among the rest of the patients.

New patients starting treatment for ESRD in 2001

Number per 100,000 population
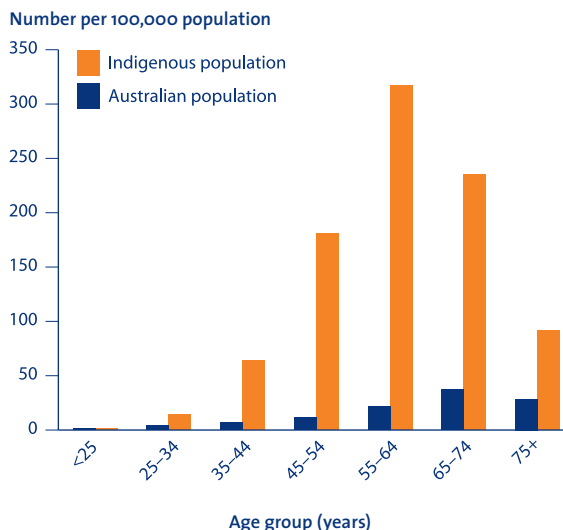
Source: ANZDATA 2002.

The age-standardised incidence rate of ESRD incidence among Indigenous Australians is highest in remote areas, where it is up to 30 times the national incidence for all Australians. In urban areas the standardised incidence for Indigenous people is much lower, but it is still significantly higher than the national incidence. Almost half of Indigenous ESRD patients come from regions without dialysis or transplant facilities and 16% from regions with only satellite dialysis facilities. In addition, socioeconomic disadvantage is strongly associated with incidence of ESRD, and Indigenous Australians are more likely to be referred late for care and are less likely to receive a kidney transplant. Other factors that probably contribute to the excess kidney disease levels in this group are a high prevalence of diabetes, smoking and poor diet; a life exposure to repeated infection and inflammation that damage the kidneys; maternal malnutrition leading to reduced nephron number at birth; and inadequate access to effective preventive care, especially for high blood pressure and diabetes.

2

Treatment and care

For Aboriginal and Torres Strait Islander peoples, treatment and care may be affected by a number of factors. These include distance to health services, the availability of transport to access services, and language and cultural differences.

Information on treatment and care of Indigenous Australians is limited. Presented here are data on care in general practice and use of selected cardiac procedures.

General practice care of heart, stroke and vascular diseases and their risk factors

For the period 1998–99 to 2002–03, there were significant differences between private general practice visits by Aboriginal and Torres Strait Islander peoples and by all Australians. However, these data may underestimate GP care provided by Aboriginal Community Controlled Health Services. This is unlikely to explain all of the differences observed.

GPs managed heart, stroke and vascular conditions overall at significantly lower rates in encounters with Indigenous patients than in total encounters (13 per 100 versus 17 per 100). High blood pressure[4] was managed significantly less often at Indigenous encounters than at all encounters (6.7 per 100 versus 8.8 per 100). Given that one in five Indigenous Australians have heart, stroke and vascular diseases, the lower rates of management of these problems should be noted.

Diabetes was the most frequently managed problem at encounters with Indigenous Australians and it was 2.5 times as common as in the total population (7.1 per 100 Indigenous encounters versus 2.8 per 100 total encounters). The greater rate of management of diabetes in Indigenous patients reflects the high prevalence of the condition in this population and indicates that GPs play an important part in treating it for this group.

Among patients attending general practice between 1998–99 and 2002–03, Indigenous Australians were more likely to be overweight (62%) than all Australians (54%). Daily smoking was also much more common among Indigenous patients than in all patients (45% compared with 19%).

Procedures

In 2000–01, Indigenous Australian males were less likely to receive procedures in hospital for heart, stroke and vascular diseases than other Australian males, while Indigenous Australian females were more likely to receive these procedures than other Australian females.

Coronary artery bypass grafting

During 1998–01, there were 8% fewer CABG operations for Indigenous Australian males than for other Australian males. Among Indigenous Australian females the reverse was true, with CABG rates being 31% higher for Indigenous Australian females than for other Australian females. The disparity in operations between males and females is found for both Indigenous and other Australians—for Indigenous Australians operation rates in males were twice those of females, and for other Australians rates in males were four times those of females.

Between 1995–98 and 1998–01, CABG rates increased among both male and female Indigenous Australians—by 35% and 21% respectively. However, among other Australians, CABG rates declined by 9% over this period for both males and females.

Coronary angioplasty

During 1998–01, there were 55% fewer coronary angioplasty procedures for males identified as Indigenous compared with other Australian males. Among Indigenous Australian females there were 16% more coronary angioplasty procedures than for other Australian females. The disparity between males and females in coronary angioplasty procedures is found for both Indigenous and other Australians—for Indigenous males and females, procedure rates in males were 1.7 times those of females, and for other Australians, rates in males were three times those of females.

Between 1995–98 and 1998–01, coronary angioplasty rates increased by 61% and 93% for Indigenous males and females, whereas for other Australians the rate increases (27% for males and 28% for females) were more modest.

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4   Includes ICPC-2 codes K86 (hypertension, uncomplicated) and K87 (hypertension, complicated).

Further reading

ABS 2002. 2001 national health survey: Aboriginal and Torres Strait Islander results, Australia. ABS Cat. No. 4715.0. Canberra: ABS.

ABS & AIHW 2003. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples. ABS Cat. No. 4704.0. Canberra: ABS.

AIHW: Davies J 2003. Coronary revascularisation in Australia, 2000. AIHW Cat. No. AUS 35. Canberra: AIHW (Bulletin No. 7).

AIHW: Britt H, Miller GC, Know S et al. 2003. General practice activity in Australia 2002–03. AIHW Cat. No. GEP 14. Canberra: AIHW (General Practice Series No. 14).

AIHW 2002. 2001 national drug strategy household survey: detailed findings. AIHW Cat. No. PHE 41. Canberra: AIHW (Drug Statistics Series No. 11).

NHMRC 2000. Nutrition in Aboriginal and Torres Strait Islander peoples. An information paper. Canberra: NHMRC.

The diseases

3

Overview of heart, stroke and vascular diseases

Key points

- Heart, stroke and vascular diseases are Australia's largest health problem, accounting for 50,294 deaths in 2002 (37.6% of all deaths) and affecting 3.67 million Australians in 2001.
- 1.10 million Australians had disabling conditions associated with heart, stroke and vascular diseases in 1998.
- Over the last decade the prevalence of heart, stroke and vascular conditions rose by around 18.2%.
- Over 1991–2002, death rates from heart, stroke and vascular diseases fell by 36.3% for males and 33.7% for females.
- In 2000–02, death rates from heart, stroke and vascular diseases in the most disadvantaged areas were 21.4% higher than in the least disadvantaged.
- In 2000–02, for Indigenous Australians death rates from heart, stroke and vascular diseases were 2.6 times as high as for other Australians.

Heart, stroke and vascular diseases (also known as cardiovascular or circulatory diseases) are Australia's largest health problem. They are Australia's greatest killer (accounting for 50,294 deaths in 2002) and affected 3.67 million Australians in 2001. They contribute to significant illness, disability, poor quality of life and premature death, and are the most expensive disease group in Australia in terms of health expenditure.

Much of the burden caused by heart, stroke and vascular diseases is preventable, and over the last few decades there have been substantial and continuing falls in death rates. These have been driven by improvements in some risk factor levels and major advances in treatment.

This chapter outlines the major components of heart, stroke and vascular diseases in terms of prevalence, incidence, hospitalisations and deaths. The types of heart, stroke and vascular diseases that pose the biggest problems in Australia are coronary heart disease, stroke, peripheral vascular disease[5] and heart failure. Acute rheumatic fever and chronic rheumatic heart disease are also major health issues among Aboriginal and Torres Strait Islander peoples. Information on congenital heart diseases is also presented, as they are among the leading causes of death in the first year of life.

What are heart, stroke and vascular diseases?

Heart, stroke and vascular diseases cover all diseases and conditions of the heart and blood vessels. There can be many forms and causes of this diverse group of diseases. However, in developed countries such as Australia, the main underlying problem 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 affects the 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 it progresses with age.

Risk factors for heart, stroke and vascular diseases

Risk factor is the term given to a range of health-related behaviours and biomedical conditions that can affect the health of an individual in a negative way.

The major preventable risk factors for heart, stroke and vascular diseases are tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition and diabetes. Atrial fibrillation, transient ischaemic attack (TIA) and high intake of alcohol are

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5   In this report, the term 'peripheral vascular disease' (commonly known as peripheral artery disease) is used to refer to diseases of arteries and arterioles (atherosclerosis of peripheral arteries, aneurysm, arterial embolism and thrombosis, and other peripheral vascular disease).

further risk factors for stroke. Risk strongly increases with age and is higher for men, Aboriginal and Torres Strait Islander peoples, and people from lower socioeconomic groups. New research suggests that other factors, including depression and social factors, may also play a role.

How many Australians have heart, stroke and vascular diseases?

Based on self-reports from the National Health Survey, 19.4% of the population had heart, stroke and vascular conditions in 2001. This corresponds to an estimated 3.67 million Australians affected. Of those with a heart, stroke and vascular condition, 12.6% had varicose veins, 9.7% had coronary heart disease and 9.6% had heart rhythm disorders. The prevalence of stroke was considerably lower at 2.8% of people with heart, stroke and vascular conditions.

Trends

Over the last decade, there has been a general increase of around 18.2% in the prevalence of heart, stroke and vascular conditions. Between 1989 and 1995, there was a 46.6% increase in the proportion of people reporting heart, stroke and vascular diseases as a long-term condition. However, between 1995 and 2001, there was a 19.4% decline.

While changes in survey methodology and classification may reduce direct comparability between the National Health Surveys, other factors may be contributing to movements in prevalence, such as changing perception of certain conditions over time and improvements in diagnostic technology.

Sex and age

In 2001, the age-standardised prevalence of heart, stroke and vascular conditions was 11% higher for females than for males: 20.8% and 18.5%, respectively. Heart, stroke and vascular conditions occur mainly among older Australians, with almost two-thirds of those aged 75 years and over reporting these conditions compared with 28.0% for 45–54-year-olds and 6.5% for those aged under 45 years.

People with heart, stroke and vascular conditions, 2001

Per cent / Age group (years). Bar chart comparing Males and Females across age groups <25, 25–34, 35–44, 45–54, 55–64, 65–74, 75+.
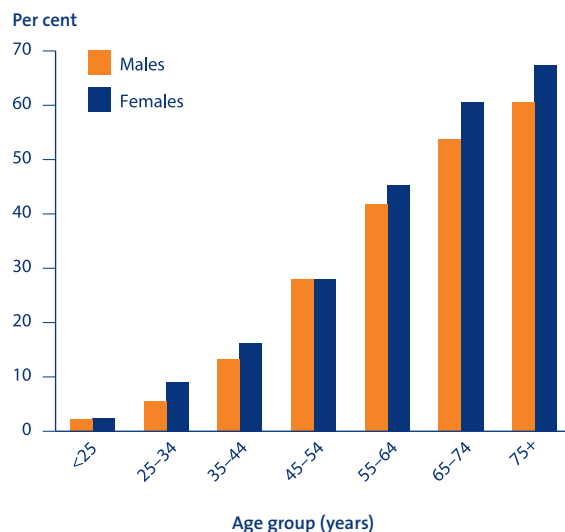
Note: Based on self-reports.

Source: AIHW analysis of the 2001 National Health Survey.

Disability due to heart, stroke and vascular diseases

Based on self-reports from the Disability, Ageing and Carers Survey, heart, stroke and vascular diseases were one of the largest causes of disability in Australia in 1998. Six per cent of survey respondents (or almost one-third of all those with a disability) reported one or more disabling conditions associated with their heart, stroke and vascular conditions. This corresponds to 1.10 million Australians affected. Of these, around 59.1% needed assistance or had difficulties with self-care, mobility or communication, and around 30.1% had no difficulty with these activities but used aids or equipment.

Hospitalisations

In 2001–02, there were 441,039 hospitalisations where heart, stroke and vascular diseases were the principal diagnosis (condition chiefly responsible for the hospitalisation) (6.9% of all hospitalisations). Of these, 36.2% were attributed to coronary heart disease, 12.3% to heart rhythm disorders, 9.5% to heart failure, 9.1% to stroke, 5.5% to peripheral vascular disease and 0.5% to acute rheumatic fever and chronic rheumatic heart disease.

When both principal and additional diagnoses were examined, heart, stroke and vascular diseases were involved in 9.8% of all hospitalisations.

Trends

Between 1993–94 and 2001–02, there was a 19.8% increase in the age-standardised hospitalisation rate for heart, stroke and vascular diseases (including TIA). This increase has coincided with an overall increase in the prevalence of heart, stroke and vascular diseases and a decline in deaths over the last decade.

Sex and age

In 2001–02, males were over one-third more likely to be hospitalised for heart, stroke and vascular diseases than females, with coronary heart disease and peripheral vascular disease rates being twice as high in males. However, hospitalisation rates for acute rheumatic fever and chronic rheumatic heart disease were almost one-third higher for females than males.

Hospitalisations for heart, stroke and vascular diseases occur predominantly among middle-aged and older Australians. Over three-quarters of all these hospitalisations occur among those aged 55 years and over, although this age group represents only 22% of the Australian population.

Hospitalisations for heart, stroke and vascular diseases in Australia, 2001–02
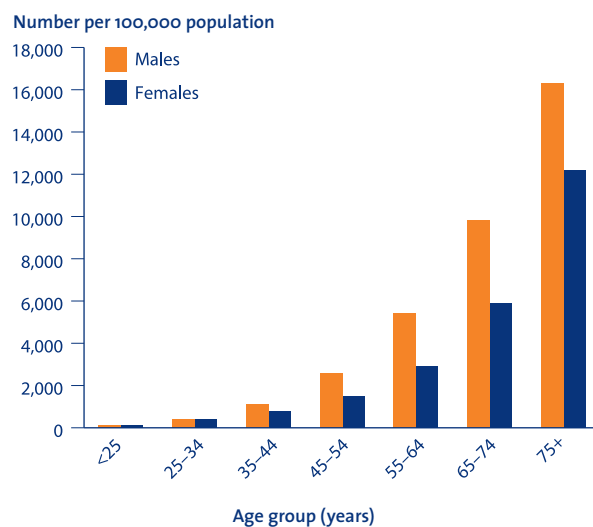
Number per 100,000 population

Source: AIHW National Hospital Morbidity Database.

Aboriginal and Torres Strait Islander peoples

In 2001–02, Aboriginal and Torres Strait Islander peoples[6] were 1.4 times as likely to be hospitalised for heart, stroke and vascular diseases as other Australians. The largest difference occurred for acute rheumatic fever and chronic rheumatic heart disease where the rate for males was six times as high and the rate for females was eight times as high as for other Australian males and females.

Length of stay in hospital

In 2001–02, 41% of hospitalisations for heart, stroke and vascular diseases were same-day hospitalisations. This was a large increase from 26.2% in 1993–94. The increase may reflect the much greater use of investigations for these diseases in recent years.

Of those hospitalised for at least one night, the average length of stay was 8.0 days, a decline from 1993–94 when the average length of stay was 9.8 days.

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6   The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use by Aboriginal and Torres Strait Islander peoples (see Methods and data sources section for more information).

Those hospitalised for stroke, peripheral vascular disease, acute rheumatic fever and chronic rheumatic heart disease tended to stay at least twice as long as those hospitalised for coronary heart disease.

Deaths

In 2002, heart, stroke and vascular diseases were the leading cause of death among Australians, accounting for 50,294 deaths (37.6% of all deaths).

Deaths by major disease categories, 2002

- All other disease (12%)
- Congenital/perinatal (1%)
- Genitourinary system (2%)
- Digestive system (3%)
- External causes (6%)
- Respiratory system (9%)
- Heart, stroke and vascular diseases (38%)
- Cancers (29%)
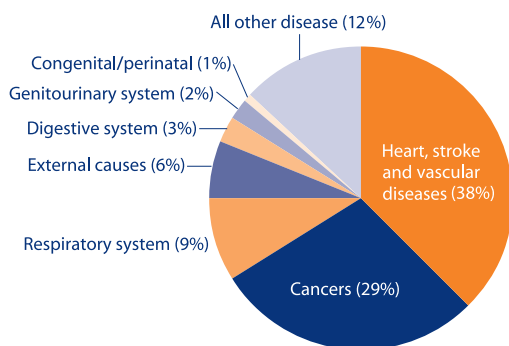
Source: ABS 2003a.

Coronary heart disease and stroke together accounted for three-quarters of all deaths from heart, stroke and vascular diseases. Coronary heart disease was the major cause of death from heart, stroke and vascular diseases, accounting for 51.8% of all such deaths, followed by stroke (24.9%), heart failure (5.4%), peripheral vascular disease (5.1%) and acute rheumatic fever and chronic rheumatic heart disease (0.5%).

Congenital heart diseases accounted for 0.2% of all deaths in Australia during 2002.

Trends

Over the period 1991–02, death rates from heart, stroke and vascular diseases declined at a rate of 4.3% per year for males and 4.0% per year females, a faster rate than for all causes of death combined (2.5% and 2.0%,respectively). This produced a total decline of

36.3% among males and 33.7% among females over the 12-year period. This decline is partly due to falls in the rate at which people get heart, stroke and vascular diseases and partly due to improved survival following an acute event (such as heart attack or stroke).

Sex and age

In 2002, males were more likely to die from heart, stroke and vascular diseases than females across all age groups, with males aged under 75 years experiencing death rates up to three times those of females of the same age. Among older Australians (those aged 75 years and over), more women died from heart, stroke and vascular diseases than men, although the death rates of elderly men and women were similar. This is because more women than men live into old age.

Although heart, stroke and vascular diseases are a common cause of death among middle-aged Australians, they kill an even greater proportion of older people. Among those aged 75 years and over, these diseases accounted for 45.8% of all deaths.

Socioeconomic status

In 2000–02, Australians in the most disadvantaged areas experienced considerably higher death rates from heart, stroke and vascular diseases than their counterparts from the least disadvantaged areas—21.0% higher for males and 19.6% for females. It is important to note that this measure of inequality relates to the average disadvantage of all people living in the area and will generally understate the true inequality in deaths at the individual level in Australia (see **Methods and data sources** for further information).

Aboriginal and Torres Strait Islander peoples

In 2000–02, heart, stroke and vascular diseases were the leading causes of death among Aboriginal and Torres Strait Islander peoples in Queensland, Western Australia, South Australia and the Northern Territory[7],

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7   Data from these jurisdictions are considered to have sufficient coverage of Indigenous Australian deaths.

accounting for 26% of all deaths among Indigenous Australians in these four jurisdictions. Indigenous Australians experienced higher death rates from heart, stroke and vascular diseases than other Australians, with rates 2.6 times as high as for other Australians.

Region

In 2000–02, death rates from heart, stroke and vascular diseases were higher in regional and remote areas of Australia compared with major cities.

These higher death rates in regional areas could be due to a range of different influences including lower socioeconomic status, poorer risk factor profiles and different access to health services. The higher death rate in remote areas may reflect the high proportion of Indigenous people in these areas and the higher rate of deaths for indigenous people overall in Australia.

State and territory

In 2002, death rates for heart, stroke and vascular diseases varied among the states and territories from 13.9% above the national average to 10.4% below the national average. Death rates were highest in Tasmania and the Northern Territory, and lowest in Western Australia and the Australian Capital Territory. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

International comparisons

Australian death rates for heart, stroke and vascular diseases ranked towards the lower end of the 24 countries compared in 1999 (sixth lowest and one-and-a-half times as high as those of the lowest countries, Japan and France). The Slovak Republic had the worst death rates from heart, stroke and vascular diseases among the selected OECD countries— two-and-a-half times those of Australia and over three times those of Japan and France.

Deaths from heart, stroke and vascular diseases, coronary heart disease and stroke by state and territory, 2002

Number per 100,000 population
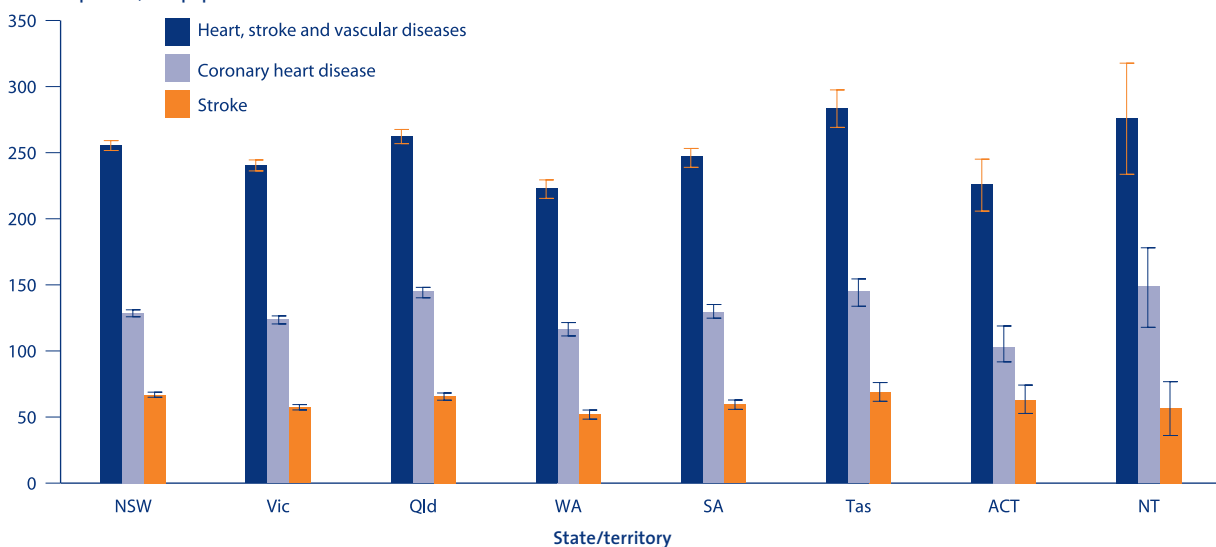
Note: Error bars indicate 95% confidence intervals.

Source: AIHW National Mortality Database.

Deaths from heart, stroke and vascular diseases for selected countries, 1999
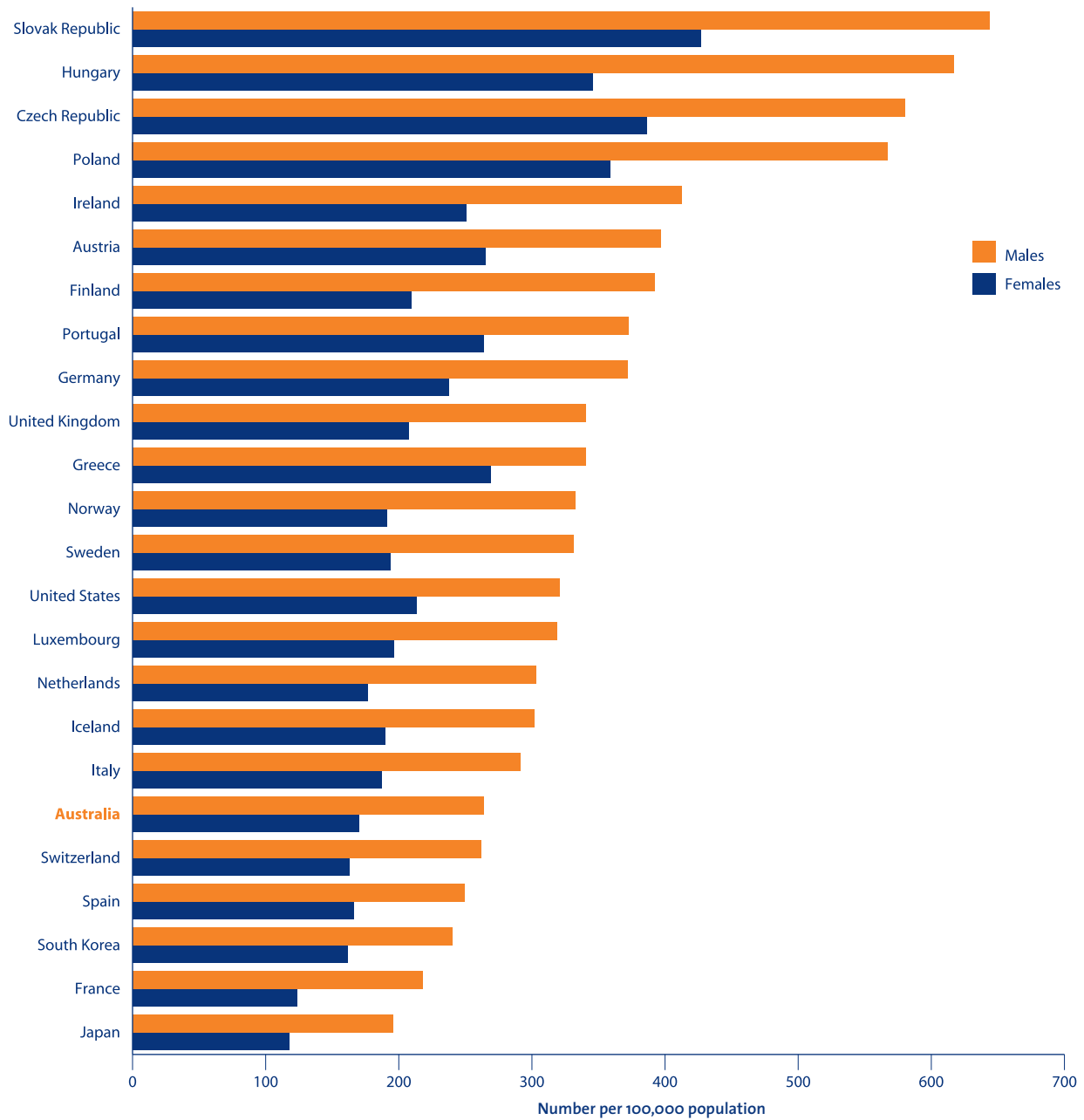
Note: Rates have been age-standardised to the 1980 OECD population.

Source: OECD Health Data 2003.

Health inequalities

Deaths from heart, stroke and vascular diseases

Year	Population subgroup	Males	Females	Persons
		Number per 100,000 population
2002	**Age group (years)**			
	45–54	82.9	25.2	54.0
	55–64	226.2	83.1	155.5
	65–74	718.5	355.8	531.9
	75–84	2,331.7	1,668.7	1,949.0
	85 and over	7,851.4	7,359.2	7,512.6
	All ages (ASR)	*298.6*	*209.8*	*248.9*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	331.9	232.9	278.0
	2nd quintile	319.5	220.2*	265.8*
	3rd quintile	311.5*	215.4*	258.9*
	4th quintile	287.5*	209.9*	245.7*
	5th quintile (least disadvantaged)	274.3*	194.7*	228.9*
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	2.8#	2.4#	2.6#
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	293.7	207.5	245.8
	Regional	323.5*	226.6*	271.5*
	Remote	338.5*	248.4*	295.9*

* Statistically significant difference when compared with the first row in the population subgroup.

Statistically significant difference from 1.0 (other Australians).

Notes

1. Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.

2. Data for all ages.

3. Significance testing was not performed on the age groups.

4. All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

Further reading

ABS 2003a. 2002 causes of death. ABS Cat. No. 3303.0. Canberra: ABS.

ABS 2003c. Occasional paper: long-term health conditions—
a guide to time series comparability from the national health
survey, Australia. ABS Cat. No. 4816.055.001. Canberra: ABS.

ABS 1999. 1998 disability, ageing and carers: summary of
findings, Australia. ABS Cat. No. 4430.0. Canberra: ABS.

AIHW 2003. Rural, regional and remote health: a study on
mortality. AIHW Cat. No. PHE 45. Canberra: AIHW (Rural Health
Series No. 2).

OECD 2003. OECD health data 2003, 3rd edition:
a comparative analysis of 30 countries (CD-ROM). Paris: OECD.

3 Coronary heart disease

Key points

- Coronary heart disease is the largest single cause of death and the most common cause of sudden death in Australia. It claimed 26,063 lives in 2002 (19.5% of all deaths).
- The 2001 National Health Survey showed that around 355,600 Australians have coronary heart disease.
- In 2001–02 there were an estimated 48,700 coronary heart disease events (deaths plus hospitalisations) in Australia among 40–90-year-olds. Around half were fatal and 86% of coronary deaths occurred outside hospital.
- Coronary heart disease death rates fell by 41.1% among males and 40.1% among females over the period 1991–02.
- In 2000–02, death rates from coronary heart disease in the most disadvantaged areas were 28.9% higher than in the least disadvantaged.
- In 2000–02, for Indigenous Australians coronary heart disease death rates were 2.6 times as high as for other Australians.

Coronary heart disease (also known as coronary artery disease or ischaemic heart disease) is the largest single cause of death and the most common cause of sudden death in Australia, claiming 26,063 lives in 2002, that is, over half of all deaths from heart, stroke and vascular diseases in 2002. It is the leading cause of premature death and disability. It was by far the greatest epidemic in Australia during the twentieth century and it is predicted that by 2020 it will become the single leading health problem for the world. However, age-standardised death rates from coronary heart disease have fallen substantially in Australia, by around 70% since the late 1960s. These patterns have been influenced by a number of factors including improvements in levels of some risk factors, improved medical care for those at higher risk of experiencing coronary heart disease and better survival for those who have had a heart attack.

What is coronary heart disease?

Coronary heart disease is the most common form of heart disease in Australia. Its two major clinical forms are heart attack and angina. The common underlying problem in coronary heart disease is atherosclerosis, where build-ups called plaques form on the inside surfaces of arteries. Plaques can occur in the arteries supplying the brain, the legs, the kidneys and, in the case of the heart itself, the coronary arteries.

A heart attack occurs when a coronary plaque suddenly breaks open. This brings on a blood clot that completely blocks blood flow to the heart muscle downstream. This is a life-threatening emergency that can cause severe chest pain, and possibly collapse and sudden death. If the clot cannot be promptly treated some of the heart muscle will die, a condition known as acute myocardial infarction (AMI).

With angina, a plaque has markedly narrowed a coronary artery to the point where, although the blood flow can usually meet most daily demands, it cannot increase to meet extra demands incurred by physical activity or strong emotion, resulting in temporary chest pain. This event is generally not life-threatening. However, people with angina are more prone to sudden cardiac death or AMI than the general population.

Acute coronary syndrome (ACS) is a term that is used to collectively describe AMI (heart attack) and unstable angina (chest pain occurring at rest, new onset of pain with exertion, or angina that is more frequent, longer in duration or lower in threshold than before) when they present as a clinical emergency. Improved diagnosis of AMI among those presenting with ACS has occurred through the use of more specific tests.

Heart attack remains an often fatal event. Among Australians having an attack, over four in ten will be dead within a year. Over half of all heart attack deaths occur before the person reaches hospital.

About 25% of those who have a heart attack die within an hour of their first-ever symptoms. In individuals with known coronary heart disease having a second heart attack, the risk of sudden death can increase greatly.

Risk factors for coronary heart disease

The major preventable risk factors for coronary heart disease 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 a higher risk of coronary heart disease. Males, older Australians, Aboriginal and Torres Strait Islander peoples, and people from lower socioeconomic groups are at greater risk of developing coronary heart disease compared with other Australians. Depression, social isolation and lack of quality social support are significant independent risk factors for coronary heart disease as well.

How many Australians have coronary heart disease?

Prevalence

Based on self-reports from the 2001 National Health Survey, 1.9% of those surveyed reported having manifestations of coronary heart disease. This corresponds to around 355,600 Australians affected. Around three-quarters of people with coronary heart disease reported having angina, and around one-third reported having had a heart attack. High blood pressure (50.3%), high blood cholesterol (38.3%) and heart rhythm disorders (14.9%) were also frequently reported conditions by people with coronary heart disease.

Sex and age

The age-standardised prevalence of coronary heart disease was one-third higher among males than females: 2.4% and 1.6%, respectively. Coronary heart disease rates increase rapidly with age from 4.0% among 55–64-year-olds to 8.2% in 65–74-year-olds and 13.1% in those aged 75 years and over. Almost two-thirds of people with coronary heart disease were aged 65 years and over.

People with coronary heart disease, 2001

Per cent

Age group (years)
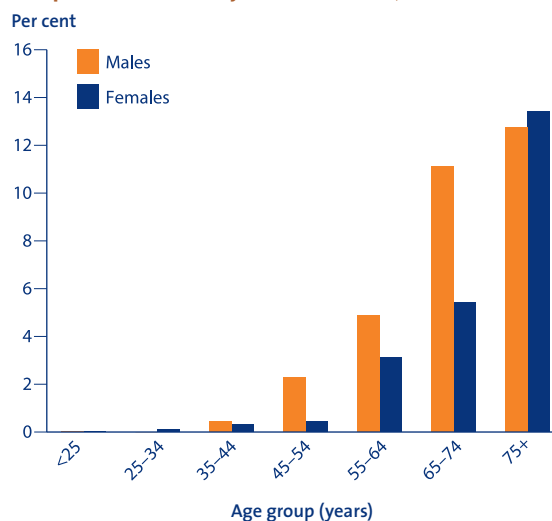
Note: Based on self-reports.

Source: AIHW analysis of the 2001 National Health Survey.

Incidence

In 2001–02 there were an estimated 48,700 coronary heart disease events[8] in Australia among 40–90-year-olds (29,800 among men and 18,900 among women). Around half of these events were fatal (case fatality of 46% or 22,400 cases), and 86% of these coronary deaths occurred outside hospital.

Trends

The age-standardised incidence of coronary heart disease has declined over the last decade, falling by around one-quarter between 1993–94 and 2001–02.

Sex and age

In 2001–02 among those aged 40–90 years, the incidence of coronary heart disease was twice as high among men as women.

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8   In this report coronary events are defined as the sum of the number of non-fatal hospitalisations for AMI and the number of coronary heart disease deaths in the population. This method has been shown to provide a reasonable approximation of the real incidence of all coronary heart disease events in the population (see Methods and data sources section).

The incidence of coronary heart disease increases dramatically with age—rates among 75–90-year-olds were 18 times those of 40–54-year-olds. This age differential was considerably higher among women than men, and this pattern has remained consistent over time. The incidence of coronary heart disease for women aged 65–74 years was comparable with that of men aged 55–64 years, indicating that men on average suffer from coronary heart disease at a younger age than women.

Incidence of coronary heart disease, 2001–02

Number per 100,000 population
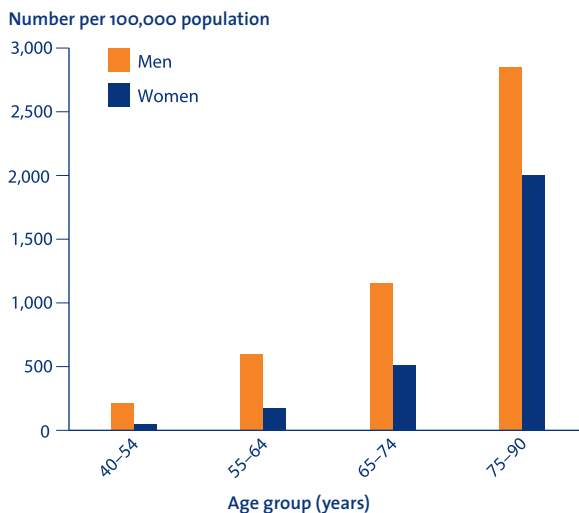
Note: Coronary heart disease incidence is defined as the sum of the number of non-fatal hospitalisations for AMI and the number of coronary heart disease deaths in the population.

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

Disability due to coronary heart disease

Coronary heart disease (angina and myocardial infarction) is one of the major causes of disability in Australia. Based on self-reports from the 1998 Disability, Ageing and Carers Survey, 1.2% of survey respondents reported one or more disabling conditions associated with coronary heart disease.

This corresponds to 224,400 Australians affected. Of these 59.0% needed assistance or had difficulties with self-care, mobility or communication, and 30.6% had no difficulty with these activities but used aids or equipment because of their disability.

Hospitalisation

In 2001–02, there were 159,572 hospitalisations for which coronary heart disease was the principal diagnosis (2.5% of hospitalisations). Coronary heart disease accounted for 36.2% of the hospitalisations for heart, stroke and vascular diseases. Of the hospitalisations for coronary heart disease, angina accounted for over half (87,026) and AMI for around one-quarter (40,338).

Trends

Between 1993–94 and 2001–02, there was a 11.7% increase in the age-standardised rate of hospitalisations for coronary heart disease. Hospitalisations for AMI increased by 22.8% over this period. The increase in hospitalisations for coronary heart disease may be due to the reductions in deaths and changes in diagnostic technology.

Sex and age

In 2001–02, males were twice as likely to be hospitalised for coronary heart disease as females. This was the case across all ages, with the greatest difference in the 45–64-year age group, where rates were three times as high in men as women. Hospital use for coronary heart disease occurred mainly among older Australians with around three-quarters of these hospitalisations occurring among those aged 60 years and over.

Hospitalisations for coronary heart disease in Australia, 2001–02

Number per 100,000 population
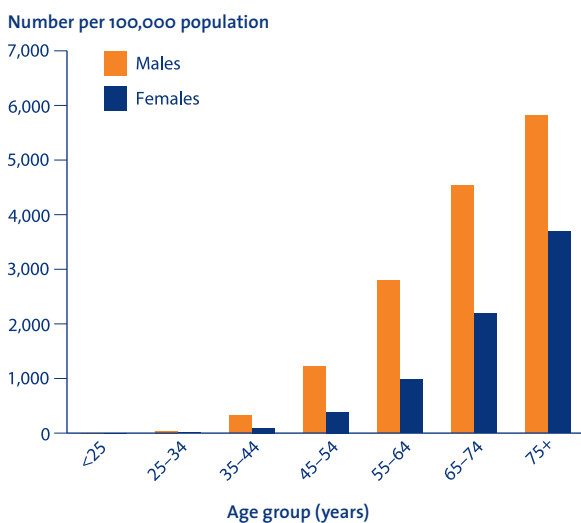
Source: AIHW National Hospital Morbidity Database.

For AMI the sex difference is even more pronounced than for the broader coronary heart disease category, particularly in the 45–64 age group, which is consistent with men's greater risk of having a heart attack (see **Risk factors** chapter). Hospital use for AMI increases rapidly with age, more so than for coronary heart disease overall, with rates among those aged 75 years and over almost twice as high as for 65–74-year-olds, and over three times as high as for 55–64-year-olds.

Aboriginal and Torres Strait Islander peoples

In 2001–02, hospitalisation rates for coronary heart disease among Aboriginal and Torres Strait Islander peoples[9] were almost twice those of other Australians.

Length of stay in hospital

In 2001–02, 39.4% of hospitalisations for coronary heart disease were same-day hospitalisations— this is a large increase from 1993–94 when it was 25.2%. This may reflect the much greater use of investigations in recent years.

Among those hospitalised for at least one night, the average length of stay was 6.3 days, a decline from 1993–94 when it was 7.5 days.

On average, those hospitalised for coronary heart disease tended to stay for a shorter period than those hospitalised for other major heart, stroke and vascular diseases (stroke, peripheral vascular disease, and acute rheumatic fever and chronic rheumatic heart disease).

For AMI, the average length of stay was 7.3 days (for those hospitalised for at least one night).

Deaths in hospital

In 2001–02, 2.7% of hospitalisations for coronary heart disease ended in death, a decline from 1993–94 when the rate was 3.7%.

The vast majority (81.3%) of coronary heart disease deaths in hospital was in people admitted for AMI. The in-hospital death rate for AMI (8.8%) was over three times as high as for the broader coronary heart disease group.

These patterns are difficult to interpret in the absence of risk-adjusted data; however, major advances in diagnosis and treatment of cardiac patients may have contributed to this decline.

Deaths

Coronary heart disease was the largest single cause of death in Australia in 2002, accounting for 26,063 deaths (19.5% of all deaths). It accounted for 51.8% of heart, stroke and vascular deaths. Over half of coronary heart disease deaths were from AMI (heart attacks).

Trends

Age-standardised coronary heart disease death rates have continued the decline that began in the 1970s: they fell at a rate of 4.9% per year among males and

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9   The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use
     by Aboriginal and Torres Strait Islander peoples (see Methods and data sources section for more information).

4.8% per year females for the period 1991–02. This produced a total decline of 41.1% among males and 40.1% among females over the 12-year period. The decline in deaths from coronary heart disease may have been influenced by both a reduction in heart attacks and improved survival following a heart attack.

Sex and age

Overall, males were almost twice as likely to die from coronary heart disease as females in 2002, with males aged 25–64 years having death rates three to five times those of females. Death rates among older Australian men were higher than for women; however, more women died. This can be explained by the much greater number of women than men who live into old age.

The vast majority (71.6%) of coronary heart disease deaths occur among those aged 75 years and over.

Deaths from coronary heart disease, 2002

Number per 100,000 population
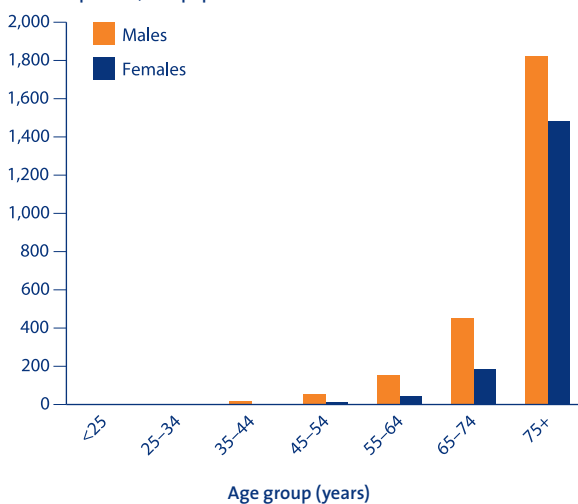
Age group (years)

Source: AIHW National Mortality Database.

Socioeconomic status

In 2000–02, Australians in the most disadvantaged areas experienced considerably higher death rates from coronary heart disease than their counterparts from the least disadvantaged areas—24.9% higher for males and 28.7% higher for females.

Aboriginal and Torres Strait Islander peoples

In 2000–02, Aboriginal and Torres Strait Islander peoples[10] died from coronary heart disease at 2.6 times the rate of other Australians.

Region

In 2000–02, death rates from coronary heart disease were higher in regional and remote areas of Australia compared with major cities. The higher death rate in remote areas may reflect the high proportion of Indigenous people in these areas and the higher rate of deaths for the Indigenous people overall in Australia.

State and territory

In 2002, death rates for coronary heart disease varied among the states and territories from 15.2% above the national average to 20.2% below the national average. Death rates were highest in the Northern Territory, Queensland and Tasmania, and lowest in the Australian Capital Territory. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

International comparisons

Australian death rates for coronary heart disease ranked towards the lower end of the 24 countries compared in 1999 (11th lowest for males and 13th lowest for females). For both males and females, the Australian death rate was over four times that of the lowest country (South Korea) and around half that of the highest country (Slovak Republic). The Slovak Republic had the highest death rate (10 times that of South Korea).

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10 Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

Deaths from coronary heart disease for selected countries, 1999

Legend:
- Males (orange)
- Females (blue)

Country	Males	Females
Slovak Republic	~337	~210
Hungary	~282	~143
Czech Republic	~260	~142
Finland	~254	~117
Ireland	~239	~119
United Kingdom	~207	~98
Poland	~200	~95
United States	~195	~110
Iceland	~190	~92
Austria	~188	~98
Sweden	~183	~84
Germany	~182	~94
Norway	~175	~80
Australia	~157	~84
Netherlands	~130	~57
Switzerland	~128	~64
Greece	~115	~51
Luxembourg	~112	~50
Italy	~106	~51
Spain	~97	~42
Portugal	~95	~48
France	~73	~29
Japan	~51	~26
South Korea	~39	~21

Number per 100,000 population

Note: Rates have been age-standardised to the 1980 OECD population.

Source: OECD Health Data 2003.

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Health inequalities

Deaths from coronary heart disease

Year	Population subgroup	Males	Females	Persons
		Number per 100,000 population		
2002	**Age group (years)**			
	45–54	56.4	10.5	33.4
	55–64	155.5	42.3	99.5
	65–74	452.6	184.5	314.6
	75–84	1,307.3	797.9	1,013.3
	85 and over	4,050.3	3,296.6	3,531.4
	All ages (ASR)	*169.7*	*97.8*	*129.1*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	193.3	114.9	150.4
	2nd quintile	185.4	106.4*	142.3*
	3rd quintile	179.5*	104.1*	137.8*
	4th quintile	163.0*	97.6*	126.9*
	5th quintile (least disadvantaged)	154.7*	89.3*	116.6*
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	2.9#	2.5#	2.6#
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	169.4	99.0	129.7
	Regional	185.3*	107.8*	143.2*
	Remote	186.0*	120.2*	155.1*

* Statistically significant difference when compared with the first row in the population subgroup.

\# Statistically significant difference from 1.0 (other Australians).

Notes

1. Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.

2. Data for all ages.

3. Significance testing was not performed on the age groups.

4. All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

Further reading

ABS 1999. 1998 disability, ageing and carers: summary of findings, Australia. ABS Cat. No. 4430.0. Canberra: ABS.

AIHW: Mathur S 2002. Epidemic of coronary heart disease and its treatment in Australia. AIHW Cat. No. CVD 21. Canberra: AIHW (Cardiovascular Disease Series No. 20).

OECD 2003. OECD health data 2003, 3rd edition: a comparative analysis of 30 countries (CD-ROM). Paris: OECD.

3   Stroke

Key points

- Stroke is Australia's second single greatest killer, claiming 12,533 lives in 2002 (9.4% of all deaths).
- The 2001 National Health Survey showed that around 217,500 Australians had a stroke sometime in their lives.
- It is estimated that each year there are about 40,000–48,000 stroke events among Australians.
- Stroke death rates fell by 28.1% among males and 27.3% among females over the period 1991–02.
- In 2000–02, death rates from stroke in Indigenous Australians were twice as high as for other Australians.

Stroke is Australia's second single greatest killer after coronary heart disease, claiming 12,533 lives in 2002. However, age-standardised death rates from stroke have fallen dramatically since the late 1960s, by around 68%. These declines appear to have been largely driven by improvements in some risk factor levels, great increases in the use of drugs to lower blood pressure and treat and prevent blood clots, and other advances in treatment. Despite these declines in death rates, the number of people dying from stroke and those surviving with a permanent disability is likely to increase in the future, given the rapid ageing of the Australian population, and a slowing in the decline of stroke death rates in recent years.

What is stroke?

Stroke (also known as cerebrovascular disease) occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot or bleeds, resulting in part of the brain dying from lack of blood flow. This causes loss of function of the affected part of the brain, leading to death or impairment in any or all of a range of functions including movement of body parts, vision, planning, communication and swallowing. Depression and anxiety are common after a stroke and many survivors have difficulty returning to their previous activities.

There are two main types of stroke: one is caused by blood clots or other particles (ischaemic strokes) and one by bleeding (haemorrhagic strokes). Ischaemic strokes occur more than five times as often as haemorrhagic strokes; however, haemorrhagic strokes have a much higher fatality rate.

Another related condition is transient ischaemic attack (TIA). They produce temporary stroke-like symptoms and are extremely important predictors of stroke. In this report, TIA is not included in the 'stroke' classification unless indicated otherwise.

Of those having a first-ever stroke, one in five die within the first 28 days, but almost two-thirds are alive one year after their stroke. About one in six people who have survived the first two days of a first-ever stroke will have a recurrent stroke over the next five years. Nearly all patients are disabled immediately following their stroke. Recovery is most rapid in the early weeks; however, by the end of the first year, about half of stroke survivors remain dependent on others for activities of daily living.

Risk factors for stroke

Risk factors for stroke include TIA, 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). Older Australians and Aboriginal and Torres Strait Islander peoples are also at a greater risk of stroke than other Australians.

How many Australians have a stroke?

Prevalence

Based on self-reports from the 2001 National Health Survey, an estimated 1.2% of those surveyed had a stroke sometime in their lives. This corresponds to 217,500 Australians affected.

Sex and age

In 2001 the prevalence of stroke was 32.2% higher among males than females: 1.4% and 1.0% for males and females, respectively. Of the 217,500 Australians who have had a stroke, 60.0% are aged 65 years and over, while 18.0% are under the age of 55 years.

People with stroke, 2001

Per cent
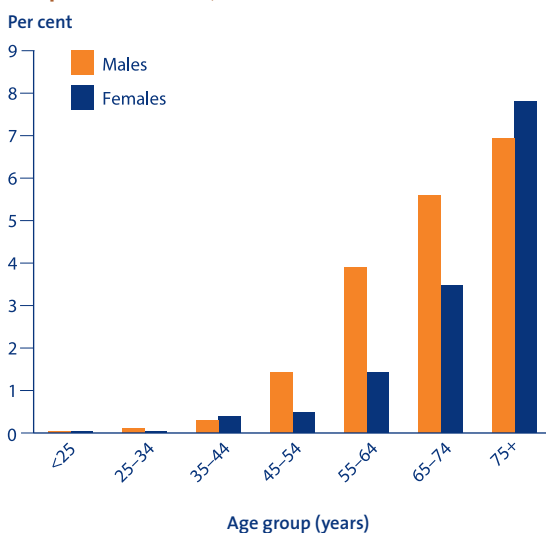
Note: Based on self-reports.

Source: 2001 National Health Survey, ABS.

Incidence

There are no national data on the incidence (new cases) of stroke. Estimates have been obtained from local registers in Melbourne and Perth. From these, it has been estimated that each year there are about 40,000–48,000 stroke events among Australians, which equates to a stroke occurring every 11–13 minutes. The majority (around 70%) of these are first-ever strokes. Each year about 12,000 people who have previously had a stroke suffer another stroke.

Sex and age

More women are affected by stroke than men, due to the larger number of elderly women in the population. However, the age-standardised stroke incidence rate for men is 30% higher than for women.

The rate of strokes is higher among men than women in all age categories except for those aged 25–34 years. Men tend to have strokes at a younger age, with around 58% and 50% of strokes (in Perth and Melbourne) occurring in men under 75 years. For women the corresponding proportion was around 35%, though this is at least partly due to the older average age of women.

Disability due to stroke

Based on self-reports from the 1998 Disability, Ageing and Carers Survey, 1.2% of survey respondents reported one or more disabling conditions associated with their stroke. This corresponds to 230,300 Australians affected. Of these, 76.6% needed assistance or had difficulties with self-care, mobility or communication, and 19.4% had no difficulties with these activities but used aids or equipment. Persons disabled by stroke were far more likely to need ongoing assistance with activities of daily living compared with persons disabled by other diseases. For example, those disabled by stroke were twice as likely to need ongoing assistance with these activities as those whose disability was caused by coronary heart disease (42.1% compared with 21.6%).

Hospitalisation

In 2001–02, there were 40,251 hospitalisations in Australia where stroke was the principal diagnosis (0.6% of all hospitalisations). Of the hospitalisations for heart, stroke and vascular diseases, stroke accounted for 9.1%.

Trends

Between 1993–94 and 2001–02, there was a 9.7% increase in the age-standardised hospitalisation rate for stroke. This has coincided with large declines in death rates from stroke over the same period. Note that hospitalisations for TIA are included in the stroke hospitalisation rates for 2001–02 for comparability with the 1993–94 rates.

Sex and age

In 2001–02, males were 29.2% more likely to be hospitalised for stroke than females. Hospital use for stroke is higher among older Australians, with rates among those aged 75 years and over almost three times as high as in 65–74-year-olds and seven times as high as in 55–64-year-olds. Around two-thirds of stroke hospitalisations occur among those aged 70 years and over, reflecting the increasing risk of stroke with age.

Hospitalisations for stroke in Australia, 2001–02
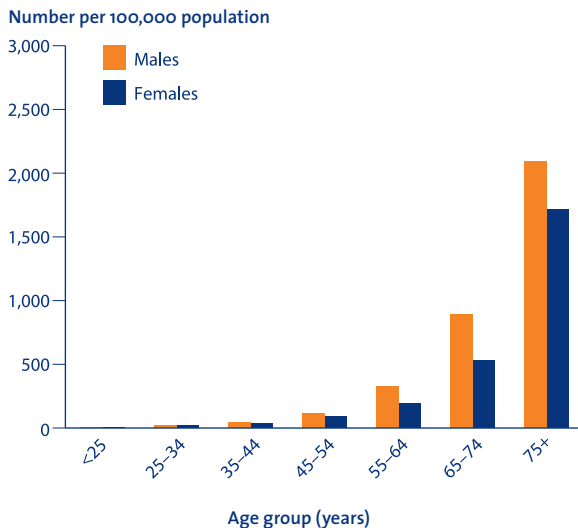
Number per 100,000 population

Source: AIHW National Hospital Morbidity Database.

Aboriginal and Torres Strait Islander peoples

In 2001–02, hospitalisation rates for stroke among Indigenous Australians[11] were 1.5 times those of other Australians.

Length of stay in hospital

In 2001–02, 22.1% of hospitalisations for stroke (and TIA) were same-day hospitalisations; this is an increase from 1993–94 when the proportion of hospitalisations was 15.4%.

Among those hospitalised for at least one night, the average length of stay was 12.0 days, a decline from 1993–94 when it was 18.0 days. On average, those hospitalised for stroke tended to stay twice as long as those hospitalised for coronary heart disease. Note that hospitalisations for TIA are included in the stroke hospitalisation rates for 2001–02 for comparability with the 1993–94 rates.

Deaths in hospital

In 2001–02, 10.6% of hospitalisations for stroke ended in death, a decline from 1993–94, when the proportion was 12.0%.

Deaths

Stroke was the second single most common cause of death among Australians in 2002, accounting for 12,533 deaths, or 9.4% of all deaths.

Trends

Between 1991 and 2002, stroke death rates declined at a rate of 3.1% per year for both males and females. This produced a total decline of 28.1% among males and 27.3% among females over the 12-year period.

Sex and age

Males are slightly more likely to die from stroke than females across most age groups. Males aged 45–74 years had death rates one-and-a-half times those of females in 2002. The difference in stroke death rates between males and females is not as marked as for coronary heart disease.

Although the age-specific death rates from stroke are generally higher among males than females (the exceptions being the 85 and over and the 25–34-year age groups), the actual number of deaths is greater for females. This can be explained by the greater number of women than men who live into old age, when death rates from stroke are considerably higher.

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11   The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use by Aboriginal and Torres Strait Islander peoples (see Methods and data sources section for more information).

Deaths from stroke, 2002

Number per 100,000 population
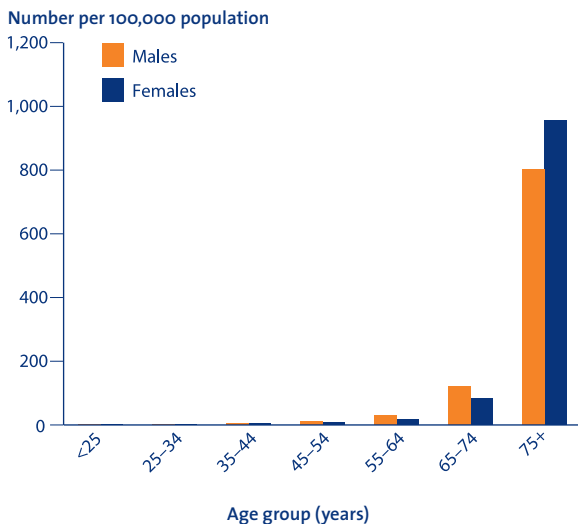
Source: AIHW National Mortality Database.

Stroke death rates increase greatly with age, with 82.3% of all deaths from stroke occurring among those aged 75 years and over.

Socioeconomic status

In 2000–02, there were no significant differences in stroke death rates between the most and least disadvantaged areas.

Aboriginal and Torres Strait Islander peoples

In 2000–02, Aboriginal and Torres Strait Islander peoples[12] died from stroke at twice the rate of other Australians.

Region

In 2000–02, there were no significant differences in stroke death rates across major cities, regional and remote areas of Australia.

State and territory

In 2002, death rates for stroke varied among the states and territories from 11.5% above the national average to 15.6% below the national average. Death rates were highest in Tasmania and lowest in Western Australia. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

International comparisons

Stroke death rates in Australia were among the lowest of the 24 OECD countries compared in 1999 (4th lowest for both males and females). The Australian stroke death rate for males was 1.2 times that of Switzerland (lowest overall). Females in France had the lowest stroke death rates and the rate for Australian females was around one-and-a-half times that of France. Portugal had the highest stroke death rate (four times that of Switzerland and three times that of Australia).

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12   Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

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Deaths from stroke for selected countries, 1999
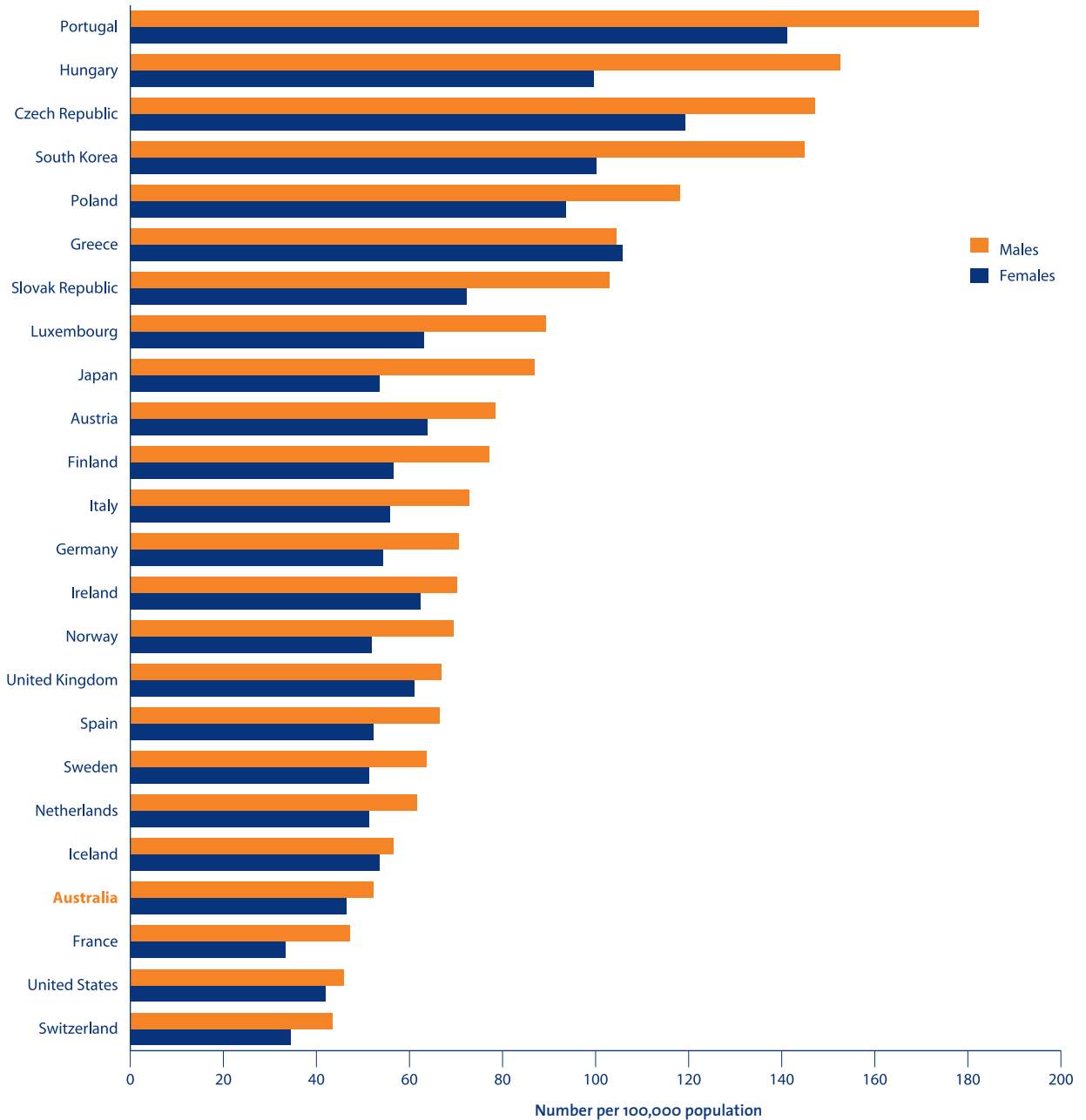
Chart legend: Males, Females

Country	(bars)
Portugal	
Hungary	
Czech Republic	
South Korea	
Poland	
Greece	
Slovak Republic	
Luxembourg	
Japan	
Austria	
Finland	
Italy	
Germany	
Ireland	
Norway	
United Kingdom	
Spain	
Sweden	
Netherlands	
Iceland	
Australia	
France	
United States	
Switzerland	

X-axis: Number per 100,000 population (0 to 200)

Note: Rates have been age-standardised to the 1980 OECD population.

Source: OECD Health Data 2003.

Health inequalities

Deaths from stroke

Year	Population subgroup	Males	Females	Persons
		Number per 100,000 population		
2002	**Age group (years)**			
	45–54	10.6	7.1	8.8
	55–64	29.6	16.4	23.1
	65–74	122.2	84.1	102.6
	75–84	534.7	493.3	510.8
	85 and over	1,944.0	2,180.6	2,106.9
	All ages (ASR)	*63.8*	*59.8*	*61.9*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	68.4	60.7	64.4
	2nd quintile	65.4	60.9	63.5
	3rd quintile	66.3	59.7	63.1
	4th quintile	62.8	61.3	62.7
	5th quintile (least disadvantaged)	63.5	60.1	62.1
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	2.3[#]	1.7[#]	1.9[#]
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	64.6	60.5	62.8
	Regional	66.6	61.2	64.1
	Remote	64.3	56.3	60.6

* Statistically significant difference when compared with the first row in the population subgroup.

\# Statistically significant difference from 1.0 (other Australians).

Notes

1. Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.

2. Data for all ages.

3. Significance testing was not performed on the age groups.

4. All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

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Further reading

ABS 1999. 1998 disability, ageing and carers: summary of findings, Australia. ABS Cat. No. 4430.0. Canberra: ABS.

AIHW 2003. Secondary prevention and rehabilitation after coronary events or stroke: a review of monitoring issues. AIHW Cat. No. CVD 25. Canberra: AIHW.

Anderson CS, Jamrozik KD, Burvill PW et al. 1993. Ascertaining the true incidence of stroke: experience from the Perth community stroke study, 1989–1990. Med J Aust 158:80–4.

Hankey GJ, Jamrozik K, Broadhurst RJ et al. 1998. Long-term risk of first recurrent stroke in the Perth community stroke study. Stroke 29:2491–2500.

OECD 2003. OECD health data 2003, 3rd edition: a comparative analysis of 30 countries (CD-ROM). Paris: OECD.

Thrift AG, Dewey HM, Macdonell RAL et al. 2000. Stroke incidence on the east coast of Australia: the North East Melbourne Stroke Incidence Study (NEMESIS). Stroke 31:2087–92.

Heart failure

Key points

- Heart failure is a major burden on the community due to the high costs of care, the lower quality of life and premature death of those affected, claiming 2,729 lives in 2002 (2.0% of all deaths).
- It is estimated that at least 300,000 Australians have chronic heart failure, with 30,000 new cases diagnosed each year. As the diagnosis is commonly missed in mild cases, the actual numbers could be as high as twice these estimates.
- Heart failure death rates fell by 43.3% among males and 41.5% among females over the period 1991–02.
- In 2000–02, death rates from heart failure among Indigenous Australians were almost three times as high as for other Australians.

Heart failure is a major cause of illness and the third largest cause of death among heart, stroke and vascular diseases, claiming 2,729 lives in 2002. It is a major burden on the community, due to the high costs of care and the lower quality of life and premature death of those affected. The number of Australians with heart failure is likely to increase in the future despite rapid declines in death rates from the disease of around 60% since the 1980s. Reasons for the increase include the ageing of the population, improved survival from heart attack and heart failure, the increased prevalence of diabetes and obesity in the population, and the wider use of sensitive diagnostic technology. The lifetime risk of developing heart failure has been estimated at around 20% for Western countries.

What is heart failure?

Heart failure describes a condition where the heart functions less effectively to pump blood around the body. It can result from a variety of diseases that impair or overload the heart, notably heart attack, high blood pressure or a damaged heart valve. It can occur suddenly, although it usually develops slowly, often over many years, as the heart gradually becomes less able to cope with the additional demands and works less effectively. 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, it is often associated with poor survival.

Congestive heart failure refers to a specific type of heart failure characterised by 'congestion' or build-up of fluid in the lungs, liver or legs that frequently occurs in people with untreated heart failure. Chronic heart failure is a general term that refers to 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 heart attack, and can sometimes be reversed.

Risk factors for heart failure

The most important risk factors for heart failure are coronary heart disease 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.

How many Australians have heart failure?

There are no national data on the incidence and prevalence of heart failure in Australia. Based on overseas findings, it is estimated that at least 300,000 Australians have chronic heart failure (about 4% of the population aged 45 years or more), with 30,000 new cases diagnosed each year. As the diagnosis is commonly missed in patients with mild heart failure, the actual numbers could be as high as twice these estimates.

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Trends

No national trend data on the incidence of heart failure are available for Australia. However, data from the United States indicate that between 1950 and 1999 the incidence of heart failure declined by around 30–40% among women but remained relatively unchanged for men.

International comparisons

Data for the United Kingdom indicate that the prevalence of heart failure is about 3% in people aged 45 years or more. According to the US National Health and Nutrition surveys, heart failure in the United States affects an estimated 2% of people aged 40–59 years, 5% aged 60–69 years and 10% aged 70 years or more.

Hospitalisation

In 2001–02, there were 41,874 hospitalisations in Australia where heart failure was the principal diagnosis (0.7% of all hospitalisations). Of the hospitalisations for heart, stroke and vascular diseases, heart failure accounted for 9.5%.

Trends

Between 1993–94 and 2001–02, the age-standardised hospitalisation rate for heart failure has remained relatively stable. However, the actual number of hospitalisations has increased from 32,323 to 41,874 over this period.

Sex and age

In 2001–02, males were 28.4% more likely to be hospitalised for heart failure than females. Hospital use for heart failure increases rapidly with age, with rates among those aged 75 years and over almost four times as high as those aged 65–74 years. Around two-thirds of hospitalisations for heart failure occur among those aged 75 years and over.

Hospitalisations for heart failure in Australia, 2001–02
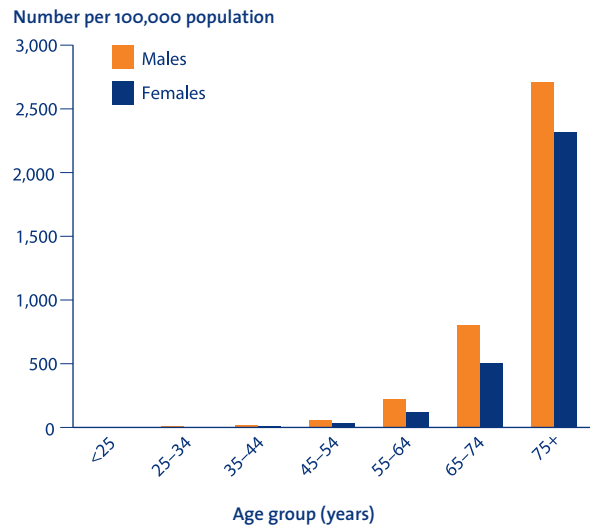
Number per 100,000 population

Source: AIHW National Hospital Morbidity Database.

Aboriginal and Torres Strait Islander peoples

In 2001–02, hospitalisation rates for heart failure among Aboriginal and Torres Strait Islander peoples[13] were around two to three times those of other Australians.

Length of stay in hospital

In 2001–02, 14.5% of hospitalisations for heart failure were same-day hospitalisations, an increase from 10.1% in 1993–94.

Among those hospitalised for at least one night, the average length of stay was 9.1 days, a decline from 1993–94 when it was 11.7 days.

Deaths in hospital

In 2001–02, 8.6% of hospitalisations for heart failure ended in death, a decline from 1993–94, when it was 9.8%.

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13   The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use by Aboriginal and Torres Strait Islander peoples (see Methods and data sources section for more information).

Deaths

Heart failure is the third largest cause of death from heart, stroke and vascular diseases in Australia, accounting for 2,729 deaths or 2.0% of all deaths in 2002.

Heart failure is more likely to be listed as an associated cause of death than as the underlying cause. It is frequently reported as an associated cause with diseases such as kidney (renal) failure (listed as an associated cause in 29% of all kidney failure deaths), coronary heart disease (24% of all coronary heart disease deaths), diabetes (19%) and chronic lower respiratory diseases (17%).

Trends

Between 1991 and 2002, death rates from heart failure declined at a rate of 5.6% per year for males and 5.5% per year for females. This produced a total decline of 43.3% among males and 41.5% among females over the 12-year period.

Sex and age

In 2002, more females died from heart failure than males, but death rates among males aged less than 85 years were higher than for females. This can be explained by the greater number of women than men who live into older age, when death rates from heart failure are considerably higher.

Deaths from heart failure occur mainly among older Australians, with 90.4% of the deaths occurring among those aged 75 years and over.

Socioeconomic status

In 2000–02, Australians in the most disadvantaged areas experienced higher death rates from heart failure than their counterparts from the least disadvantaged areas.

Deaths from heart failure, 2002

Number per 100,000 population
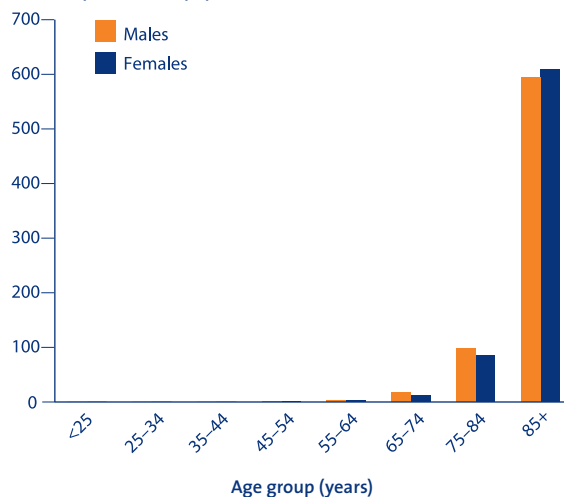
Source: AIHW National Mortality Database.

Aboriginal and Torres Strait Islander peoples

In 2000–02, Aboriginal and Torres Strait Islander[14] males were almost four times as likely to die from heart failure as other Australian males, and for females the death rate was twice as high among Aboriginal and Torres Strait Islander females.

Region

In 2000–02, death rates from heart failure were higher in regional and remote areas of Australia compared with major cities. The higher death rate in remote areas may reflect the high proportion of the Indigenous population in these areas and the higher rate of deaths for Indigenous people overall in Australia.

State and territory

In 2002, death rates for heart failure varied among the states and territories from 47.4% above the national average to 27.4% below the national average. Death rates were highest in the Northern Territory and lowest in Queensland. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

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14 Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

Health inequalities

Deaths from heart failure

Year	Population subgroup	Males	Females	Persons
				Number per 100,000 population
2002	**Age group (years)**			
	45–54	0.9	0.4	0.6
	55–64	3.4	2.1	2.7
	65–74	16.8	11.0	13.8
	75–84	97.4	85.0	90.2
	85 and over	594.7	609.7	605.0
	All ages (ASR)	*14.1*	*13.0*	*13.4*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	15.5	13.8	14.6
	2nd quintile	16.0	14.3	15.0
	3rd quintile	14.9	13.8	14.3
	4th quintile	14.4	13.3	13.9
	5th quintile (least disadvantaged)	11.1*	11.1*	11.2*
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	3.8[#]	2.2[#]	2.8[#]
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	12.6	11.8	12.2
	Regional	17.0*	15.8*	16.4*
	Remote	25.3*	20.2*	22.9*

* Statistically significant difference when compared with the first row in the population subgroup.

\# Statistically significant difference from 1.0 (other Australians).

Notes

1. Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.

2. Data for all ages.

3. Significance testing was not performed on the age groups.

4. All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

Further reading

AIHW 2003. Rural, regional and remote health: a study on mortality. AIHW Cat. No. PHE 45. Canberra: AIHW (Rural Health Series No. 2).

AIHW: Field B 2003. Heart failure...what of the future? AIHW Cat. No. AUS 34. Canberra: AIHW (Bulletin No. 6).

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3 Peripheral vascular disease

Key points

- Peripheral vascular disease claimed 2,581 lives in 2002 (1.9% of all deaths) and was responsible for 24,288 hospitalisations in 2001–02.
- No national data are available on the number of Australians who have peripheral vascular disease.
- Death rates for peripheral vascular disease fell by 40.2% among males and 37.1% among females over the period 1991–02.
- In 2000–02, there were no significant differences in death rates from peripheral vascular disease between Indigenous Australians and other Australians.

Peripheral vascular disease mainly affects older Australians and its prevalence is likely to increase considerably as the population ages. It claimed 2,581 lives in 2002 and was responsible for 24,288 hospitalisations in 2001–02. People with peripheral vascular disease have a higher risk of death from stroke and heart attack, due to generalised atherosclerosis.

What is peripheral vascular disease?

Peripheral vascular disease[15] (also commonly known as peripheral artery disease) refers to diseases of arteries outside the heart and brain. It occurs when fatty deposits build up in the inner walls of these arteries and affect blood circulation, mainly in the arteries leading to the legs and feet. It ranges from asymptomatic disease, through pain on walking, to pain at rest and limb-threatening reduced blood supply that can lead to amputation. A major form of peripheral vascular disease is abdominal aortic aneurysm, which is an abnormal widening of the aorta (the main artery leading from the heart) below the level of the diaphragm. These aneurysms can be life-threatening if they rupture so surgery is performed in severe cases. The major cause of death in people with peripheral vascular disease is coronary heart disease, reflecting the generalised nature of the disease process.

Risk factors for peripheral vascular disease

The major preventable risk factors for peripheral vascular disease are diabetes, tobacco smoking, high blood cholesterol, high blood pressure, and overweight and obesity.

How many Australians have peripheral vascular disease?

No national data are available on the number of Australians who have peripheral vascular disease.

Hospitalisation

In 2001–02, there were 24,288 hospitalisations where peripheral vascular disease was the principal diagnosis (0.4% of all hospitalisations) in Australia. Of the hospitalisations for heart, stroke and vascular diseases, peripheral vascular disease accounted for 5.5%. Atherosclerosis of the peripheral arteries accounted for over half of the hospitalisations (13,564) and abdominal aortic aneurysm accounted for almost one in five (4,577).

Trends

Between 1993–94 and 2001–02 there was a 21.4% increase in the age-standardised hospitalisation rate for peripheral vascular disease. This has coincided with increases in hospitalisations for coronary heart disease and stroke, and large declines in deaths from peripheral vascular disease over the last decade.

Sex and age

In 2001–02, males were twice as likely to be hospitalised for peripheral vascular disease as females. Hospital use for peripheral vascular disease increases rapidly from age 60, with rates among those aged 75 years and over twice as high as those

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15   In this report, the term 'peripheral vascular disease' (commonly known as peripheral artery disease) is used to refer to diseases of arteries and arterioles (atherosclerosis of peripheral arteries, aneurysm, arterial embolism and thrombosis, and other peripheral vascular disease).

aged 65–74 years and six times as high as those aged 55–64 years. Around two-thirds of hospitalisations for peripheral vascular disease were among those aged 70 years and over.

For abdominal aortic aneurysm, the sex difference is even greater than for peripheral vascular disease overall, with rates almost five times higher in men. Almost all hospitalisations for abdominal aortic aneurysm (88.6%) occur among those aged 65 years and over.

Hospitalisations for peripheral vascular disease in Australia, 2001–02
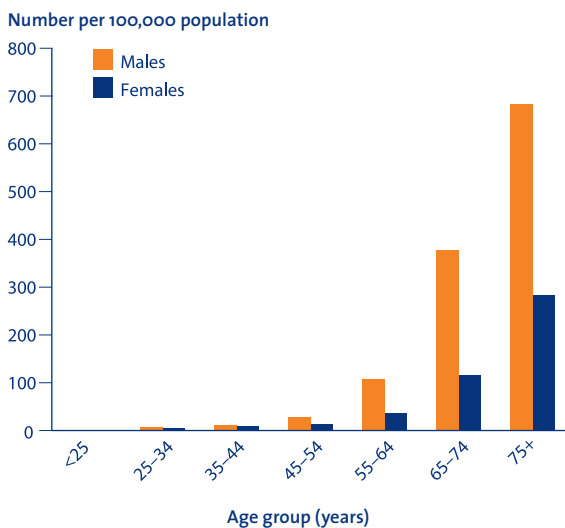
Number per 100,000 population

Source: AIHW National Hospital Morbidity Database.

Aboriginal and Torres Strait Islander peoples

In 2001–02, hospitalisation rates for peripheral vascular disease among Indigenous Australians[16] were slightly less than other Australians.

Length of stay in hospital

In 2001–02, 40.3% of hospitalisations for peripheral vascular disease were same-day hospitalisations, an increase from 1993–94 when the percentage was 25.3%.

Among those hospitalised for at least one night, the average length of stay was 11.5 days, a decline from 1993–94 when it was 13.3 days. On average, those hospitalised for peripheral vascular disease tended to stay almost twice as long as those hospitalised for coronary heart disease.

Deaths in hospital

In 2001–02, 5.5% of hospitalisations for peripheral vascular disease ended in death, and this rate has declined from 1993–94 when it was 7.1%.

Around 43.2% of these deaths were for people admitted for abdominal aortic aneurysm, and the in-hospital death rate for this condition (12.7%) was twice that for peripheral vascular disease overall.

Deaths

Peripheral vascular disease accounted for 2,581 deaths or 1.9% of all deaths in 2002.

Trends

Between 1991 and 2002, deaths from peripheral vascular disease declined at a rate of 5.1% per year for males and 4.7% per year for females. This produced a total decline of 40.2% among males and 37.1% among females over the 12-year period.

Sex and age

In 2002, males were almost twice as likely to die from peripheral vascular disease as females. Deaths from peripheral vascular disease increase greatly with age, with 76.1% of deaths occurring among those aged 75 years and over.

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16   The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use by Aboriginal and Torres Strait Islander peoples (see Methods and data sources section for more information).

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Deaths from peripheral vascular disease, 2002
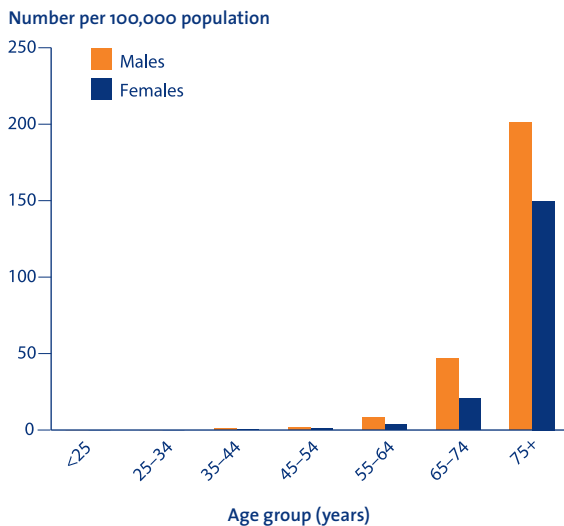
Number per 100,000 population

Source: AIHW National Mortality Database.

Socioeconomic status

In 2000–02, Australians in the most disadvantaged areas experienced higher death rates from peripheral vascular disease than their counterparts from the least disadvantaged areas.

Aboriginal and Torres Strait Islander peoples

Among Aboriginal and Torres Strait Islander peoples[17] there are relatively few deaths attributed to peripheral vascular disease. This may be a reflection of the younger age structure of Aboriginal and Torres Strait Islander peoples compared with the overall Australian population. In 2000–02, there were no significant differences in peripheral vascular disease death rates between Aboriginal and Torres Strait Islander Australians and other Australians.

Region

In 2000–02, death rates from peripheral vascular disease were higher in regional areas than in major cities. Death rates in remote areas were not significantly different to those in major cities.

State and territory

In 2002, death rates for peripheral vascular disease varied among the states and territories from 45.7% above the national average to 7.0% below the national average. Death rates were highest in Tasmania, and lowest in Western Australia and the Australian Capital Territory. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

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17 Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

Health inequalities

Deaths from peripheral vascular disease

Year	Population subgroup	Males	Females	Persons
		Number per 100,000 population		
2002	**Age group (years)**			
	45–54	1.9	0.7	1.3
	55–64	8.5	3.5	6.0
	65–74	46.5	20.5	33.1
	75–84	147.0	78.4	107.4
	85 and over	434.7	339.5	369.1
	All ages (ASR)	*16.9*	*9.9*	*12.8*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	18.9	11.4	14.6
	2nd quintile	19.6	10.8	14.5
	3rd quintile	16.5	10.0	12.7
	4th quintile	16.8	9.7	12.7
	5th quintile (least disadvantaged)	14.5*	9.2	11.4*
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	0.8	1.3	1.0
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	15.9	9.6	12.2
	Regional	19.6*	11.5*	15.0*
	Remote	18.6	9.5	13.9

* Statistically significant difference when compared with the first row in the population subgroup.

Notes

1. Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.
2. Data for all ages.
3. Significance testing was not performed on the age groups.
4. All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

3 Rheumatic fever and rheumatic heart disease

Key points

- Australia's Aboriginal and Torres Strait Islander peoples living in remote areas have among the highest rates of acute rheumatic fever and chronic rheumatic heart disease in the world.
- Acute rheumatic fever and chronic rheumatic heart disease accounted for 274 deaths in 2002 (0.2% of all deaths).
- Acute rheumatic fever is frequently misdiagnosed or underreported and, therefore, its true incidence is underestimated. In 2002, there were 58 people identified with acute rheumatic fever in the Top End of the Northern Territory and 27 in Central Australia—all were Aboriginal and Torres Strait Islander peoples.
- Death rates for acute rheumatic fever and chronic rheumatic heart disease fell by 33.0% among males and 20.4% among females over the period 1991–02.
- In 2000–02, death rates from acute rheumatic fever and chronic rheumatic heart disease among Indigenous Australians were 19 times those of other Australians.

Acute rheumatic fever and chronic rheumatic heart disease accounted for 274 deaths in 2002, and were responsible for 2,258 hospitalisations in 2001–02. Australia's Aboriginal and Torres Strait Islander peoples living in remote areas have among the highest rates of these diseases in the world. However, acute rheumatic fever and chronic rheumatic heart disease are almost entirely preventable causes of illness and death. Since the 1950s, these diseases have largely become diseases of economically disadvantaged people.

What are rheumatic fever and rheumatic heart disease?

Acute rheumatic fever is a delayed complication of an untreated throat infection from Group A *Streptococcus* bacteria and there is some evidence that it may also be caused by 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 disease can affect the heart valves, the heart muscle and its lining, the joints and the brain. Its effect on the heart (rheumatic heart disease) is the only permanent manifestation and may be asymptomatic or may result in shortness of breath and chest pain. Those most at risk are children and young adults. After an attack of acute rheumatic fever, people are at high risk of recurrences if they are infected with the bacterium again. Recurrences lead to cumulative heart damage, but can be prevented by strict follow-up and monthly injections of penicillin for at least five years (and often longer) after the last episode. Because rheumatic heart valve lesions are the cumulative result of repeated or prolonged episodes of acute rheumatic fever in childhood and adolescence, the prevalence of rheumatic heart disease rises steadily with age, peaking in adults aged 20 to 40 years.

Risk factors for rheumatic fever and rheumatic heart disease

Poverty and 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.

How many Australians have rheumatic fever and rheumatic heart disease?

Registers of people with known or suspected acute rheumatic fever and chronic rheumatic heart disease have been established in the Top End of the Northern Territory and Central Australia. This section draws on data from these two registers.

Incidence of acute rheumatic fever

Acute rheumatic fever is frequently misdiagnosed or underreported and, therefore, its true incidence is underestimated.

In 2002, there were 58 people registered with acute rheumatic fever in the Top End of the Northern Territory and 27 in Central Australia—all were Aboriginal and Torres Strait Islander peoples. In the Top End, most cases (83%) required hospitalisation and 35% were for recurrences. In Central Australia, 30% were recurrences. Recurrences are defined as cases diagnosed in someone with established rheumatic heart disease three months or more after the most recent episode of acute rheumatic fever. Children aged 5–14 years accounted for the majority of cases (55%), with an incidence rate of 346 per 100,000 population in the Top End of the Northern Territory and 365 per 100,000 population in Central Australia. While the peak age group is 5–14 years, cases do occur in adults but are rare in children under four years of age. Females accounted for over two-thirds of acute rheumatic fever in the Top End of the Northern Territory.

Trends

There may be some evidence that acute rheumatic fever among Aboriginal and Torres Strait Islander children in the Top End has declined over the past decade. During 1998–02 the rate of Aboriginal and Torres Strait Islander children aged 5–14 years with acute rheumatic fever was 245 per 100,000 population, compared with 254 per 100,000 population in 1989–93. By contrast, in Central Australia the incidence of acute rheumatic fever appears to have increased among 5–14-year-olds from 198 per 100,000 population in 1995 to 365 per 100,000 population in 2002.

However, these variations over time need to be interpreted with caution. In Central Australia, they may simply reflect increased coverage of active surveillance, which was quite low in the early years (below 50%) but was estimated to be nearly 90% in 2001–02. In the Top End they may reflect different methods of case ascertainment in the two time periods.

Prevalence of rheumatic heart disease

In 2002, there were 696 people registered with chronic rheumatic heart disease in the Top End of the Northern Territory and 283 people in Central Australia. Almost all of these (92–94%) were Aboriginal or Torres Strait Islander peoples. The prevalence rate among Aboriginal and Torres Strait Islander peoples was 16.6 per 1,000 population in the Top End of the Northern Territory and 12.5 per 1,000

People with chronic rheumatic heart disease in the Top End of the Northern Territory and in Central Australia, 2002

Age group (years)	Top End		Central Australia	
	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians
Number per 1,000 population				
5–14	5.8	0.2	7.6	0.0
15–24	19.8	0.3	18.6	0.5
25–44	29.4	0.8	15.8	0.4
45 and over	18.6	0.8	14.9	1.4
Total	**16.6**	**1.7**	**12.5**	**0.6**

Sources: Top End Rheumatic Heart Disease Register; Central Australian Rheumatic Heart Disease Register.

in Central Australia, compared with 1.7 per 1,000 and 0.6 per 1,000 among other Australians living in the Top End and Central Australia, respectively.

Chronic rheumatic heart disease occurs mainly in those aged 15 years and over. In 2002 in the Top End of the Northern Territory 8% of cases occurred in those aged 5–14 years. Results from Central Australia indicated that over two-thirds of cases occurred in the 15–44-year age range.

Trends

The reported prevalence of chronic rheumatic heart disease continues to increase in the Top End of the Northern Territory. In 2002, there were 17 cases per 1,000 Aboriginal and Torres Strait Islander peoples, compared with 9 per 1,000 in 1995. This increase is likely to be due to an improvement in reporting and case finding, and better awareness of the condition and its symptoms rather than an actual rise in the number of cases.

Hospitalisation

In 2001–02, there were 2,258 hospitalisations in Australia for acute rheumatic fever and chronic rheumatic heart disease as the principal diagnosis (0.04% of all hospitalisations). Of the hospitalisations for heart, stroke and vascular diseases, acute rheumatic fever and chronic rheumatic heart disease accounted for 0.5%. Most (89.9%) hospitalisations are for rheumatic heart disease.

Trends

While the actual number of hospitalisations has increased from 1,836 to 2,258 between 1993–94 and 2001–02, the age-standardised hospitalisation rate for acute rheumatic fever and chronic rheumatic heart disease has remained relatively stable.

Sex and age

In 2001–02, females were 28.4% more likely to be hospitalised for acute rheumatic fever and chronic rheumatic heart disease than males. Hospital use for chronic rheumatic heart disease increased with age up to 80 years, with 70.7% of such cases aged 45–79 years. Acute rheumatic fever is more common among the younger age groups, with 55.5% of hospitalisations occurring among those aged 5–19 years.

Hospitalisations for acute rheumatic fever and chronic rheumatic heart disease in Australia, 2001–02
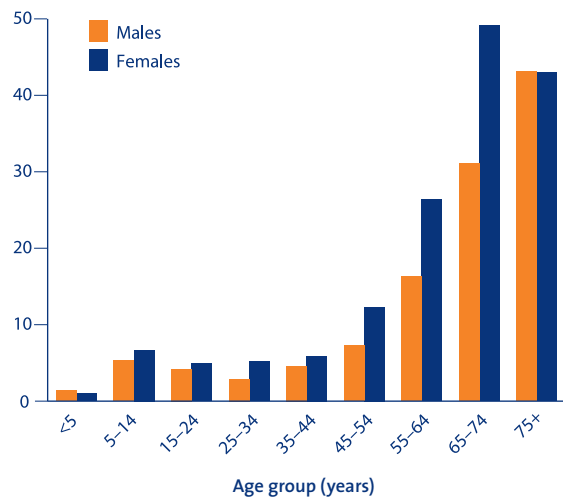
Source: AIHW National Hospital Morbidity Database.

Aboriginal and Torres Strait Islander peoples

In 2001–02, although Aboriginal and Torres Strait Islander peoples[18] represent about 2% of the population, they accounted for 15.1% of hospitalisations for acute rheumatic fever and chronic rheumatic heart disease. Hospitalisation rates for acute rheumatic fever and chronic rheumatic heart disease were much higher among Aboriginal and Torres Strait Islander peoples (six times for males and eight times for females) than among other Australians in 2001–02.

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18   The reporting of the Indigenous identifier in hospital records is not always complete, so the rates presented may underestimate true hospital use by Aboriginal and Torres Strait Islander peoples (see Methods and data sources section for more information).

Length of stay in hospital

In 2001–02, 32.2% of hospitalisations for acute rheumatic fever and chronic rheumatic heart disease were same-day hospitalisations, an increase from 1993–94 when the figure was 26.4%.

Among those hospitalised for at least one night, the average length of stay was 11.1 days, an increase from 1993–94 when it was 10.0 days.

Deaths in hospital

In 2001–02, 2.0% of hospitalisations for acute rheumatic fever and chronic rheumatic fever ended in death, and this has remained stable since 1993–94.

Deaths

Acute rheumatic fever and chronic rheumatic heart disease accounted for 274 deaths in Australia, 0.2% of all deaths in 2002. Chronic rheumatic heart disease accounted for 98% of these deaths.

Trends

Between 1991 and 2002, death rates from acute rheumatic fever and chronic rheumatic heart disease declined at a rate of 2.4% per year for males and 2.6% per year for females. This produced a total decline of 33.0% among males and 20.4% among females over the 12-year period.

Sex and age

In 2002, females were almost twice as likely to die from acute rheumatic fever and chronic rheumatic heart disease as men. Around 73.0% of deaths occur in those aged 65 years and over.

Socioeconomic status

In 2000–02, there were no significant differences in death rates from acute rheumatic fever and chronic rheumatic heart disease between the most and least disadvantaged areas.

Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islander peoples[19] are far more likely to die from acute rheumatic fever and chronic rheumatic heart disease than other Australians. In 2000–02, Indigenous males were almost 17 times and Indigenous females 21 times as likely to die from acute rheumatic fever and chronic rheumatic heart disease as other Australians.

Region

In 2000–02, death rates from acute rheumatic fever and chronic rheumatic heart disease were four times higher in remote areas of Australia than in major cities. The higher death rate in remote areas largely reflects the high proportion of the Indigenous population in these areas and the higher rate of deaths for Indigenous people overall in Australia. Death rates in regional areas were not significantly different to those in major cities.

State and territory

In 2002, death rates for acute rheumatic fever and chronic rheumatic heart disease varied among the states and territories from five times above the national average to 18.9% below the national average. Death rates were highest in the Northern Territory and lowest in South Australia and New South Wales. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

International comparisons

Despite the much lower incidence and prevalence of acute rheumatic fever and chronic rheumatic heart disease in developed countries, they remain important causes of illness and deaths in Australia and New Zealand. In New Zealand, acute rheumatic fever and chronic rheumatic heart disease continue to be major health problems, particularly among Maori and Pacific Islander peoples. Between 1995 and 2000, the annual incidence of acute rheumatic fever was

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19   Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

2.8 per 100,000. The annual incidence rate among those aged 5–14 years was 13.8 per 100,000 among these peoples.

The World Health Organization (WHO) estimated in 1994 that acute rheumatic fever and chronic rheumatic heart disease affected 12 million people in developing countries, with 400,000 deaths annually. It has also been estimated that acute rheumatic fever and chronic rheumatic heart disease are responsible for almost half of the heart, stroke and vascular diseases in all age groups worldwide and are the leading causes of heart, stroke and vascular diseases deaths in the first five decades of life.

Health inequalities

Deaths from acute rheumatic fever and chronic rheumatic heart disease

Year	Population subgroup	Males	Females	Persons
		Number per 100,000 population		
2002	**Age group (years)**			
	45–54	0.6	1.0	0.8
	55–64	1.1	2.7	1.9
	65–74	2.9	5.8	4.4
	75 and over	8.1	14.9	12.2
	All ages (ASR)	*1.0*	*1.7*	*1.4*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	1.2	2.0	1.6
	2nd quintile	1.2	1.5	1.3
	3rd quintile	1.0	1.5	1.3
	4th quintile	0.9	1.7	1.4
	5th quintile (least disadvantaged)	1.0	1.1	1.1
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	16.6[#]	21.1[#]	18.9[#]
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	1.0	1.4	1.2
	Regional	1.1	1.6	1.4
	Remote	2.6*	5.9*	4.1*

*   Statistically significant difference when compared with the first row in the population subgroup.

[#]   Statistically significant difference from 1.0 (other Australians).

Notes

1.   Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.

2.   Data for all ages.

3.   Significance testing was not performed on the age groups.

4.   All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

Further reading

AIHW: Field B 2004 (forthcoming). Rheumatic heart disease—all but forgotten in Australia except among Aboriginal and Torres Strait Islander peoples. Canberra: AIHW.

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WHO 1995. Strategy for controlling rheumatic fever/rheumatic heart disease, with emphasis on primary prevention: memorandum from a joint WHO/ISFC meeting. Bull WHO 73(5):583–7.

3 Congenital heart diseases

Key points

- Congenital heart diseases represent around one-third of all congenital malformations. They are one of the biggest killers of infants less than one year old.
- In 2002, congenital heart diseases accounted for 224 deaths (0.17% of all deaths) in Australia.
- In 1997, there were 1,380 births with congenital heart diseases—a rate of 54 per 10,000 live births.
- Death rates from congenital heart diseases fell by 27.6% among males and 32.2% among females over the period 1991–02.
- In 2000–02, death rates from congenital heart diseases among Indigenous Australians were 2.6 times those of other Australians.

Congenital heart diseases (those present at birth) represent around one-third of all congenital malformations. They are one of the biggest killers of infants less than one year old. Over 42% of the deaths from congenital heart diseases occur in those aged under five years.

Improvements in medical care such as better diagnostic tests (such as foetal cardiac diagnosis), new medications and surgical techniques have increased survival from congenital heart diseases. Over the past two decades, death rates from congenital heart diseases have fallen by around 48.9%. Hospitalisations for these conditions have increased by 19% in the last ten years.

What are congenital heart diseases?

Congenital heart diseases refer to disorders of the heart or central (main) blood vessels present at birth. Congenital conditions include abnormalities of the heart or heart valves, defects of vessels such as the aorta and pulmonary artery or combinations of defects. Symptoms may appear at birth or sometime thereafter and can include breathlessness or a failure to attain normal growth and development. However,

clinical signs can vary with each defect. Most children with congenital heart defects are treated with surgery or catheter-based techniques, usually in infancy or early childhood.

Risk factors for congenital heart diseases

In most cases, the cause of a baby's congenital heart disease is unknown. Some of the known risk factors include genetic factors; viral infections, such as rubella (German measles); maternal use of alcohol, over-the-counter and prescription medications, and illicit drugs during pregnancy; and maternal health factors, such as poorly controlled diabetes and poor nutrition.

How many Australians have congenital heart diseases?

It is not known how many Australians have congenital heart diseases. New cases are registered each year with state and territory birth defects registers—these data are presented below.

In 1997, there were 1,380 births with congenital heart diseases—a rate of 54 per 10,000 live births. This represents around one-third of all congenital malformations during 1997. The most common congenital heart defects in Australia are septal defects.

Septal defects

Septal defects allow blood to flow between the heart's right and left chambers due to an abnormal opening in the wall (septum) that separates the two sides of the heart. The defect is sometimes called 'a hole in the heart'. The two most common types of this defect are atrial septal defect and ventricular septal defect.

Ventricular septal defect refers to a hole in the wall (septum) between the heart's two pumping chambers (the ventricles). In 1997, there were 484 births with ventricular septal defects, representing a rate of 19 per 10,000 births.

Atrial septal defect refers to a hole in the wall (septum) between the heart's two collecting chambers (the atria). In 1997, there were 218 births with atrial septal defects, representing a rate of 9 per 10,000 births.

Patent ductus arteriosus (also known as persistent ductus arteriosus)

This is a defect in which the ductus arteriosus, which allows the blood to bypass the lungs during foetal life, fails to close at, or soon after, birth.

In 1997, there were 207 births with patent ductus arteriosus, representing a rate of 8 per 10,000 births.

Obstruction defects

An obstruction (or stenosis) is a narrowing that partially or completely blocks the flow of blood. The obstruction can occur in heart valves, arteries or veins. The three most common forms are pulmonary stenosis, coarctation of the aorta and aortic stenosis.

Pulmonary stenosis refers to narrowing of the pulmonary valve—located between the right ventricle and the pulmonary artery. In 1997, there were 68 births with 'isolated' pulmonary stenosis, representing a rate of 3 per 10,000 births.

Coarctation of the aorta refers to a narrowing of the aorta. The narrowing restricts blood flow to the lower body and increases blood pressure above the constriction. In 1997, there were 63 births with coarctation of the aorta, representing a rate of 3 per 10,000 births.

Aortic stenosis refers to an abnormality (narrowing) of the aortic valve—located between the left ventricle and the aorta—which results in the valve opening incompletely. In 1997, there were 50 births with aortic stenosis, representing a rate of 2 per 10,000 births.

Cyanotic defects

With these types of defects, blood pumped to the body contains less oxygen than normal. It causes a condition called cyanosis, a blue discolouration of the skin, and babies are often referred to as 'blue babies'. The most common cyanotic defects are Transposition of the great arteries and Tetralogy of Fallot.

Transposition of the great arteries refers to the reversal of the pulmonary artery and aorta. The aorta is connected to the right ventricle instead of the left and the pulmonary artery is connected to the left ventricle. In 1997, there were 79 births with transposition of the great arteries, representing a rate of 3 per 10,000 births.

Tetralogy of Fallot comprises four defects: narrowing of the pulmonary artery and its valve (pulmonary stenosis); a hole in the wall between the two lower chambers of the heart (ventricular septal defect); abnormal rightward positioning of the aorta (above the ventricular septal defect); and thickening (hypertrophy) of the right ventricle of the heart. In 1997, there were 54 births with Tetralogy of Fallot, representing a rate of 2 per 10,000 births.

Hypoplastic left heart syndrome

This refers to underdevelopment of the left side of the heart. This defect affects the aorta, aortic valve, left ventricle and mitral valve. In 1997, there were 54 births with hypoplastic left heart syndrome, representing a rate of 2 per 10,000 births.

Hospitalisation

In 2001–02, there were 4,960 hospitalisations where congenital heart diseases were the principal diagnosis (0.08% of all hospitalisations). Of the hospitalisations for congenital malformations, congenital heart diseases accounted for 14.6%.

Trends

Between 1993–94 and 2001–02, there was a 19.2% increase in the age-standardised hospitalisation rate for congenital heart diseases. The increase in congenital heart disease hospitalisations may be influenced by the changes in diagnostic technology over this period, such as foetal diagnosis.

Sex and age

In 2001–02, male and female hospitalisation rates for congenital heart diseases were similar.

Children aged less than 10 years accounted for 59.7% of hospitalisations. Only 15.3% of hospitalisations were in people aged 45 years or more.

Hospitalisations for congenital heart diseases, 2001–02

Number per 100,000 population
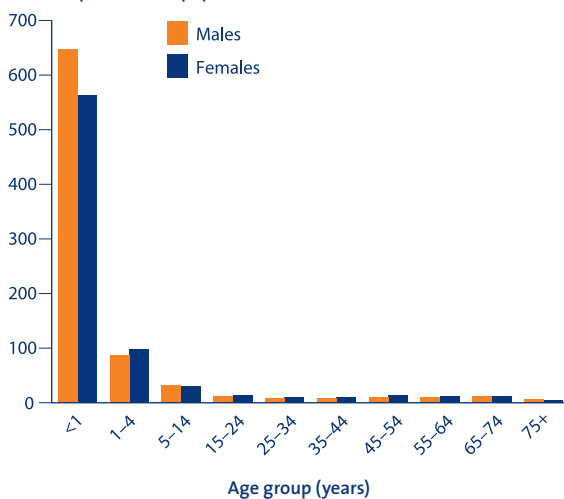
Source: AIHW National Hospital Morbidity Database.

Length of stay in hospital

In 2001–02, 52.9% of hospitalisations for congenital heart diseases were same-day hospitalisations, a large increase from 32.5% in 1993–94.

Among those hospitalised for at least one night, the average length of stay was 10.1 days, an increase from 1993–94 when it was 9.4 days.

Infants aged less than one year stayed in hospital nearly twice as long as children aged 5–10 years, 13.0 days compared with 6.8 days respectively (of those hospitalised for at least one night).

Deaths in hospital

In 2001–02, 1.4% of hospitalisations for congenital heart diseases ended in death, a decline from 3.1% in 1993–94.

Procedures for congenital heart diseases

In 2001–02 there were 889 procedures for closure of an atrial septal defect, 466 for closure of patent ductus arteriosus and 387 for closure of ventricular septal defect. These include both surgical and catheter-based procedures.

Where procedures were performed for patent ductus arteriosus and ventricular septal defect, most were done on children aged less than 10 years (90.6% and 85.8% respectively).

Procedures for atrial septal defect were spread more evenly over all ages, with only 42.5% of procedures in those aged less than 10 years.

Deaths

In 2002, congenital heart diseases accounted for 224 deaths (0.17% of all deaths) in Australia.

Perinatal deaths comprise stillbirths (foetal deaths) and deaths of infants within the first 28 days of life (neonatal deaths). In 2002, there were 72 perinatal deaths, of which 29 were foetal deaths and 43 were neonatal deaths.

Trends

Between 1991 and 2002, death rates from congenital heart diseases declined at a rate of 4.8% per year for males and 4.9% per year for females. This produced a total decline of 27.6% for males and 32.2% for females over the 12-year period. Among children aged under five years, declines in death rates have been much steeper, 50.1% for males and 40.4% for females.

As well as improvements in treatments, declines in death rates may also have been influenced by the early diagnosis of complex congenital heart diseases in pregnancy and terminations for these foetal malformations.

The proportion of deaths from congenital heart diseases occurring in young children has declined markedly over the last two decades. In 1983, deaths were most common in children aged under five years, accounting for 73.7% of deaths. By 2002, only 42.4% of deaths from congenital heart diseases occurred in this age group.

Deaths from congenital heart diseases, for selected ages, 1983–2002

Number per 100,000 population
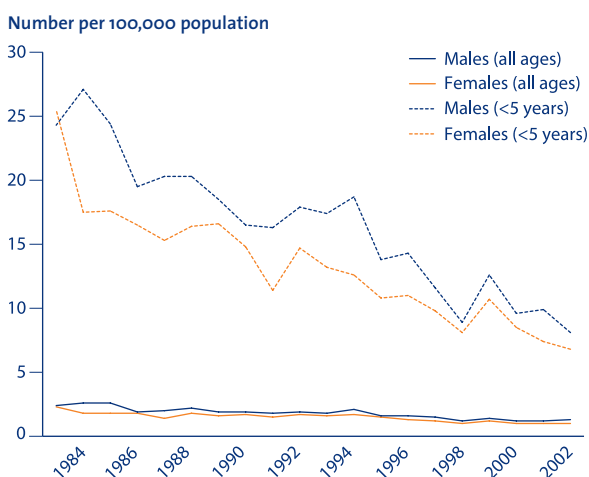
Source: AIHW National Mortality Database.

Sex and age

Death rates from congenital heart diseases were similar between males and females. Death rates declined with age—over 42% of the deaths from congenital heart diseases occurred in those aged under 5 years.

Socioeconomic status

In 2000–02, there were no significant differences in death rates from congenital heart diseases between the most and least disadvantaged areas.

Aboriginal and Torres Strait Islander peoples

In 2000–02, Aboriginal and Torres Strait Islander peoples[20] were 2.6 times as likely to die from congenital heart diseases compared with other Australians.

Region

In 2000–02, death rates from congenital heart diseases were overall higher in remote areas of Australia than in major cities. The higher death rate in remote areas largely reflects the high proportion of the Indigenous population in these areas and the higher rate of deaths for Indigenous people overall in Australia. Death rates in regional areas were not significantly different to those in major cities.

State and territory

In 2002, death rates for congenital heart diseases varied between the states, from 17.3% above the national average to 17.4% below the national average. Death rates were highest in New South Wales and lowest in Western Australia. The number of deaths in Tasmania and the territories was too small to draw any reliable conclusions. For more information see the National Cardiovascular Disease Database <http://www.aihw.gov.au/cvdhtml/cvd-menu.htm>.

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20 Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

Health inequalities

Deaths from congenital heart diseases

Year	Population subgroup	Males	Females	Persons
			Number per 100,000 population	
2002	**Age group (years)**			
	0–4	8.1	6.8	7.5
	5–14	0.5	0.4	0.4
	15–24	0.8	0.4	0.6
	25–34	0.9	0.8	0.9
	35–54	0.7	0.5	0.6
	55–74	0.8	0.7	0.8
	75 and over	1.5	1.4	1.5
	All ages (ASR)	*1.3*	*1.0*	*1.2*
2000–02	**Socioeconomic status (IRSD)**			
	1st quintile (most disadvantaged)	1.6	1.1	1.4
	2nd quintile	1.3	1.2	1.3
	3rd quintile	1.3	0.9	1.1
	4th quintile	0.9	0.9	0.9
	5th quintile (least disadvantaged)	0.9	0.8	0.8
2000–02	**Aboriginal and Torres Strait Islander status**			
	Standardised mortality ratio	2.8[#]	2.3	2.6[#]
2000–02	**Region (ASGC remoteness structure)**			
	Major cities	1.1	0.8	1.0
	Regional	1.4	1.2*	1.3*
	Remote	1.9	1.9	1.9*

*　Statistically significant difference when compared with the first row in the population subgroup.

#　Statistically significant difference from 1.0 (other Australians).

Notes

1.　Standardised mortality ratio = observed deaths divided by expected deaths. For further information see Methods and data sources section.

2.　Data for all ages.

3.　Significance testing was not performed on the age groups.

4.　All rates other than age-specific rates and standardised mortality ratio are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW National Mortality Database.

Further reading

AIHW 2003. Rural, regional and remote health: a study on mortality. AIHW Cat. No. PHE 45. Canberra: AIHW (Rural Health Series No. 2).

AIHW: Hurst T, Shafir E & Lancaster P 2001. Congenital malformations, Australia, 1997. Sydney: AIHW National Perinatal Statistics Unit (Birth Defects Series No. 4).

American Heart Association 2003. Congenital cardiovascular defects. Viewed 3 October 2003, <http://www.americanheart.org/presenter.jhtml?identifier=4565>.

Risk factors and associated conditions for heart, stroke and vascular diseases

4   Introduction

Risk factor is the term given to a range of health-related behaviours and biomedical conditions that can affect the health of an individual in a negative way. For heart, stroke and vascular diseases they include genetic, behavioural and biomedical factors, although there is a growing body of evidence that the determinants of health go beyond these to the underlying social, economic, psychological and cultural factors that can contribute to disease. Risk factors include both modifiable and non-modifiable factors.

Assessing the prevalence of risk factors in the population is useful in understanding trends in disease prevalence, incidence and death as well as predicting future trends, and can help to explain why some groups have better or worse health than others. Monitoring their prevalence can also provide insight into the success of health-related campaigns or the need to initiate health promotion interventions.

What are the risk factors for heart, stroke and vascular diseases?

The major preventable risk factors for heart, stroke and vascular diseases are tobacco smoking, insufficient physical activity, poor nutrition, alcohol consumption, high blood pressure, high blood cholesterol, overweight and diabetes.

Behavioural risk factors can influence biomedical (physiological) risk factors (e.g. poor nutrition and insufficient physical activity can lead to overweight, high blood pressure and high blood cholesterol). Behavioural and biomedical risk factors have the potential to be modified.

The risk factors presented in this chapter are:

Behavioural factors

- tobacco smoking
- insufficient physical activity
- poor nutrition
- alcohol consumption.

Biomedical factors

- high blood pressure
- high blood cholesterol
- overweight
- diabetes
- kidney (renal) failure.

Diabetes and kidney (renal) failure are both risk factors and associated conditions for heart, stroke and vascular diseases.

Although this report presents sections on individual risk factors, the actual risk of developing a heart, stroke or vascular disease depends on the 'intensity' of abnormalities (or levels) of risk factors.

Burden of risk factors

From the 1996 Burden of Disease and Injury Study, tobacco smoking was estimated to be the risk factor responsible for the greatest burden of disease (in terms of deaths and disability) in Australia, accounting for about 12% of the total burden of disease and injury in males and 7% in females, or 10% overall. This is followed by insufficient physical activity, responsible for about 7% of the total burden. Diabetes, high blood pressure and excessive alcohol consumption each account for about 5% of the total burden, overweight and obesity just over 4%, and high blood cholesterol and inadequate fruit and vegetable consumption about 3% each.

How many Australians have a modifiable risk factor for heart, stroke and vascular diseases?

In the 2001 National Health Survey, respondents were asked about their health and health behaviours. The results indicate that nine in ten Australians surveyed aged 18 years and over report having at least one of the following risk factors: tobacco smoking, excessive alcohol consumption, high blood pressure, high blood cholesterol, insufficient physical activity, overweight or diabetes. This corresponds to an estimated 13.1 million Australians affected.

Multiple risk factors

The more risk factors a person has, the greater his or her risk of developing heart, stroke and vascular diseases.

In 2001, based on self-reported information, more women (35.3%) than men (26.2%) aged 18 years and over had just one risk factor, whereas more men (26.1%) than women (20.9%) had three or more risk factors. The prevalence of three or more risk factors, as expected, is more common among older people (about one in three aged 65 years and over).

Other factors

Psychosocial factors, atrial fibrillation and transient ischaemic attack (TIA) can also affect the development of heart, stroke and vascular diseases. Due to limited data available, they are only briefly discussed in this section.

Psychosocial factors

A 2003 review by the NHFA concluded that depression, social isolation and lack of quality social support are substantial independent risk factors for coronary heart disease. The increased risk contributed by these psychosocial risk factors is of

a similar order to other risk factors such as tobacco smoking, high blood pressure and high blood cholesterol. Depression is common in Australia with up to one in four females and one in six males likely to suffer from it at some time in their lives. Less is known about the prevalence and the impact of social isolation and lack of social support.

Atrial fibrillation

Atrial fibrillation is a condition in which the heart's two pumping chambers (the atria) quiver instead of beating regularly. Blood isn't pumped completely out of them, so it may pool and clot. If a piece of a blood clot in the atria leaves the heart and becomes lodged in an artery in the brain, a stroke may result. Atrial fibrillation affects 5% of people aged 65 years and over and increases their risk of stroke by five to six times compared with those of similar age.

Transient ischaemic attack

TIA is a temporary interruption of the blood supply to an area of the brain. A TIA may cause no permanent disability and can last up to 24 hours, but most last only a few minutes. A TIA is an important predictor of stroke and heart attack in the future.

Further reading

Bunker SJ, Colquhoun DM, Esler MD et al. 2003. Position statement. 'Stress' and coronary heart disease: psychosocial risk factors. NHFA position statement update. Med J Aust 178(6):272–6.

Hankey GJ, on behalf of the National Blood Pressure Advisory Committee of the National Heart Foundation of Australia 2001. Position statement. Non-valvular atrial fibrillation and stroke prevention. Med J Aust 174:234–348.

4 Tobacco smoking

Key points

- Tobacco smoking increases the risk of coronary heart disease, stroke and peripheral vascular disease.
- In 2001, almost 3.06 million (just below 20%) Australians aged 14 years and over smoked daily. A further 4% (almost 600,000 persons) smoked occasionally.
- Smoking rates among Australian adults fell steadily since the early 1970s and this trend continues.
- For people aged 14 years and over, smoking was more common in the most disadvantaged areas than in the least disadvantaged.
- Indigenous Australians were twice as likely to smoke compared with other Australians.

Tobacco smoking increases the risk of coronary heart disease, stroke and peripheral vascular disease, as well as a range of cancers and other diseases and conditions. The nicotine and carbon monoxide in tobacco smoke reduce the amount of oxygen in the blood and damage blood vessel walls, causing plaque to build up. Tobacco smoke may also trigger the formation of blood clots. Exposure to second-hand smoke also has serious health consequences, including increased risk of coronary heart disease and respiratory problems among adults and children.

What is tobacco smoking?

Smoking in this report refers to the smoking of tobacco products, including packet cigarettes, roll-your-own cigarettes, pipes and cigars. 'Daily smokers' refers to those who smoke at least one cigarette per day, and 'occasional smokers' refers to those who smoke less often than daily.

How many Australians smoke?

Based on self-reports from the 2001 National Drug Strategy Household Survey, 19.5% of Australians aged 14 years and over smoked on a daily basis. This corresponds to almost 3.06 million Australians. This is the first time that the prevalence of daily smoking has dropped below 20%. A further 4% (almost 600,000 persons) reported occasional smoking and were thus also at risk of developing coronary heart disease and other chronic conditions associated with the smoking of tobacco products.

Trends

Smoking rates among Australian adults have declined steadily since the early 1970s, and this trend continues. Smoking rates have declined by 21% for males and 16% for females over the last decade. The greatest recent decline (between 1998 and 2001) was among those aged 20–29 years. The fall was greater for women than for men in this age group.

People who were daily smokers, aged 14 years and over, 1991–01
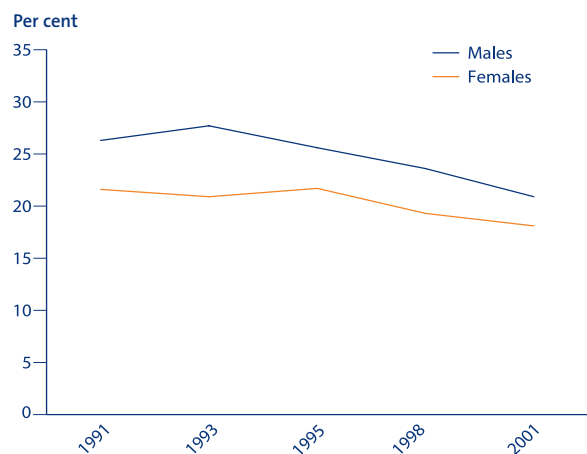
Per cent

Notes

1. Based on self-reports.

2. Age-standardised to the 2001 Australian population.

Sources: National Campaign Against Drug Abuse Household Survey 1991, 1993; National Drug Strategy Household Survey 1995, 1998, 2001.

Sex and age

In 2001, an estimated 21.1% of males and 18.0% of females aged 14 years and over were daily smokers. The highest rates of daily smoking occurred among men and women aged 20–29 years (26%). Beyond this age regular smoking declines, with those aged 60 years or more recording the lowest rates of daily smoking (9%). Around 15% of young people (aged 14–19 years) were daily smokers.

Around 30% of males and 23% of females aged 14 years and over reported that they were former smokers, while a further 45% and 56%, respectively, stated that they had never smoked.

People who were daily smokers, aged 14 years and over, 2001
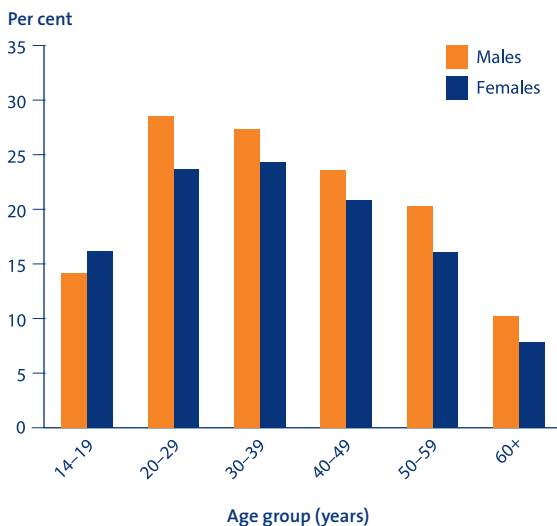
Note: Based on self-reports.

Source: AIHW analysis of the 2001 National Drug Strategy Household Survey.

Socioeconomic status

In 2001, people aged 14 years and over in the most disadvantaged areas were more likely to smoke than those in the least disadvantaged areas (24% compared with 14%).

It is important to note that this measure of inequality relates to the average disadvantage of all people living in the area and will generally understate the true inequality at the individual level.

Aboriginal and Torres Strait Islander peoples

In 2001, Aboriginal and Torres Strait Islander peoples aged 14 years and over were twice as likely to smoke compared with other Australians (43% compared with 19%). Indigenous Australians were less likely than other Australians to be former smokers or to have never smoked.

Region

In 2001, people aged 14 years and over living in rural and remote areas were more likely to smoke than those living in urban areas (22% compared with 19%). Further, 52% of urban Australians reported that they had never smoked, compared with 47% of Australians in rural and remote areas.

State and territory

In 2001, among people aged 14 years and over, smoking rates were highest in the Northern Territory (28%) and lowest in New South Wales (18%). This compares with the national average of just under 20%.

International comparisons

Tobacco consumption is highly prevalent in many countries of the world. In 2001, of those countries compared in the OECD Health Database, Turkey reported the highest consumption of tobacco at 2,380 grams per capita per year for those aged 15 years and over, while Finland reported the lowest at 992 grams. Australia's consumption of tobacco was 1,269 grams per capita and was towards the lower end of consumption of the countries compared.

4

Tobacco consumption, grams per capita, people aged 15 years and over, selected countries, 2001

Country	Grams per capita
Turkey	~2,380
Netherlands	~2,320
France	~2,040
Iceland	~1,760
Poland	~1,710
United States	~1,540
Denmark	~1,520
Norway	~1,430
Canada	~1,430
Australia	~1,270
United Kingdom	~1,230
New Zealand	~1,140
Finland	~990

Grams per capita
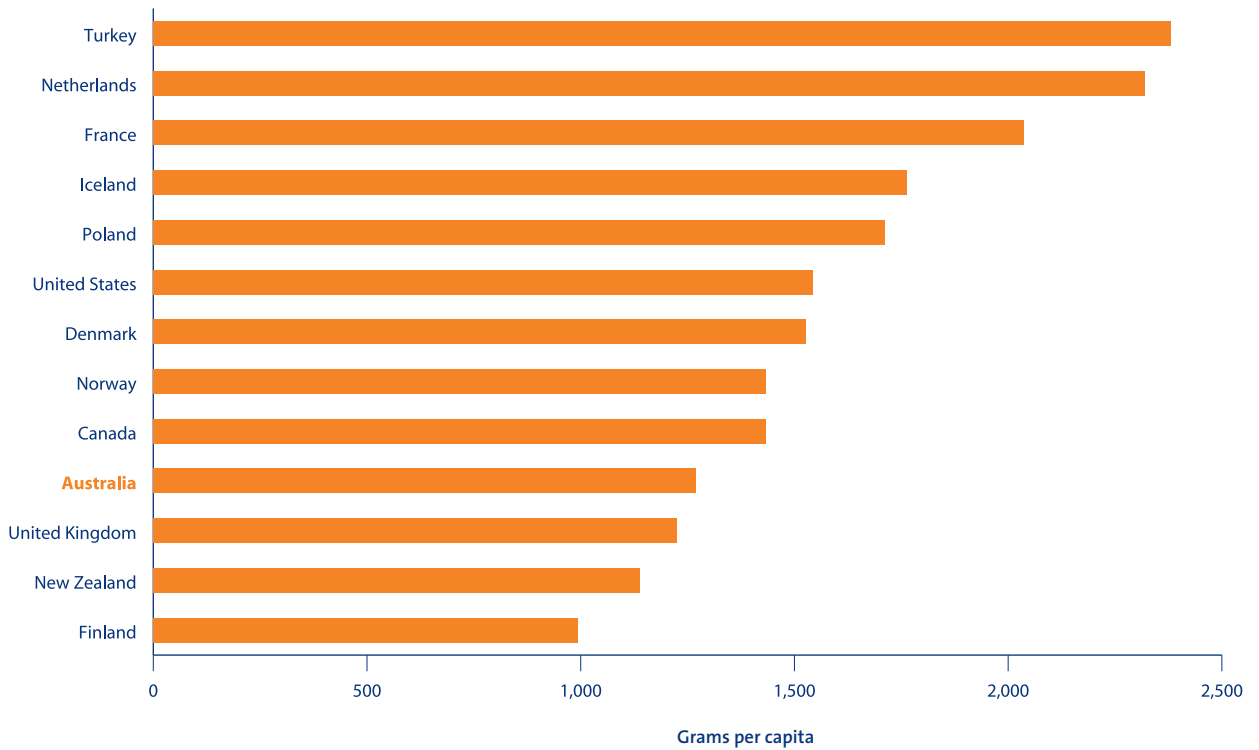
Source: AIHW 2002b.

Health inequalities

People who were daily smokers, 2001

Population subgroup	Males	Females	Persons
			Per cent
Age group (years)			
14–19	14.1	16.2	15.1
20–29	28.5*	23.7*	26.1*
30–39	27.3*	24.3*	25.7*
40–49	23.6*	20.8	22.2*
50–59	20.3*	16.1	18.2
60 and over	10.2	7.8*	8.9*
Ages 14 and over (ASR)	*20.9*	*18.1*	*19.5*
Socioeconomic status (IRSD)			
1st quintile (most disadvantaged)	24.5	22.8	23.6
2nd quintile	22.6	20.6	21.6
3rd quintile	21.4	18.1*	19.8*
4th quintile	20.6	18.0*	19.2*
5th quintile (least disadvantaged)	16.0*	11.8*	13.9*
Aboriginal and Torres Strait Islander status			
Aboriginal and Torres Strait Islander peoples	44.2	42.4	43.2
Other Australians	20.6*	17.7*	19.1*
Region (RRMA)			
Urban	19.7	17.4	18.6
Rural/remote	24.1*	19.9*	22.0*

* Statistically significant difference when compared with the first row in the population subgroup.

Notes

1. Based on self-reports.
2. Data for ages 14 years and over.
3. All rates other than the age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 2001 National Drug Strategy Household Survey.

4

Further reading

AIHW 2002a. 2001 national drug strategy household survey: detailed findings. AIHW Cat. No. PHE 41. Canberra: AIHW (Drug Statistics Series No. 11).

AIHW 2002b. Statistics on drug use in Australia 2002. AIHW Cat. No. PHE 43. Canberra: AIHW (Drug Statistics Series No. 12).

AIHW: Ridolfo B & Stevenson C 2001. The quantification of drug-caused mortality and morbidity in Australia, 1998. AIHW Cat. No. PHE 29. Canberra: AIHW (Drug Statistics Series No. 7).

OECD 2003. OECD health data 2003, 3rd edition: a comparative analysis of 30 countries (CD-ROM). Paris: OECD.

Insufficient physical activity

Key points

- Being physically active reduces the risk of heart, stroke and vascular diseases.
- In 2000, 54% of Australians aged 18–75 years did not undertake sufficient physical activity for health benefits (7.27 million Australians). Around 15% were sedentary and around 39% reported some activity, but not enough to be categorised as 'sufficient'.
- Between 1997 and 2000, the proportion who were not sufficiently active rose from 49% to 54%.

Being physically active reduces the risk of heart, stroke and vascular diseases, particularly coronary heart disease. People who do not participate in regular physical activity are almost twice as likely to die from coronary heart disease as those who do. Insufficient physical activity is one of the most widespread of the established coronary risk factors. It is almost as important as tobacco smoking, and similar to high blood pressure and high blood cholesterol, in contributing to the prevalence of heart, stroke and vascular diseases in Australia.

Evidence suggests that regular physical activity may play a protective role against stroke. Leisure-time physical activity and vigorous work-related physical activity have been shown to lower the incidence of stroke.

Insufficient physical activity is linked to other risk factors for heart, stroke and vascular diseases such as overweight and obesity, high blood pressure, unfavourable levels of high-density lipoprotein (HDL) and total blood cholesterol, and Type 2 diabetes. There is also evidence that people who increase their level of physical activity reduce their levels of these risk factors.

What is sufficient physical activity?

The *National Physical Activity Guidelines for Australians* recommend 'at least 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week' to achieve health benefits. This is generally interpreted as 30 minutes on at least five days of the week; a total of at least 150 minutes of moderate-intensity activity per week. Examples of moderate-intensity activity include brisk walking, swimming, doubles tennis and cycling.

For population-monitoring purposes, 'sufficient time and sessions' is the recommended measure of sufficient physical activity for health as it takes into account the frequency and duration of physical activity. Research suggests that health benefits result from activity undertaken in a number of short sessions of 10 minutes or more as well as from longer sessions of 30 minutes or more. 'Sufficient time and sessions' is defined as at least 150 minutes (two-and-a-half hours) of physical activity accrued over at least five separate sessions (10 minutes or more) in the previous week. People reporting no physical activity at all during the previous week are classed as 'sedentary'.

Information presented in this section relates to walking, other moderate activity and vigorous activity during leisure time. Non-leisure activity such as work or domestic activity also contributes to overall physical activity, but is not currently collected in national population surveys.

How many Australians are not sufficiently active?

In 2000, more than half (54%) of Australians aged 18–75 years did not undertake physical activity at the levels recommended to achieve health benefits. This corresponds to 7.27 million Australians. Around 15% of people were sedentary in their leisure time and around 39% reported some activity, but not enough to be categorised as 'sufficient'.

Trends

Between 1997 and 2000, the proportion of people who were not sufficiently active rose from 49% to 54%. The increase occurred among men and women and across all age groups with the exception of those aged 60–75 years (for whom activity levels remained fairly constant).

People who were not sufficiently active, aged 18–75 years, 1997, 1999 and 2000

Per cent

— Men
— Women
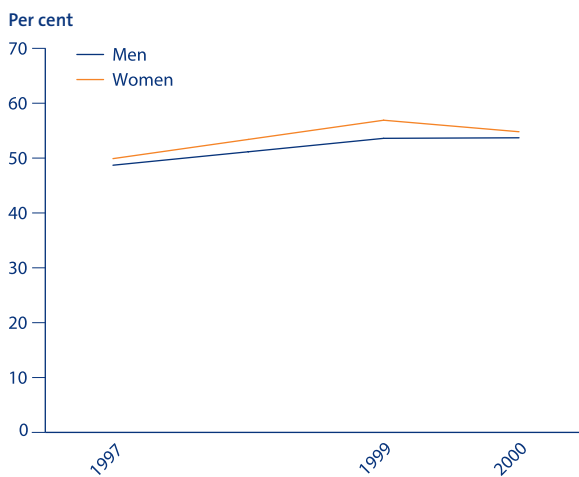
Notes

1. Based on self-reports.
2. Age-standardised to the 2001 Australian population.
3. 'Sufficient' physical activity is at least 150 minutes of activity accrued over at least five separate sessions in the previous week.

Source: AIHW analysis of the 1997, 1999, 2000 National Physical Activity Surveys.

Sex and age

In 2000, 55% of women and 54% of men were not sufficiently active. More men than women reported being sedentary in their leisure time (18% of men compared with 13% of women). Around 41% of women and 36% of men reported some physical activity, but for either insufficient time or too few sessions.

Rates of insufficient physical activity (including those who were sedentary) were highest among 30–59-year-olds (around 59%) and lowest among 18–29-year-olds (42%). The proportion of people who were sedentary increased with age from 10% in those aged 18–29 years to 18% in those 45–75 years of age.

People who were not sufficiently active, aged 18–75 years, 2000

Per cent

Men
Women

Age group (years)

Notes

1. Based on self-reports.
2. 'Sufficient' physical activity is at least 150 minutes of activity accrued over at least five separate sessions in the previous week.

Source: AIHW analysis of the 2000 National Physical Activity Survey.

Socioeconomic status

Educational attainment was used as an indicator of socioeconomic status. In 2000, people with less than 12 years of education were more likely to be insufficiently active (61%) than people who completed secondary school (52%) and those who completed a TAFE or tertiary qualification (51%). Around one in five adults with fewer than 12 years of education reported being sedentary in their leisure time, nearly twice the rate of those in the TAFE- or tertiary-educated group.

Aboriginal and Torres Strait Islander peoples

Comparable data on levels of insufficient physical activity are not available for Indigenous Australians.

Region

Comparable data on levels of insufficient physical activity are not available by region.

State and territory

Comparable data on levels of insufficient physical activity are not available by all states and territories.

International comparisons

Comparable international data on levels of insufficient physical activity are not available.

Health inequalities

People who were not sufficiently active, 2000

Population subgroup	Men	Women	Persons
		Per cent	
Age group (years)			
18–29	39.6	44.8	42.2
30–44	58.5*	57.6*	58.0*
45–59	58.1*	59.4*	58.7*
60–75	56.8*	56.0*	56.4*
Ages 18–75 (ASR)	*53.7*	*54.8*	*54.2*
Socioeconomic status (highest level of education)			
Did not complete secondary school	63.1	59.3	60.6
Completed secondary school	49.5*	54.3	51.6*
TAFE/tertiary	49.2*	52.7	50.8*
Aboriginal and Torres Strait Islander status	n.a.	n.a.	n.a.
Region	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes
1. Based on self-reports.
2. Data for ages 18–75 years.
3. All rates other than the age-specific rates are age-standardised (ASR) to the 2001 Australian population.
4. 'Sufficient' physical activity is at least 150 minutes of activity accrued over at least five separate sessions in the previous week.
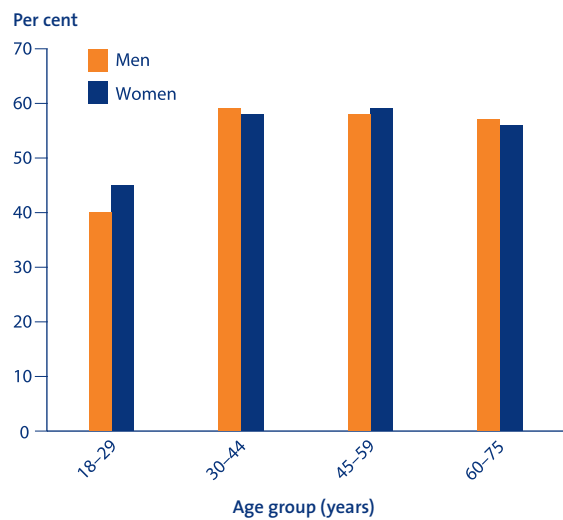
Source: AIHW analysis of the 2000 National Physical Activity Survey.

Further reading

ABS 2002. 2001 national health survey: Aboriginal and Torres Strait Islander results, Australia. ABS Cat. No. 4715.0. Canberra: ABS.

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4   Poor nutrition

Key points

- The effect of nutrition on the risk of coronary heart disease and stroke results from the combined effects of individual dietary factors and total energy intake if it leads to overweight and obesity.
- Between 1983 and 1995, average energy intake in 25–64-year-olds increased significantly by about 350 kJ per day. Total fat intake declined, protein intake did not change significantly but intake of carbohydrates increased by 16–17%.
- The consumption of saturated fat, which can increase the risk of coronary heart disease, is above recommended levels. That of polyunsaturated fatty acids, which can reduce the risk of coronary events and deaths, is below recommended levels.
- A high dietary intake of salt may contribute to raise blood pressure. No national data exist to assess levels of salt consumption among Australians. However, in one study conducted in Hobart in the mid-1990s, only 6% of men and 36% of women were below the maximum levels recommended.
- The 2001 National Health Survey showed that Australian adults need to eat more fruit and vegetables to minimise the risk of heart, stroke and vascular diseases.

The effect of nutrition on the risk of coronary heart disease and stroke results from the combined effects of individual dietary factors and total energy intake if it leads to overweight and obesity. Heart, stroke and vascular diseases cannot be attributed to any one dietary component alone. Nutrition affects several biomedical conditions and other risk factors (e.g. blood pressure, blood cholesterol levels, micronutrient levels, overweight and obesity, and diabetes).

Dietary guidelines for Australians recommend consumption of a wide variety of nutritious foods. Essential nutrients for good health are found in varying amounts throughout many food groups. Variety in a diet maximises the possibility of

obtaining enough of these essential nutrients. Food variety can be defined as the consumption of foods that are biologically diverse or nutritionally distinct from each other. Data from the 1995 National Nutrition Survey showed that the variety of food consumed in Australia had increased significantly since the previous survey in 1983.

There have been very few data collected in recent years on the food and nutrient intake of Australians. Therefore much of the following discussion relates to data that are five to ten years old.

Dietary risk factors for heart, stroke and vascular diseases

Energy intake

Between 1983 and 1995, average energy intake among comparable samples of 25–64-year-olds increased significantly by about 350 kJ per day. Fats are the most concentrated forms of energy but total fat intake over this time declined among this population. Protein intake did not change significantly but intake of carbohydrates increased by 16–17%.

Total intake of fat

Recent evidence suggests that total fat intake is not an independent risk factor for coronary heart disease, but a diet high in fat may contribute to an increased risk of being overweight. Among Australian men and women aged 25–64 years, average total fat intake (i.e. saturated, monounsaturated and polyunsaturated) declined significantly between 1983 and 1995. In 1995, total fat accounted for about 33% of the total energy intake of Australian adults—a significant reduction from around 37% in the 1980s (or between 100 and 200 kJ per day). However, this level is still above the National Health and Medical Research Council's (NHMRC's) recommended level of 30% and is well above the recommended 20–25% for anyone who is overweight.

Average energy intake among adults in capital cities aged 25–64 years, 1983 and 1995

Average energy intake (kJ)

Men

Average energy intake (kJ)
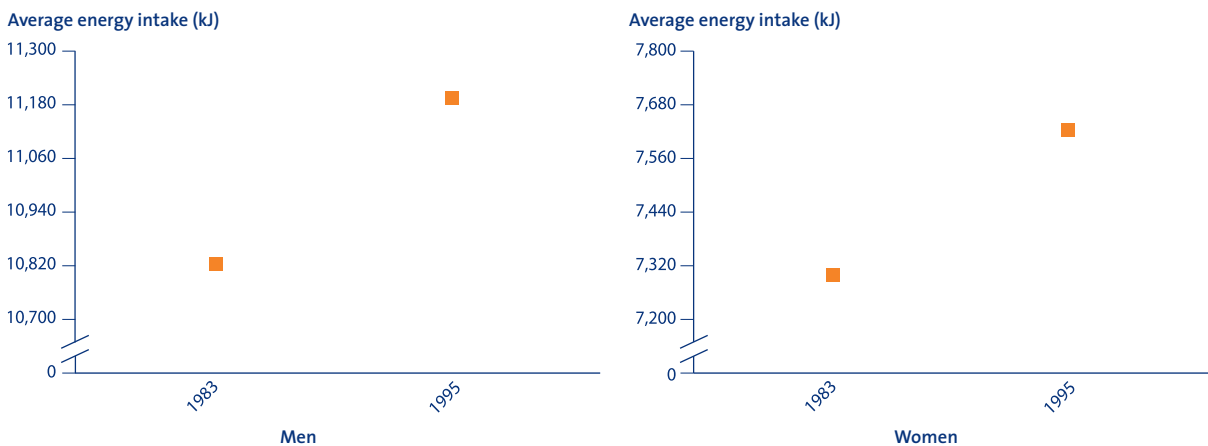
Women

Notes

1. Different scales have been used for men and women due to their differing dietary requirements and intake.

2. The difference between estimated average energy intake for 1983 and 1995 is statistically significant at the 0.01 level.

3. Data excludes the Northern Territory and Australian Capital Territory.

Source: Cook, Rutishauser & Seelig 2001.

Intake of saturated fatty and trans fatty acids

There is good evidence to support an association between a high consumption of saturated fatty acids and an increased risk of coronary heart disease. Saturated fatty acids increase the risk of coronary heart disease by increasing total and low-density lipoprotein (LDL) cholesterol (the 'bad' cholesterol). Among Australian adults, the contribution of saturated fat as a proportion of total energy intake has declined over the past decade. However, saturated fat still accounts for around 13% of total energy intake, higher than the maximum level of 10% recommended by the NHMRC. Consumption of saturated fat is slightly higher among younger Australians than among older Australians. The major sources of saturated fats in the adult diet are milk, cream, cheese, butter, pastries and fatty meat.

Trans fatty acids are a minor group of fats that occur in small amounts in meat fat and dairy fat as well as in 'hardened margarines' used in the production of baked and pastry products. Table (or 'soft') margarines and spreads on the Australian market

Saturated fat as a proportion of total energy intake, 1995

Per cent
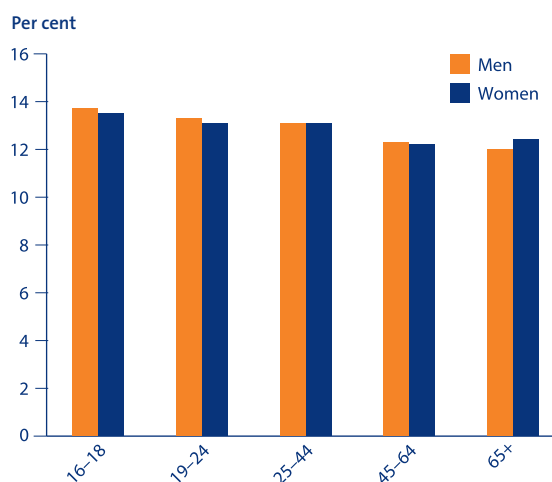
Source: ABS & DHFS 1997.

are virtually free of trans fatty acids. A high intake of trans fatty acids increases the risk of coronary heart disease by increasing total blood cholesterol and LDL cholesterol, and decreasing HDL cholesterol (the 'good' cholesterol). Currently there are no national data to assess trans fatty acid intake among Australians although it is believed to be between 1–2% of total fat.

To minimise the risk of coronary heart disease the NHFA recommends that saturated fatty acids and trans fatty acids together contribute no more than 8% of total energy intake.

Intake of polyunsaturated fatty acids

There is good evidence for replacing saturated fatty acids with n-6 polyunsaturated fatty acids (found primarily in vegetable oils and spreads made from seeds such as sunflower and soybean) to reduce the risk of coronary events and death, and to lower total cholesterol, LDL cholesterol and triglycerides. In 1995, the average Australian intake was 5% of total energy intake which is below the NHMRC's recommended range of 6–8%. Similarly the current intake of n-3 polyunsaturated fatty acids (found in oily fish, leafy plants, and canola and flaxseed oil) among Australian adults is low (about 0.2 g). The NHFA recommends the consumption of at least two fish meals (preferably oily fish) per week, and the intake of plant n-3 polyunsaturated fatty acids of at least two grams per day.

Intake of dietary cholesterol

There is some evidence that dietary cholesterol contributes to an increased risk of coronary heart disease but the risk is substantially less than for saturated and trans fatty acids. The major sources of dietary cholesterol are eggs, meat, poultry and milk. Among a comparable sample of the Australian population aged 25–64 years, average intake of dietary cholesterol decreased by about 60 mg between

1983 and 1995. In 1995, the average daily intake of dietary cholesterol among Australian men was 358 mg, and among women, 240 mg. The NHFA recommends that people at low risk of coronary heart disease can consume moderate quantities of cholesterol-rich foods. People with blood cholesterol levels greater than 5.0 mmol/L or with other risk factors should restrict their intake of cholesterol-rich foods.

High consumption of salt

Existing evidence suggests that a high dietary intake of salt may contribute to the rise in blood pressure that occurs with increasing age in western countries. No national data exist to assess levels of salt consumption among Australians. However, in one study conducted in Hobart in the mid-1990s, only 6% of men and 36% of women were below the maximum intake for sodium of 100 mmol/day recommended by the NHMRC. The source of most dietary sodium in Australia, as in other western countries, is not discretionary salt use (i.e. salt added to cooking and at the table) but widely consumed processed foods such as bread, cheese, processed meats and snack foods. Because of this, the Australian dietary guidelines for adults recommends that the entire population reduce its salt consumption as a primary preventive measure against high blood pressure.

Consumption of fruit and vegetables

There is good evidence that increased consumption of fruit and vegetables reduces the risk of heart, stroke and vascular diseases. Protection may arise from reduced risk of developing atherosclerosis, a reduction in blood cholesterol levels, a reduction in levels of homocysteine (which is a possible risk factor for coronary heart disease) and reduced blood pressure. The Australian dietary guidelines for adults recommend consuming at least two serves of fruit and at least five serves of vegetables per day. Based on self-reports from the 2001 National Health Survey, these recommendations were more likely to be met

by older people than younger people, with men aged 19–34 years reporting the lowest levels of fruit and vegetable consumption (62% not consuming enough fruit and 79% not consuming enough vegetables).[21] Generally, more women than men met the recommended levels of consumption—about 60% of women and less than 50% of men consumed two or more serves of fruit, and about 35% of women and less than 30% of men consumed four or more serves of vegetables. Based on these results, the adult population as a whole needs to increase its fruit and vegetable consumption to minimise the risk of heart, stroke and vascular diseases.

International comparisons

In 2000 in the United States, 80% of men and 70% of women aged 20 years or more consumed less than five serves of fruit and vegetables per day. At the same time, in the United Kingdom among 19–64-year-olds, 87% of men and 85% of women reported low levels of fruit and vegetable consumption, and in Canada the prevalence among those aged 12 years or more was 67% of males and 57% of females.

In 1999–00, dietary intake in the United States, among all ages, showed that fat on average comprised 33% of energy intake, with little difference by age. Saturated fat intake among adults was about 11%; above the level recommended in the United States of 10% of energy intake. In New Zealand in 1997, 35% of energy came from fat in the diet of both males and females aged 15 years and older, with saturated fat comprising about 15%.

These results indicate that fruit and vegetable intake needs to increase and saturated fat intake needs to fall to minimise the risk of heart, stroke and vascular diseases arising from poor nutrition.

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21 Analysis of vegetable consumption differs slightly from the recommended number of serves (it is based on 'less than four serves' not less than five) because the data did not permit analysis based on 'less than five serves'.

Health inequalities

People with a low intake of fruit and vegetables, 2001

Population subgroup	Proportion usually consuming less than 2 serves of fruit per day			Proportion usually consuming less than 4 serves of vegetables per day		
	Men	Women	Persons	Men	Women	Persons
			Per cent			
Age group (years)						
19–34	61.6	50.2	55.9	79.2	74.5	76.8
35–54	55.2*	43.2*	49.1*	73.0*	65.1*	69.0*
55–74	43.9*	30.0*	36.9*	67.4*	58.5*	62.9*
75 and over	38.1*	31.7*	34.3*	63.9*	61.4*	62.4*
Ages 19 and over (ASR)	*53.3*	*41.5*	*47.4*	*73.0*	*66.3*	*69.6*
Socioeconomic status (IRSD)						
1st quintile (most disadvantaged)	56.0	46.6	51.1	73.9	67.3	70.4
2nd quintile	56.7	42.9	49.8	71.8	66.6	69.2
3rd quintile	53.2	40.6	46.6	71.3	64.1	67.6
4th quintile	53.3	39.9*	46.6	72.4	67.2	69.7
5th quintile (least disadvantaged)	48.1*	38.6*	43.4*	75.7	66.3	71.0
Aboriginal and Torres Strait Islander status	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Regions (ASGC remoteness structure)						
Major cities	52.4	41.6	46.9	77.2	70.7	73.9
Inner regional	54.7	39.8	47.1	66.0*	56.1*	60.8*
Other areas	56.1	45.2	50.6	61.8*	59.0*	60.6*

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on self-reports.
2. Data for ages 19 years and over.
3. All rates other than age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 2001 National Health Survey.

Further reading

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4   Alcohol consumption

Key points

- Low to moderate consumption of alcohol is potentially protective whereas high consumption is associated with higher risk of heart, stroke and vascular diseases.
- The vast majority of people consume alcohol in moderation—73% of Australians aged 14 years and over in 2001. By contrast, 10% of those aged 14 years and over drank at levels harmful to their overall health (1.54 million Australians). About 18% of people aged 14 years and over abstained from alcohol.
- In 2001, among people aged 14 years and over, 10.5% of Indigenous Australian males drank alcohol at 'risky' levels compared with 6.7% for other Australian males. Similar proportions of Indigenous Australian females and other Australian females drank at 'risky' levels (around 7%).

The impact of alcohol consumption on heart, stroke and vascular diseases varies with levels of consumption—low to moderate consumption of alcohol is potentially protective whereas high consumption is associated with higher risk of heart, stroke and vascular diseases. High intake of alcohol (and particularly binge drinking) is associated with higher blood pressure and increased risk of death from stroke. Alcohol can also have an impact on blood triglyceride levels, complicating the effects of high blood cholesterol where present.

Many studies indicate that non-drinkers have a greater risk of heart attack and death from coronary heart disease than those with a moderate alcohol intake. The reasons for this are not yet entirely clear and the issues surrounding the protective or harmful effects of alcohol consumption are somewhat controversial. The benefit of low to moderate alcohol consumption in protecting against coronary heart disease (one to two drinks per day for men and less than one per day for women) relates mainly to men over 40 years of age and post-menopausal women.

Although alcohol is widely used and enjoyed in Australia, there are many cultural, social and health reasons why people choose not to drink. The potential health benefits alone should not be an inducement for abstainers to start drinking alcohol. The Australian alcohol guidelines state that 'if you choose not to drink, a healthy diet, regular exercise and giving up smoking will provide similar health benefits'. The contribution of alcohol to overall energy intake also needs to be considered because of its potential effect on weight gain.

What is alcohol consumption?

In this report, alcohol consumption is presented according to the NHMRC's alcohol guidelines. These describe three risk categories for alcohol-related harm in the long term. For males, the consumption of up to 28 standard drinks per week is considered 'low risk', 29 to 42 per week 'risky', and 43 or more per week 'high risk'. For females, the consumption of up to 14 standard drinks per week is considered 'low risk', 15 to 28 per week 'risky', and 29 or more per week 'high risk'.

How many Australians drink alcohol?

Based on self-reports from the 2001 National Drug Strategy Household Survey, the vast majority of people consume alcohol in moderation ('low risk')—73% of Australians aged 14 years and over. By contrast, 10% of those aged 14 years and over drank at levels considered to be harmful ('risky' and 'high risk') to their overall health. This corresponds to 1.54 million Australians affected. Around 18% of people aged 14 years and over abstained from alcohol in the previous 12 months.

People at risk of long-term harm from alcohol consumption, aged 14 years and over, 2001

| | Level of risk[a] | | |
	Low risk	Risky	High risk
	Per cent		
Males	75.6	6.7	3.5
Females	69.8	7.2	2.3
Persons	*72.7*	*6.9*	*2.9*

(a) The NHMRC's alcohol guidelines describe three risk categories for alcohol-related harm in the long term. For males, the consumption of up to 28 standard drinks per week is considered 'low risk', 29 to 42 per week 'risky', and 43 or more per week 'high risk'. For females, the consumption of up to 14 standard drinks per week is considered 'low risk', 15 to 28 per week 'risky', and 29 or more per week 'high risk'.

(b) Based on self-reports.

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

Source: 2001 National Drug Strategy Household Survey.

Trends

Information from previous years are not available based on the criteria of 'risky' and 'high risk'. Overall, population trends in alcohol consumption have remained relatively unchanged since 1993.

Sex and age

In 2001, among people aged 14 years and over, similar proportions of males and females drank at levels considered 'risky' or 'high risk' (10.2% and 9.5% respectively). More males (3.5%) than females (2.3%) were in the 'high risk' category for alcohol consumption.

Younger males and females (15% of 20–29-year-olds) were more likely than other age groups to consume high levels of alcohol.

Socioeconomic status

In 2001, among people consuming alcohol at harmful levels ('risky' and 'high risk') there were no significant differences by level of socioeconomic disadvantage.

Aboriginal and Torres Strait Islander peoples

In 2001, among people aged 14 years and over, 10.5% of Aboriginal and Torres Strait Islander males drank alcohol at 'high risk' levels compared with 3.3% among other Australian males. Among females, there was no significant difference in the proportions drinking at 'high risk' levels. Indigenous Australians were three times more likely to consume alcohol at 'high risk' levels than other Australians (9.3% compared with 2.7%). However, Indigenous Australians were more likely to abstain from alcohol compared with other Australians.

Region

In 2001, among people aged 14 years and over, a slightly higher percentage of people living in rural and remote areas reported consuming alcohol at 'risky' (7.9%) and 'high risk' (3.6%) levels, compared with those living in urban areas (6.6% and 2.6%, respectively). Males living in rural and remote areas were more likely to consume alcohol at 'risky' (8.4%) and 'high risk' (3.9%) levels, compared with females in rural and remote areas (7.4% 'risky' and 3.4% 'high risk').

State and territory

In 2001, among people aged 14 years and over, the Northern Territory reported the highest rate of 'risky' level of alcohol consumption (13%) and Tasmania reported the highest rate of 'high risk' level of alcohol consumption (5%).

International comparisons

Alcohol consumption is highly prevalent in many countries of the world. In 2001, of those countries compared in the OECD Health Database, Luxemburg reported the highest per capita consumption of pure alcohol at 15 litres per capita per year for those aged 15 years and over, while Turkey reported the lowest at just over 1 litre per capita. Australia's per capita consumption of pure alcohol was 10 litres per capita and was towards the lower end of the countries compared.

4

Alcohol consumption, litres of pure alcohol per capita, people aged 15 years and over, selected countries, 2001

Country	Litres per capita
Luxembourg	15.0
France	12.9
Ireland	12.3
Spain	11.7
Austria	11.3
Switzerland	11.2
United Kingdom	10.2
Netherlands	10.0
Australia	9.8
New Zealand	8.9
United States	8.3
Canada	7.6
Sweden	6.2
Turkey	1.4
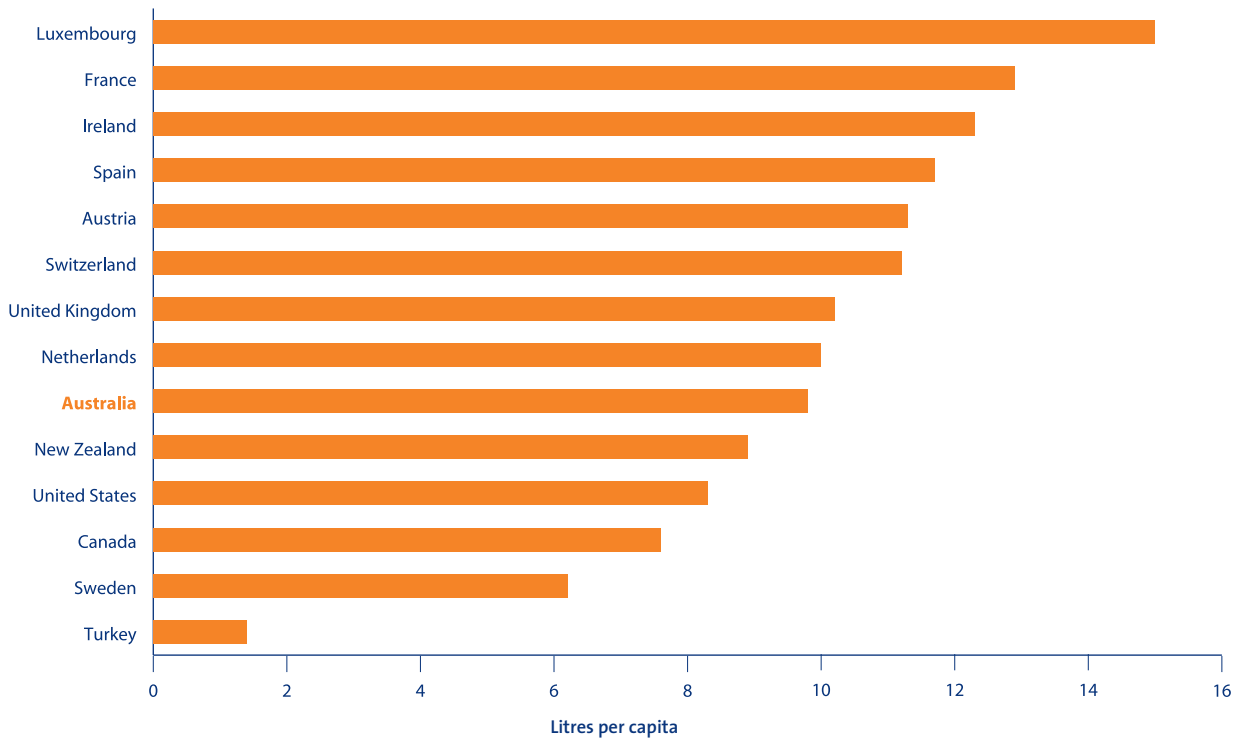
Source: AIHW 2003.

Health inequalities

People at risk of long-term harm from alcohol consumption, 2001

Population subgroup	Males 'Risky'	Males 'High risk'	Females 'Risky'	Females 'High risk'	Persons 'Risky'	Persons 'High risk'
	Per cent					
Age group (years)						
14–19	6.1	2.7	9.9	4.7	8.0	3.7
20–29	9.5*	5.0*	10.9	4.0	10.2	4.5
30–39	5.8	3.1	6.8	1.9*	6.3	2.5
40–49	6.4	3.2	7.8	1.9*	7.1	2.6
50–59	7.3	4.3	5.9*	1.5*	6.6	2.9
60 and over	5.4	2.6	3.7*	0.7*	4.4*	1.6*
Ages 14 and over (ASR)	*6.7*	*3.5*	*7.2*	*2.3*	*6.9*	*2.9*
Socioeconomic status (IRSD)						
1st quintile (most disadvantaged)	7.3	3.7	6.2	2.9	6.8	3.3
2nd quintile	6.6	4.1	6.7	2.5	6.6	3.3
3rd quintile	7.2	3.4	6.9	2.4	7.0	2.9
4th quintile	7.1	3.5	8.0	1.8	7.5	2.7
5th quintile (least disadvantaged)	5.8	2.6	8.3	1.7	7.0	2.2
Aboriginal and Torres Strait Islander status						
Aboriginal and Torres Strait Islander peoples	9.9	10.5	5.6	7.2	7.6	9.3
Other Australians	6.7	3.3*	7.2	2.2	6.9	2.7*
Region (RRMA)						
Urban	6.1	3.3	7.1	1.9	6.6	2.6
Rural/remote	8.4*	3.9	7.4	3.4*	7.9*	3.6*

* Statistically significant difference when compared with the first row in the population subgroup.

Notes

1. Based on self-reports.
2. Data for ages 14 years and over.
3. All rates other than age-specific rates are age-standardised to the 2001 Australian population.
4. 'Risky' refers to consuming 29 to 42 (for males) or 15 to 28 (for females) standard drinks per week. 'High risk' refers to consuming 43 or more (for males) or 29 or more (for females) standard drinks per week.

Source: AIHW analysis of the 2001 National Drug Strategy Household Survey.

4

Further reading

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AIHW 2002. 2001 national drug strategy household survey: detailed findings. AIHW Cat. No. PHE 41. Canberra: AIHW (Drug Statistics Series No. 11).

AIHW: Ridolfo B & Stevenson C 2001. The quantification of drug-caused mortality and morbidity in Australia, 1998. AIHW Cat. No. PHE 29. Canberra: AIHW (Drug Statistics Series No. 7).

NHMRC 2001. Australian alcohol guidelines: health risks and benefits. Canberra: NHMRC.

OECD 2003. OECD health data 2003, 3rd edition: a comparative analysis of 30 countries (CD-ROM). Paris: OECD.

High blood pressure

Key points

- High blood pressure is a major risk factor for coronary heart disease, stroke, heart failure, peripheral vascular disease and kidney failure. The risk of disease increases as the level of blood pressure increases.
- In 1999–00, 3.69 million Australians aged 25 years and over (30% of that population) had high blood pressure.
- For people aged 25–64 years living in urban areas, the proportion of people with high blood pressure has halved since 1980.
- Based on self-reports from the 2001 National Health Survey, among Australians of all ages, 14% of Indigenous Australians had high blood pressure, compared with 10% of other Australians.

High blood pressure (also referred to as hypertension) is a major risk factor for coronary heart disease, stroke, heart failure, peripheral vascular disease and kidney failure. The risk of disease increases as the level of blood pressure increases. High blood pressure causes the heart to work harder than normal, causing it to enlarge and weaken over time. When high blood pressure is controlled by medication, the risk of heart, stroke and vascular diseases is reduced, but not necessarily to the levels of unaffected people.

Major causes of high blood pressure include poor diet (particularly a high salt intake), overweight, excessive alcohol consumption and insufficient physical activity.

What is high blood pressure?

Blood pressure represents the forces exerted by blood on the walls of the arteries and is written as systolic/diastolic (e.g. 120/80 mmHg, stated as '120 over 80').

There is a continuous relationship between blood pressure levels and the risk of heart, stroke and vascular diseases, making the definition of high blood pressure somewhat arbitrary.

In this report, high blood pressure is categorised using the WHO guidelines:

- systolic blood pressure (SBP) greater than or equal to 140 mmHg; or
- diastolic blood pressure (DBP) greater than or equal to 90 mmHg; or
- receiving medication for high blood pressure.

While SBP is a stronger predictor of risk of heart, stroke and vascular diseases than DBP, for population monitoring purposes SBP, DBP and medication use are measured.

How many Australians have high blood pressure?

Based on measured data from the 1999–00 Australian Diabetes, Obesity and Lifestyle (AusDiab) Study, an estimated 30% of people aged 25 years or more had high blood pressure. This corresponds to 3.69 million Australians.

Trends

Trends in measured blood pressure are only available for people aged 25–64 years living in urban areas. Over the last two decades there have been large declines in the prevalence of high blood pressure. For men the prevalence has fallen steadily from 47% in 1980 to 21% in 1999–00. The rate for women has also halved, from 32% in 1980 to 16% in 1999–00.

People with high blood pressure, aged 25–64 years, 1980 to 1999–00
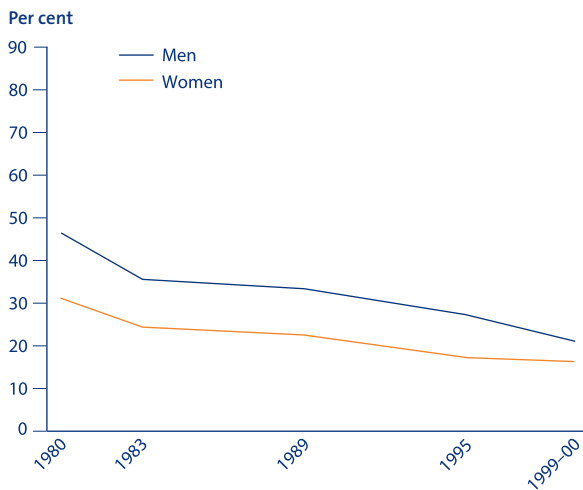
Per cent

Notes

1. Based on measured data.

2. Age-standardised to the 2001 Australian population.

3. Urban areas only.

4. Trends for older Australians are not available.

Sources: AIHW analysis of the 1980, 1983, and 1989 Risk Factor Prevalence Studies; 1995 National Nutrition Survey; 1999–00 AusDiab Study.

Sex and age

In 1999–00, 32% of men and 27% of women aged 25 years and over had high blood pressure. The proportion of men and women with high blood pressure increases with age. Among people aged 65–74 years, around two-thirds had high blood pressure. This compares with around 5% for those aged 25–34 years.
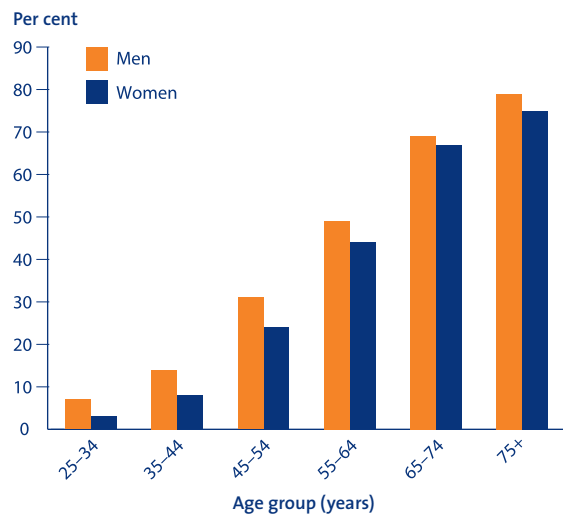
People with high blood pressure, aged 25 years and over, 1999–00

Per cent

Age group (years)

Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, among adults aged 25 years and over in 1999–00, there were generally no significant differences in the prevalence of high blood pressure.

Aboriginal and Torres Strait Islander peoples

There are no national data on measured blood pressure to assess the prevalence among Indigenous Australians. However, based on self-reports from the 2001 National Health Survey, among people of all ages, 14% of Indigenous Australians reported high blood pressure, compared with 10% of other Australians. Indigenous Australians reported high blood pressure from a younger age than other Australians.

Region

The most recent data on measured blood pressure for regions of Australia come from the 1995 National Nutrition Survey. In 1995, among people aged 18 years and over, there were no significant differences in the prevalence of high blood pressure between urban, rural and remote areas.

State and territory

In 1999–00, the prevalence of high blood pressure among people aged 25 years and over ranged among the states and territories from 34% in Victoria to 25% in the Northern Territory. Note that data were not available for the Australian Capital Territory.

International comparisons

The WHO compiled data on a range of risk factors, including high blood pressure. Four countries presented comparable recent national data for adults.

From this, England showed the highest prevalence of high blood pressure (40% of men and 38% of women) for the four countries. Australia ranked third of the four countries compared, with 31% of men and 28% of women having high blood pressure in 1999–00. Men and women in Thailand had the lowest rate of the four countries compared: 23% of men and women in 2000 had high blood pressure.

Care should be taken when making comparisons based upon these data, as they may apply to different years, age ranges and have not been age-standardised.

People with high blood pressure, by selected countries, latest available year
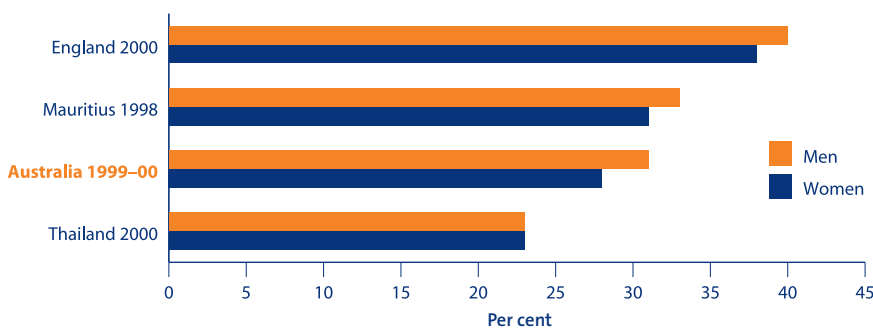
Notes

1. Based on measured data.
2. High blood pressure is defined as systolic blood pressure of 140 mmHg or more; or diastolic blood pressure of 90 mmHg or more; or receiving medication for high blood pressure.
3. Data are for the following age groups: England 16 years and over; Mauritius 25–74 years; Australia 25 years and over; Thailand 35 years and over.
4. Crude rates are presented.

Source: Strong & Bonita 2003.

4

Health inequalities

People with high blood pressure, 1999–00

Population subgroup	Men	Women	Persons
			Per cent
Age group (years)			
25–34	7.1	3.4	5.2
35–54	21.6*	14.9*	18.3*
55–74	58.5*	55.8*	57.1*
75 and over	78.8*	74.6*	76.3*
Ages 25 and over (ASR)	*32.3*	*27.2*	*29.7*
Socioeconomic status (highest level of education)			
Did not complete secondary school	35.0	29.9	31.8
Completed secondary school	29.4	28.3	28.8
TAFE/tertiary	31.8	25.3*	28.9
Aboriginal and Torres Strait Islander status	n.a.	n.a.	n.a.
Region	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row
 in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than age-specific rates are age-standardised (ASR) to
 the 2001 Australian population.
4. High blood pressure is defined as systolic blood pressure of 140 mmHg
 or more; or diastolic blood pressure of 90 mmHg or more; or receiving
 medication for high blood pressure.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Further reading

ABS 2002. 2001 national health survey: Aboriginal and Torres
Strait Islander results, Australia. ABS Cat. No. 4715.0. Canberra: ABS.

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Strong K & Bonita R 2003. The SuRF report 1. Surveillance of risk
factors related to noncommunicable diseases: current status of
global data. Geneva: WHO.

WHO–ISH 1999. 1999 guidelines for the management of
hypertension. CVD Prevention 2(2):76–111.

High blood cholesterol

Key points

- High blood cholesterol is a risk factor for coronary heart disease, ischaemic stroke and peripheral vascular disease. The risk of coronary heart disease increases with rising blood cholesterol levels.
- In 1999–00, 6.40 million Australians aged 25 years and over (51%) had cholesterol levels of 5.5 mmol/L or more.
- For people aged 25–64 years living in capital cities, there has been no marked fall in the prevalence of people with high blood cholesterol over 1980 to 1999–00.

High blood cholesterol is a risk factor for coronary heart disease, ischaemic stroke and peripheral vascular disease. It is the main cause of the process by which the blood vessels that supply the heart and other parts of the body become clogged. The risk of coronary heart disease increases with rising blood cholesterol levels.

For most people, a high level of saturated fat in the diet is the main factor that raises blood cholesterol levels. Cholesterol in foods can also raise blood cholesterol levels, but less so than saturated fat. Genetic factors also affect blood cholesterol levels and a few people have high cholesterol levels regardless of their dietary intake of saturated fat and cholesterol.

What is high blood cholesterol?

Total blood cholesterol levels of 5.5 mmol/L or more are an indication of an increased risk of developing coronary heart disease, and levels of 6.5 mmol/L or more are considered to indicate high risk. However, these values are somewhat arbitrary, as coronary heart disease risk increases continuously from cholesterol levels of 4.5 mmol/L or possibly lower.

While total blood cholesterol is measured for population-monitoring purposes, also of interest are the components of cholesterol, HDL and LDL cholesterol—so called 'good' and 'bad' cholesterol, respectively. HDL cholesterol provides protection against heart disease by helping to reduce atherosclerosis. Excess levels of LDL cholesterol can contribute to clogging of the arteries (atherosclerosis), increasing the risk of heart attack and stroke.

How many Australians have high blood cholesterol?

Based on measured data from the 1999–00 AusDiab Study, 52% of Australians aged 25 years and over had cholesterol levels of 5.5 mmol/L or more. This corresponds to 6.40 million Australians.

Trends

Trends in measured blood cholesterol are available only for people aged 25–64 years living in capital cities. These data show that average blood cholesterol levels have remained fairly constant over the period 1980 to 1999–00. In 1999–00, average blood cholesterol levels were 5.5 mmol/L for men and 5.4 mmol/L for women.

There has been no marked reduction in the prevalence of people with high blood cholesterol over the period 1980 to 1999–00. In 1980, 51% of men and 43% of women had high blood cholesterol, compared with 49% of men and 46% of women in 1999–00.

4

People with high blood cholesterol (5.5 mmol/L or more) aged 25–64 years, 1980 to 1999–00

Per cent
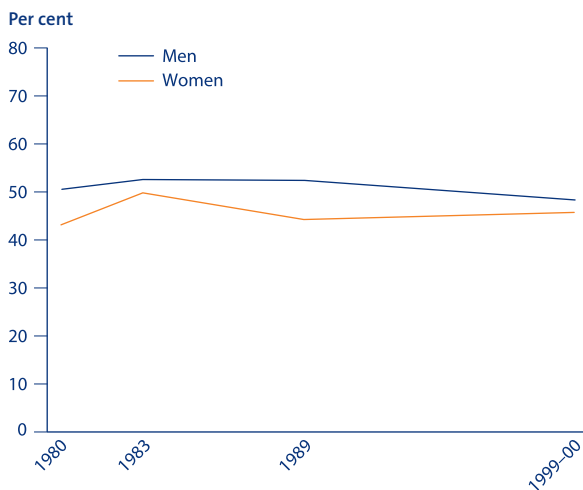
Notes

1. Based on measured data.
2. Age-standardised to the 2001 Australian population.
3. Capital cities only.

Sources: AIHW analysis of the 1980, 1983, 1989 Risk Factor Prevalence Studies; 1999–00 AusDiab Study.

Sex and age

In 1999–00, 52% of men and 51% of women aged 25 years and over had blood cholesterol levels of 5.5 mmol/L or more. The prevalence of high blood cholesterol increased with age: for women, there was a steady increase to 65–74 years; for men, prevalence increased steadily with age until 55–64 years, after which it declined. From 55 years of age, a higher proportion of women than men had high blood cholesterol.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, among people aged 25 years and over in 1999–00, there were no significant differences in the prevalence of high blood cholesterol.

People with high blood cholesterol (5.5 mmol/L or more), aged 25 years and over, 1999–00

Per cent

Age group (years)
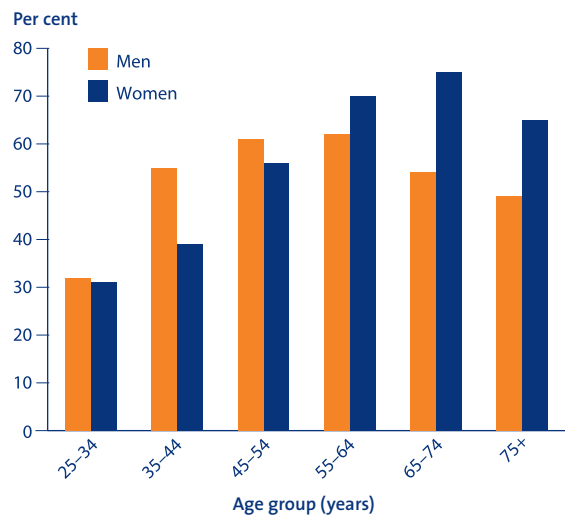
Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Aboriginal and Torres Strait Islander peoples

There are no national data on measured blood cholesterol levels for Indigenous Australians.

Region

There are no national data on measured blood cholesterol levels across regional areas of Australia.

State and territory

In 1999–00, among people aged 25 years and over, the prevalence of high blood cholesterol ranged among the states and territories from 56% in South Australia to 49% in New South Wales. Note that data were not available for the Australian Capital Territory.

International comparisons

The WHO compiled data on a range of risk factors, including average blood cholesterol levels. Seven countries presented comparable recent national data for adults.

From this, Australia ranked second highest after Germany, with the Dominican Republic reporting the lowest average cholesterol levels of the seven countries compared.

Care should be taken when making comparisons based upon these data, as they may apply to different years and age ranges, and have not been age-standardised.

Average blood cholesterol levels, by selected countries, latest available year
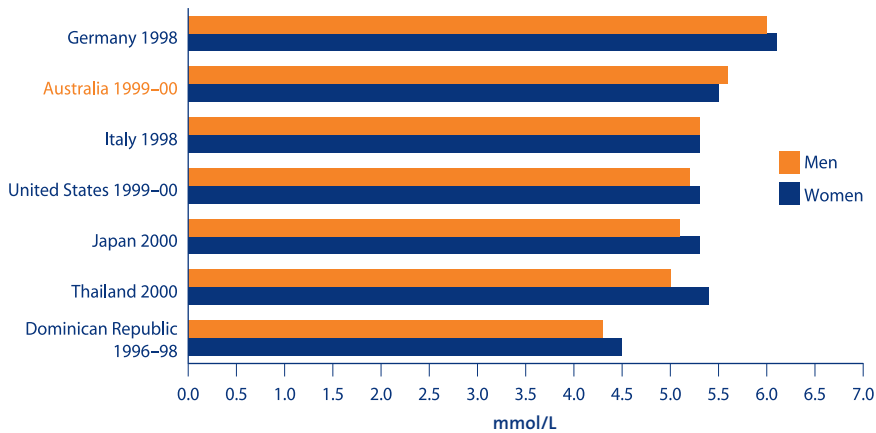
Note: Data are for the following age groups: Germany 18–79 years; Australia 25 years and over; Italy 35 years and over; United States and Japan 20 years and over; Thailand 35 years and over; Dominican Republic 18–74 years.

Sources: AIHW analysis of the 1999–00 AusDiab Study; Strong & Bonita 2003.

4

Health inequalities

People with high blood cholesterol (5.5 mmol/L or more), 1999–00

Population subgroup	Men	Women	Persons
		Per cent	
Age group (years)			
25–34	32.2	31.2	31.7
35–54	58.0*	46.5*	52.2*
55–74	58.3*	72.5*	65.7*
75 and over	49.3*	65.4*	58.8*
Ages 25 and over (ASR)	*51.5*	*51.0*	*51.5*
Socioeconomic status (highest level of education)			
Did not complete secondary school	54.1	53.0	53.2
Completed secondary school	50.1	52.5	52.9
TAFE/tertiary	51.5	49.6	50.4
Aboriginal and Torres Strait Islander status	n.a.	n.a.	n.a.
Region	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes
1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Further reading

ABS 2002. 2001 national health survey: Aboriginal and Torres Strait Islander results, Australia. ABS Cat. No. 4715.0. Canberra: ABS.

NHFA 1999. A review of the relationship between dietary fat and cardiovascular disease. Aust J Nutr Diet 56(Suppl 4):S5–S22.

NHFA & CSANZ (Cardiac Society of Australia and New Zealand) 2001. Lipid management guidelines. Med J Aust 175:S55–S90.

Strong K & Bonita R 2003. The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. Geneva: WHO.

Overweight

Key points

- Overweight, and in particular obesity, is associated with higher rates of death and illness.
- In 1999–00, 7.42 million adult Australians (60% of those aged 25 years and over) were overweight. Of these, about 2.5 million (21% of those aged 25 years and over) were obese.
- In 1995, 20% of boys and 21% of girls aged 2–18 years were overweight.
- For people aged 25–64 years in urban areas, between 1980 and 1999–00 the proportion who were obese rose from 9% to 17% for men and 8% to 20% for women. The proportion of men who were overweight but not obese also increased from 38% to 49%, and among women from 19% to 27%.
- Based on self-reports from the 2001 National Health Survey, men and women aged 20 years and over in the most disadvantaged areas were almost twice as likely to be obese than those in the least disadvantaged areas.
- Based on self-reports from the 2001 National Health Survey, among people aged 18 years and over, 64% of Indigenous Australians were overweight compared with 50% of other Australians. Indigenous Australians were nearly twice as likely to be obese than other Australians (31% compared with 16%).

Overweight, and in particular obesity, is associated with higher death and illness. Diseases and conditions including coronary heart disease, high blood pressure, high blood cholesterol, Type 2 diabetes, certain cancers and psychosocial problems are all more prevalent in overweight individuals.

Among those who are overweight, weight loss reduces the incidence and severity of high blood pressure, high blood cholesterol, Type 2 diabetes and osteoarthritis.

What is overweight?

Overweight is a condition of excess body fat that results from a sustained energy imbalance. This occurs when dietary energy intake exceeds energy expenditure over a period of time, resulting in weight gain. Obesity is a severe form of overweight.

There are two main methods for measuring levels of overweight and obesity at the population level: body mass index (BMI) and waist circumference.

BMI is the most commonly used of these two measures. It is calculated by dividing weight in kilograms by the square of height in metres (kg/m²). A BMI of 25 or more indicates overweight, and 30 or more indicates obesity. In this report, unless stated otherwise, overweight refers to a BMI of 25 or more (i.e. the term includes obesity). Classifications of overweight and obesity are based primarily on the association between BMI and mortality, and are the standard recommended by the WHO and the *National Health Data Dictionary* (NHDD). This classification may not be suitable for all ethnic groups, who may have equivalent levels of risk at lower BMI (e.g. Asians) or higher BMI (e.g. Polynesians). For children and adolescents aged 2–17 years, a separate classification of body weight based on age and sex has been developed.

As a measure of overweight, waist circumference is a useful addition to BMI because abdominal fat mass can vary greatly within a narrow range of total body fat or BMI. The NHDD defines waist circumference cutoffs for increased and substantially increased risk of ill health. Waist circumferences of 94 cm or more in men and 80 cm or more in women indicate increased risk. Waist circumferences of 102 cm or more in men and 88 cm or more in women indicate substantially increased risk. As with BMI, this classification may not be suitable for use in people aged 18 years or below, and the cutoffs may not be suitable for all ethnic groups.

Unless otherwise stated, results presented in this section are based on BMI derived from measured height and weight.

How many Australians are overweight?

Based on measured data from the 1999–00 AusDiab Study, 60% of Australians aged 25 years and over were overweight (BMI of 25 or more). This corresponds to 7.42 million Australians. Of these, about 2.5 million (21% of the population aged 25 and over) were obese (BMI of 30 more).

Trends

Trends in measured body weight are available only for people aged 25–64 years living in urban areas. These data show that there has been a considerable increase in the prevalence of overweight in Australia over the last 20 years. Trends for the urban population of Australia show that between 1980 and 1999–00 the proportion of men and women who were obese rose from 9% to 17% and 8% to 20% respectively. Similarly, the proportion of men aged 25–64 years who were overweight but not obese increased from 38% to 49%, and among women of the same age from 19% to 27%.

While trends for people aged 65 years and over are not available from measured data, based on self-reports from the National Health surveys, the prevalence of overweight has increased by 30% and obesity by 67% over the period 1989–90 to 2001.

Sex and age

In 1999–00, among Australians aged 25 years and over, men were more likely to be overweight than women (67% compared with 52%), although rates of obesity were similar (19% compared with 22%). The prevalence of overweight increased with age up to about 65 years. The highest rates were among 55–74-year-olds (71%) with the lowest rates in 25–34-year-olds (49%).

People who were overweight (BMI of 25 or more), aged 25–64 years, 1980 to 1999–00
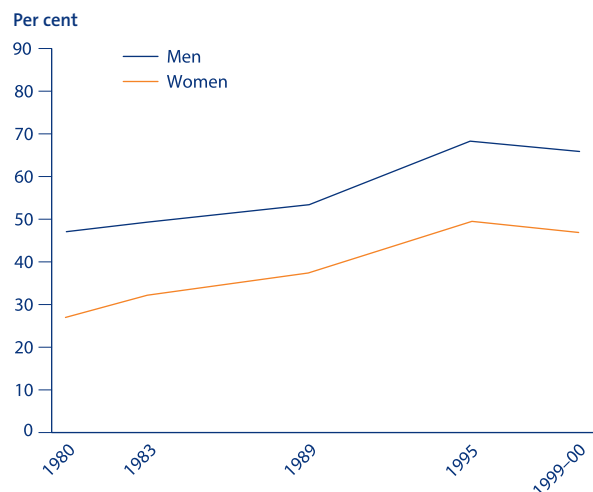
Per cent

Notes
1. Based on measured data.
2. Age-standardised to the 2001 Australian population.
3. Urban areas only.

Sources: AIHW analysis of the 1980, 1983, 1989 Risk Factor Prevalence Studies; 1995 National Nutrition Survey; 1999–00 AusDiab Study.

**People who were overweight (BMI of 25 or more), aged 25 years and over, 1999–00**

Per cent

Age group (years)
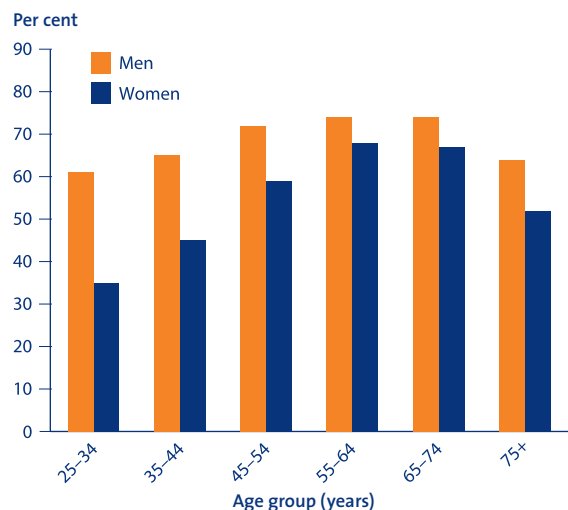
Note: Based on measured data.
Source: AIHW analysis of the 1999–00 AusDiab Study.

In 1999–00, 55% of men had a waist circumference greater than 94 cm and 56% of women had a waist circumference greater than 80 cm. Around 27% of men had a waist circumference greater than 102 cm and 34% of women had a waist circumference greater than 88 cm, indicating substantially increased risk of health problems. For both men and women, the prevalence of overweight based on waist circumference increased with age to 65–74 years and then declined.

People who were overweight (waist circumference of 94 cm or more for men and 80 cm or more for women), aged 25 years and over, 1999–00
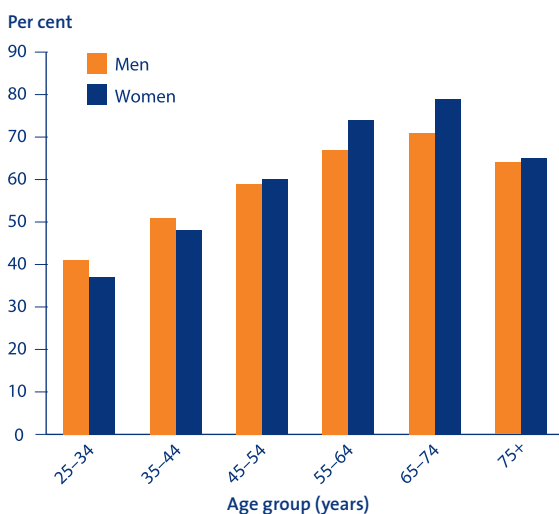
Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Socioeconomic status

Using educational attainment as an indicator of socio-economic status, there were no significant differences in the prevalence of overweight based on educational attainment in 1999–00 (using measured data).

Based on self-reports from the 2001 National Health Survey, among people aged 20 years and over, men and women from the most disadvantaged areas were almost twice as likely to be obese than those in the least disadvantaged areas.

Aboriginal and Torres Strait Islander people

Available data show that Indigenous Australians are more likely than other Australians to be overweight. Based on self-reports from the 2001 National Health Survey, among people aged 18 years and over living in non-remote areas, 64% of Indigenous Australians were overweight compared with 50% of other Australians. The disparity in obesity rates in non-remote areas is even stronger—Indigenous Australians were nearly twice as likely to be obese than other Australians (31% compared with 16%).

Region

The most recent data on overweight derived from measured data for regions of Australia come from the 1995 National Nutrition Survey. From these data there were no significant differences in the prevalence of overweight for people aged 18 years and over living in urban, rural and remote areas in 1995.

State and territory

In 1999–00, among people aged 25 years and over, the rate of overweight ranged from 65% in South Australia to 59% in New South Wales, Queensland and Western Australia. Note that data were not available for the Australian Capital Territory.

Children and adolescents

Children and adolescents who are overweight or obese also have an increased risk of adverse health conditions, including risk factors for heart, stroke and vascular diseases. They have a greater likelihood of becoming overweight or obese adults, and have a greater risk of developing conditions such as Type 2 diabetes.

In 1995, the prevalence of overweight among children and adolescents aged 2–18 years was 19.5% for boys and 21.1% for girls. These results are based on age- and sex-specific BMI cutoffs.

International comparisons

In a comparison based on measured data for people aged 25–64 years among three countries (there are only limited international data that are directly comparable with Australian data in terms of the age groups included) results showed that New Zealand and Australia had similar rates of overweight (61% compared with 58%), while Italy's overweight rate was around one-quarter lower than that of Australia's at 42%. These rates were age-standardised to the WHO standard population.

The WHO compiled data on a range of risk factors, including obesity, which provides more extensive comparisons. Fourteen countries presented comparable recent national data for adults.

From this, obesity rates ranged from as low as 3% for men and 6% for women in the Philippines in 1998, to as high as 26% of men and 40% of women in the United Arab Emirates in 1999–00 of the 14 countries compared. Australian rates were at the higher end of the scale for the 14 countries compared, with 19% of men and 22% of women classed as obese in 1999–00.

Care should be taken when making comparisons based upon these data, as they may apply to different years and age ranges, and have not been age-standardised.

People who were obese (BMI of 30 or more) by selected countries, latest available year
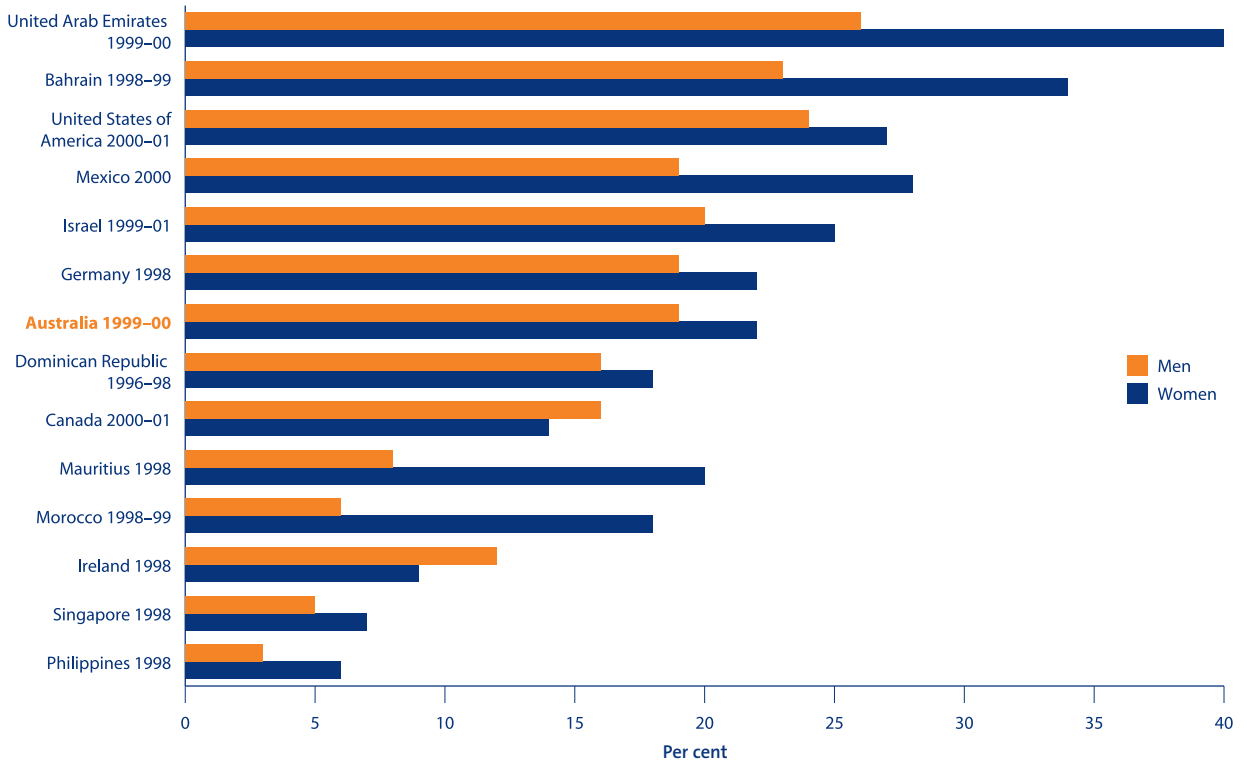
Note: Crude rates are presented and are for different age groups.

Source: Strong & Bonita 2003.

Health inequalities

People who were overweight (BMI of 25 or more), 1999–00

Population subgroup	Men	Women	Persons
		Per cent	
Age group (years)			
25–34	61.1	35.0	48.5
35–54	68.1	51.5*	59.9*
55–74	74.1*	67.8*	70.8*
75 and over	63.6	52.0*	56.8
Ages 25 and over (ASR)	*67.4*	*51.9*	*59.6*
Socioeconomic status (highest level of education)			
Did not complete secondary school	70.5	56.7	62.1
Completed secondary school	67.9	54.7	61.1
TAFE/tertiary	66.2	50.0*	58.8
Aboriginal and Torres Strait Islander status	n.a.	n.a.	n.a.
Region	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.

2. Data for ages 25 years and over.

3. All rates other than the age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 1999–00 AusDiab Study.

4

Further reading

AIHW: Bennett SA, Magnus P & Gibson D 2004. Obesity trends in older Australians. AIHW Cat. No. AUS 42. Canberra: AIHW (Bulletin No. 12).

AIHW: Dixon T & Waters A-M 2003. A growing problem: trends and patterns in overweight and obesity among Australian adults, 1980 to 2001. AIHW Cat. No. AUS 36. Canberra: AHIW (Bulletin No. 8).

AIHW: O'Brien K & Webbie K 2004. Health, wellbeing and body weight: characteristics of overweight and obesity in Australia, 2001. AIHW Cat. No. AUS 43. Canberra: AIHW (Bulletin No. 13).

AIHW: O'Brien K & Webbie K 2003. Are all Australians gaining weight? Differentials in overweight and obesity among adults, 1989–90 to 2001. AIHW Cat. No. AUS 39. Canberra: AIHW (Bulletin No. 11).

Magarey A, Daniel L & Boulton TJ 2001. Prevalence of overweight and obesity in Australian children and adolescents: reassessment of 1985 and 1995 data against new standard international definitions. Med J Aust 174:561–4.

NHDC (National Health Data Committee) 2003. National health data dictionary. Version 12. AIHW Cat. No. HWI 43. Canberra: AIHW.

NHMRC 1997. Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity. Canberra: NHMRC.

Strong K & Bonita R 2003. The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. Geneva: WHO.

WHO 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series 894. Geneva: WHO.

Diabetes

Key points

- People with diabetes are at increased risk of developing coronary heart disease, stroke and peripheral vascular disease. It claimed 3,329 lives in 2002 (2.5% of all deaths).

- Based on measured blood glucose levels, about 945,600 Australians aged 25 years and over (7.6% of the population) had diabetes in 1999–00. About half these people were not aware that they had it. Based on self-reports from the 2001 National Health Survey, an estimated 554,200 Australians had diabetes.

- Based on comparison of the 1981 Busselton Study and the 1999–00 AusDiab Study, which both used blood glucose measurements to determine prevalence, there was a significant increase (from 3% to 7%) in the age-standardised prevalence of diabetes in Australia over that 20-year period. The 2001 National Health Survey also showed a large increase in self-reported diabetes compared with the 1989–90 survey (unadjusted prevalence of 1% and 3%, respectively).

- In 2001, the prevalence of self-reported diabetes was almost twice as high in the most disadvantaged areas than in the least disadvantaged.

- Aboriginal and Torres Strait Islander peoples have one of the highest rates of diabetes in the world. In 2001, the age-standardised prevalence of self-reported diabetes among Indigenous Australians (11%) was almost four times as high as for other Australians (3%). In 2000–02, death rates from diabetes among Indigenous Australians were almost 15 times as high as for other Australians.

Diabetes (also known as diabetes mellitus) has a significant impact on the health of Australians, both as a disease in its own right and as a risk factor for heart, stroke and vascular diseases. People with diabetes are at increased risk of developing coronary heart disease, stroke and peripheral vascular disease. Diabetes is the sixth leading cause of death in Australia, and contributes to significant illness, disability, poor quality of life and premature death. However, death rates from diabetes have fallen substantially over the last half-century, particularly among females.

Diabetes is presented here as a risk factor for heart, stroke and vascular diseases and also as an associated condition. This reflects the importance of diabetes in the development of heart, stroke and vascular diseases, and the emerging public health issue that diabetes itself presents.

Determining the prevalence of diabetes in the population is difficult. Most population surveys simply ask people whether they have ever been told by a health professional that they have diabetes. This method is limited, as people may not know that they have diabetes and the criteria used by health professionals in making diagnoses vary.

What is diabetes?

Diabetes represents a collection of closely related metabolic conditions characterised by high blood glucose levels resulting from defects in secretion of the hormone insulin, the physiological actions of insulin, or both. Insulin is a hormone produced in the pancreas that helps glucose to enter body cells for energy metabolism. The chronic high blood glucose levels (hyperglycaemia) of poorly controlled diabetes are associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels.

There are three main types of diabetes: Type 1, Type 2 and gestational diabetes.

- **Type 1 diabetes** results from an autoimmune destruction of the cells in the pancreas which produce insulin. People with Type 1 diabetes must have daily injections of insulin for survival.
- **Type 2 diabetes**, which accounts for about 85–90% of all diabetes, is characterised by insulin resistance and/or abnormal insulin secretion. In many cases the actual metabolic causes for this condition are not yet understood. In rare cases it arises from specific genetic mutations. In most cases, Type 2 diabetes can be prevented or at least delayed through the modification of its major risk factors including overweight and obesity, and physical inactivity.
- **Gestational diabetes** occurs during pregnancy in about 3–8% of females not previously diagnosed with diabetes and is a marker of greater risk of developing Type 2 diabetes later in life.

Risk factors for diabetes

Both genetic and environmental factors contribute to the onset of diabetes. Diabetes shares several risk factors with, and is itself a risk factor for, heart, stroke and vascular diseases. Type 1 diabetes is believed to be caused by exposure to environmental triggers, possibly certain viruses or food toxins. The development of Type 2 diabetes is influenced largely by the presence of behavioural and biomedical risk factors including obesity, physical inactivity, and possibly poor nutrition in foetal and early infant life. The risk factors for gestational diabetes are similar to those for Type 2 diabetes.

The existence of diabetes is also known to magnify the effect of conventional risk factors for heart, stroke and vascular diseases such as elevated cholesterol levels, central obesity, high blood pressure and smoking. Further, people with diabetes are more likely to have a clustering of these risk factors— sometimes known as the metabolic syndrome.

How many Australians have diabetes?

Prevalence

Based on measured blood glucose levels from the 1999–00 AusDiab Study, 7.6% of Australians aged 25 years and over had diabetes. This corresponds to an estimated 945,600 Australians. About half these people were not aware that they had diabetes.

Based on self-reports from the 2001 National Health Survey, an estimated 554,200 Australians had diabetes as a current, long-term condition.

Trends

There are no national data to compare trends of diabetes prevalence in Australia. However, both the 1981 Busselton Study in Western Australia and the 1999–00 AusDiab Study used blood glucose measurements to measure diabetes prevalence. A comparison of results indicated that there was a significant increase (from 3% to 7%) in the age-standardised prevalence of diabetes in Australia over that 20-year period.

The 2001 National Health Survey also showed a large increase in self-reported diabetes compared with the equivalent 1989–90 survey (unadjusted prevalence of 1% and 3%, respectively).[22]

Sex and age

In 1999–00, the prevalence of diabetes was similar for men and women, 8% and 7% respectively. The proportion of Australians with diabetes increased with age, from 0.3% for those aged 25–34 years to 23% for those aged 75 years or over. A similar pattern was observed from the 2001 National Health Survey data, although the age-specific rates were about half the size of those observed in the 1999–00 AusDiab Study, reflecting the fact that estimates based on self-report underestimate the true prevalence of diabetes.

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22 Changes in survey methodology and classification may reduce direct comparability between the National Health surveys.

People with diabetes, aged 25 years and over, 1999–00
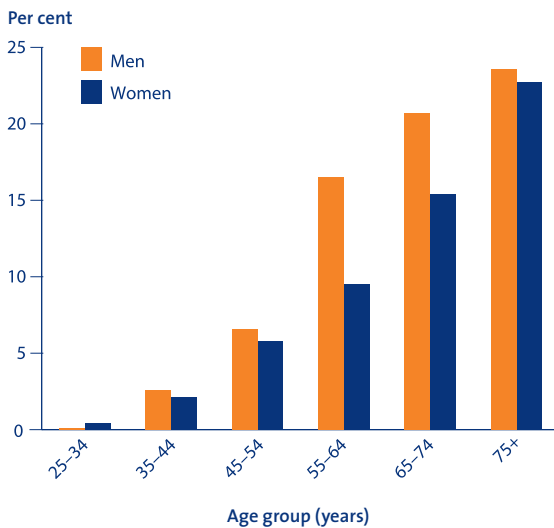
Per cent

Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, among people aged 25 years and over, there were no significant differences in the prevalence of diabetes based on educational attainment in 1999–00 (based on measured data).

Based on self-reports from the 2001 National Health Survey, the prevalence of diabetes was almost twice as high in the most disadvantaged areas as in the least disadvantaged areas.

Aboriginal and Torres Strait Islander peoples

Indigenous Australians have one of the highest rates of diabetes, especially Type 2, in the world. There are no national data on measured prevalence of diabetes among Indigenous Australians. However, based on self-reports from the 2001 National Health Survey, the age-standardised prevalence of diabetes among Indigenous Australians was almost four times as high as among other Australians (11% compared with 3%). Indigenous Australians from remote areas were almost twice as likely as those from non-remote areas to report having diabetes (16% compared with 9%).

Indigenous females were more likely to report diabetes than Indigenous males (12% compared with 9%).

While in both Indigenous and non-Indigenous populations the prevalence of diabetes is higher in older age groups, the prevalence among Indigenous Australians aged 35–44 years is almost as high as among other Australians aged 55 years and over.

Region

Based on self-reports from the 2001 National Health Survey, there were no significant differences in the prevalence of diabetes between major cities and rural/remote areas of Australia.

State and territory

The prevalence of self-reported diabetes was lowest in Tasmania (2%), with rates in the other states and territories around 3%.

Non-English-speaking backgrounds

Certain overseas-born Australians have a higher prevalence of diabetes than people born in Australia. In 2001, the prevalence of self-reported diabetes was highest among men born in the Middle East and North Africa, and in South-East Asia and Southern Asia, and among women born in Southern and Eastern Europe, and Central Asia.

International comparisons

Data collated by the International Diabetes Federation (IDF) indicate that diabetes prevalence rates are higher in the Caribbean (10.3%), Eastern Europe (9.3%), Northern America (8.1%), Western Europe (8.0%), Southern and South-Eastern Europe (7.8%), New Zealand (7.6%), Northern Europe (7.0%), and North Africa and the Middle East (6.4%) compared with Australia (6.2%). All other regions had lower prevalence rates than Australia. These comparisons should be interpreted with caution, as the IDF data were derived from a variety of measured and self-reported data, with preference given to measured data, and varying methodologies and data sources were used to compile and extrapolate the IDF data into the regions.

4

People with diabetes, aged 20–79 years, by selected regions, 2003

Region	Per cent
Caribbean	10.3
Eastern Europe	9.3
Northern America	8.1
Western Europe	8.0
Southern & South-Eastern Europe	7.8
New Zealand	7.5
Northern Europe	7.0
North Africa & Middle East	6.4
Australia	6.2
Central Asia	5.9
Southern Asia	5.8
South & Central America	5.6
United Kingdom & Ireland	3.9
South Pacific	3.6
North-East Asia	3.3
Sub-Saharan Africa	2.4
South-East Asia	2.2

Per cent

Notes

1. Crude rates are presented.

2. South Pacific includes Melanesia, Micronesia & Polynesia (excludes Hawaii).

Source: IDF 2003.

Incidence

Between 1999–02, around 32,600 people were registered on the National Diabetes Register as new cases of insulin-treated diabetes. Around 60% were found to have Type 2 diabetes, 28% Type 1 diabetes and 9% gestational diabetes. At diagnosis 48% were aged 45 years and over, and less than 11% were aged 0–14 years.

Over 2000–02, just over 2,430 new cases of Type 1 diabetes in children aged under 15 years were recorded, equating to an average annual incidence rate of 20 new cases per 100,000 population in this age group.

Information on the incidence of non-insulin-treated diabetes is unavailable.

Trends

In Australia, previous survey estimates of the incidence of Type 1 diabetes in the 0–14-year-old age group have ranged from 12 per 100,000 in 1983 to 18 per 100,000 from 1990–96. Thus the latest incidence data from the National Diabetes Register supports recent reports suggesting that the incidence of Type 1 diabetes is increasing among children aged 0–14 years in Australia.
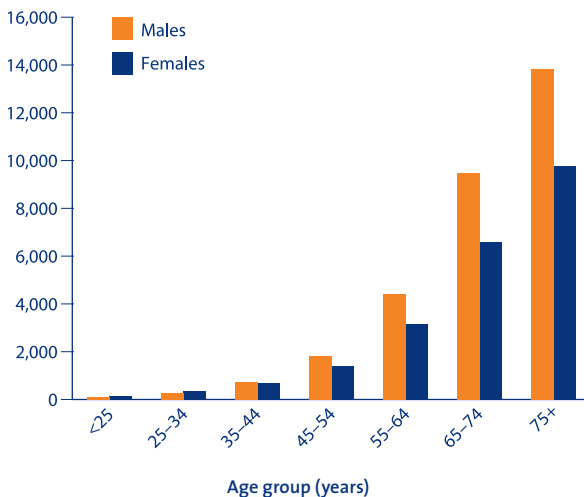
Hospitalisation

In 2001–02, there were 53,232 hospitalisations where diabetes was the principal diagnosis (0.8% of all hospitalisations). Diabetes is more often reported as an additional diagnosis, particularly when coronary heart disease, stroke and kidney disease are listed as the principal diagnosis. When hospitalisations for diabetes as the principal and additional diagnoses are combined, the total number was 391,912, or 6% of all hospitalisations.

Trends

Recent changes in the way hospital data for diabetes are recorded has made it difficult to compare counts over time. One consequence of the changes in recording procedure is an apparent, but not real, large increase in the number of hospitalisations where diabetes was recorded as the principal diagnosis compared with previous years.

Hospitalisations for diabetes, 2001–02

Number per 100,000 population

Age group (years)

Source: AIHW National Hospital Morbidity Database.

Sex and age

In 2001–02, Australian males were more likely to be hospitalised for diabetes than females. This is true for both principal or additional diagnoses, and for most age groups.

Hospitalisations for diabetes increase steadily with age. Around 70% of hospitalisations for diabetes occur among those aged 60 years and over.

Length of stay in hospital

In 2001–02, the average length of stay in hospital (of those hospitalised for at least one night) for people with diabetes as the principal diagnosis was 10 days. In comparison, the average length of stay for all other principal diagnoses was 9 days. Diabetes also contributes to extended hospital stays for other conditions. When hospitalisations for diabetes as an additional diagnosis were taken into account, the average length of hospital stay (for those hospitalised for at least one night) for diabetes increased to 11 days compared with 9 days for persons without diabetes.

Deaths in hospital

In 2001–02, 3% of hospitalisations for diabetes (as a principal or additional diagnosis) ended in death.

Deaths

Diabetes was the sixth leading underlying cause of death among Australians in 2002, accounting for 3,329 deaths (2.5% of all deaths). However, when the number of deaths from diabetes as an associated cause as well as the underlying cause of death were combined, the number of deaths increased to 11,467 deaths (9% of all deaths). In other words, diabetes was three times as likely to be listed as an associated cause rather than the underlying cause of death.

Causes of death commonly listed with diabetes

Before 1998, deaths from diabetes were underestimated in Australian death reports, as diabetes was rarely listed alone as the underlying cause of death. However, since 1998, information on both underlying and associated causes of death has become available. When listed as an associated cause of death, diabetes predominantly occurs with heart, stroke and vascular diseases and, to a lesser extent, diseases of the genito-urinary system.

Of the deaths where diabetes was recorded as the underlying cause, coronary heart disease was listed as an associated cause in 50% of deaths in 2002. When diabetes was listed as an associated cause of death, coronary heart disease was the underlying cause in 24% of these deaths.

Trends

Death rates from diabetes (as an underlying cause) fell substantially over the second half of last century, particularly among females where there was a 66% decline since the early 1940s, when death rates for Australian females peaked. For Australian males, the diabetes death rate peaked in the late 1960s and has since declined by 17%. Between 1991–02, the death rate from diabetes (as the underlying cause of death) increased by around 9% among males, while the female death rate declined by about 6%.

Sex and age

In 2002, Australian males were more than one-and-a-half times as likely to die from diabetes (as the underlying cause of death) as Australian females.

Diabetes death rates increase dramatically with age, with 86% of all deaths occurring among those aged 65 years and over.

Deaths from diabetes, 2002
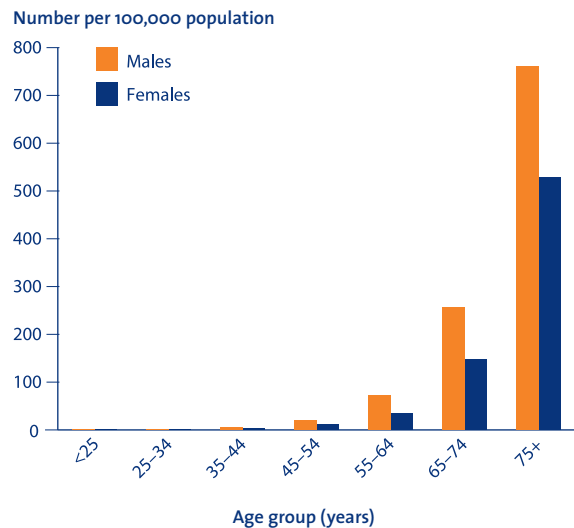
Number per 100,000 population

Source: AIHW National Mortality Database.

Aboriginal and Torres Strait Islander peoples

In 2000–02, Aboriginal and Torres Strait Islander peoples[23] died from diabetes (as the underlying cause of death) at almost 15 times the rate of other Australians.

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23   Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.

Health inequalities

People with diabetes, 1999–00

Population subgroup	Men	Women	Persons
			Per cent
Age group (years)			
25–34	0.1	0.4	0.3
35–54	4.5*	3.8*	4.1*
55–74	18.4*	12.5*	15.4*
75 and over	23.6*	22.7*	23.0*
Ages 25 and over (ASR)	*8.7*	*6.7*	*7.6*
Socioeconomic status (highest level of education)			
Did not complete secondary school	10.5	6.8	8.1
Completed secondary school	9.5	5.1	6.8
TAFE/tertiary	7.8	7.4	7.7
Aboriginal and Torres Strait Islander status	n.a.	n.a.	n.a.
Region	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than the age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 1999–00 AusDiab Study.

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4

Kidney (renal) failure

Key points

- Kidney failure is both a risk factor for and a condition associated with heart, stroke and vascular diseases.
- Kidney failure was recorded as underlying or associated cause in 13,361 deaths in 2002 (10% of all deaths).
- There are no national figures on the prevalence of kidney failure. Data on those on treatment for end-stage renal disease (ESRD), the severe end of kidney failure, provide an approximation. There were 12,945 people (66 per 100,000 population) with ESRD receiving kidney replacement treatment (dialysis or kidney transplantation) at the end of 2002.
- In 2002, 1,855 people (9 per 100,000 population) with ESRD started kidney replacement treatment in Australia.
- Kidney failure is more common among Aboriginal and Torres Strait Islander peoples than among other Australians. During 2000–02, the age-standardised Indigenous death rate from kidney failure was around five times that of other Australians.

Kidney failure is a condition where much or all of the kidney function is lost. The kidney fails to adequately do its job of removing waste products from the blood and regulating the body water and chemical balance. Acute kidney failure is usually reversible. However, chronic kidney failure is a long-term condition where kidney function is lost progressively and irreversibly. ESRD is the final stage in the progressive deterioration of kidney function. In this situation, a person needs dialysis or a kidney transplant to remain alive. This section deals with kidney failure in relation to heart and blood vessel disease, and its risk factors.

Heart, stroke and vascular causes, risk factors and complications

Acute kidney failure may result, among other causes, from heart or blood vessel disease that limits blood flow to the kidneys. This can happen in heart failure, heart attack or heart valve disease, where the blood flow to the kidney from the heart is reduced. It can also be due to a blockage (clot or embolus) in the vessels that supply blood to the kidneys (renal arteries). Patients undergoing major heart, stroke and vascular surgery may also have less blood reaching the kidneys. Complications of acute kidney failure include abnormal heart rhythms, heart attack and inflammation of the outer layer of the heart (pericarditis).

Chronic kidney failure may be caused by any condition that damages the normal structure and function of the kidney. Infections, diabetes and high blood pressure are the main causes—26%, 26% and 16%, respectively, according to the ANZDATA (Australia and New Zealand Dialysis and Transplant Registry) (see **Methods and data sources**). Other vascular causes include narrowing or blockages of the kidney vessels, or following interventions to the aorta, renal arteries or coronary arteries in people with atherosclerosis. People with kidney failure are at high risk of heart, stroke and vascular diseases.

Heart, stroke and vascular diseases are the most frequent cause of death in people with ESRD. Lifestyle changes and treatments to reduce the risk of heart, stroke and vascular events are especially important in this group.

Risk factors for kidney failure include certain kinds of infections, diabetes, high blood pressure, heredity, injury, overweight and obesity, tobacco smoking and use of certain pain killers.

How many Australians have kidney failure?

There are no national figures on the prevalence of kidney failure. The 1999–00 AusDiab Study (ages 25 years and over) provided some information on indicators of kidney disease: 1.1% of those surveyed had elevated blood creatinine, 2.5% had protein in their urine and 6.4% had blood in the urine. ANZDATA collects data on those on treatment for ESRD, the severe end of kidney failure, and thus provides a proxy measure of the prevalence and incidence of ESRD.

Prevalence

There were 12,945 people (66 per 100,000 population) with ESRD receiving kidney replacement treatment (dialysis or kidney transplantation) at the end of 2002. Of these, 5,740 (29 per 100,000 population) had had a kidney transplant and just over 7,200 (37 per 100,000 population) were on dialysis. These figures represent a 5% increase in the number of dialysis-dependent people and a 5% increase in the number of people living with kidney transplants compared with the previous year.

These increases are likely to have been due to a combination of increased incidence, better management and new technologies, and kidney replacement therapy being provided to older people.

Incidence

In 2002, 1,855 people (9 per 100,000 population) with ESRD started kidney replacement treatment in Australia. The average age of new patients was 59 years.

Associated heart, stroke and vascular conditions and risk factors

Among the people who started treatment for ESRD in 2002, 32% had coronary heart disease, 19% had peripheral vascular disease, 10% had had a stroke, 37% had diabetes, 12% were current tobacco smokers and 41% were former tobacco smokers.

Trends

In the last decade, the proportion of people starting treatment for ESRD who have heart, stroke and vascular diseases has remained steady but the proportion with Type 2 diabetes has increased.

Hospitalisations

In 2001–02, there were 11,594 hospitalisations for which kidney failure was the principal diagnosis (0.2% of all hospitalisations). In 47% of these, heart, stroke and vascular diseases were recorded as an additional diagnosis. However, kidney failure was more likely to be recorded as an additional diagnosis, with a principal diagnosis of dialysis in 78% of such cases. There were 636,026 hospitalisations for dialysis (10% of all hospitalisations). This represents multiple admissions for a smaller number of patients as each receives dialysis two to three times each week. In addition, there were 111 hospitalisations with a principal diagnosis of thrombosis/occlusion of the renal artery and 632 for hypertensive kidney disease or high blood pressure secondary to other kidney disorders.

Procedures

In 2001–02 there were 570 kidney transplant operations. There were also 640,202 dialysis procedures, 22 procedures for renal bypass surgery, 29 for renal artery endarterectomy, and nine for embolectomy or thrombectomy of renal arteries.

Deaths

Kidney failure was the underlying cause of death for 1,925 Australians in 2002 (1.4% of all deaths). However, kidney failure is seven times as likely to be listed as an associated cause of death, bringing the total number of deaths where this condition was involved to 13,361 (10% of all deaths).

Kidney failure is rarely listed as the only cause of death, without any associated causes. Where kidney failure was the underlying cause of death in 2002, heart failure was listed as an associated cause in 29% of cases, coronary heart disease in 26% and stroke in 8%. When kidney failure was listed as an associated cause, heart, stroke and vascular diseases were the underlying cause of death in 41% of cases.

Cardiac events are the most common cause of death in people with ESRD. Of the 1,185 deaths among people on kidney replacement treatment for ESRD in 2002, 37% were due to heart disease (mainly cardiac arrest and heart attack) and 5% to stroke.

Sex and age

In 2002, males were one-and-a-half times as likely to die from kidney failure (as the underlying cause of death) as females.

Death rates from kidney failure increase markedly with age, with 88% of deaths occurring among those aged 75 years and over.

Aboriginal and Torres Strait Islander peoples

Deaths from kidney failure occur at much higher rates among Indigenous Australians compared with other Australians. During 2000–02, in Queensland, Western Australia, South Australia and the Northern Territory, there were 63 Indigenous deaths due to kidney failure. This corresponds to an age-standardised Indigenous death rate of around five times that of other Australians.

Further reading

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Deaths from kidney failure, 2002

Number per 100,000 population

Source: AIHW National Mortality Database.

Treatment and care

5 Introduction

The treatment and care of patients with heart, stroke and vascular diseases is an important function of the health care system, and is one of the success stories of modern medicine. As the disease group that accounts for the highest disease burden (in terms of deaths and disability), this is not surprising. Heart, stroke and vascular diseases are estimated to have accounted for around 11% of all problems managed by general practitioners (GPs) in 2002–03. They were the principal diagnoses for 7% of all hospitalisations in 2001–02, an increase of around 16% in the last decade, and were the most expensive disease group in Australia in terms of health expenditure.

The potential for people with these diseases to benefit from interventions is substantial. For example, the WHO MONICA Study found that the advances and improvements in acute coronary care, accounted for nearly two-thirds of the decline in coronary heart disease death rates.

The treatment and care of people with heart, stroke and vascular diseases and associated risk factors is quite broad. It covers a number of settings and phases of care—prevention, general practice, specialist care, emergency care, acute care, rehabilitation and long-term care. These components of care are briefly outlined below, and some are covered in more detail in separate sections of this chapter. Specific details on health care expenditure, diagnostic and surgical procedures, and drug treatment, are also presented in this chapter.

Prevention

Prevention encompasses a wide range of interventions that aim to decrease the risk of the disease and occurrence of new cases, delay its onset or limit its progression. It may be undertaken at the population level (such as tobacco taxes to discourage smoking) or aimed at particular individuals (such as drug treatment for lowering high blood pressure). Prevention can occur through individuals acting on their own behalf, through government action, or through the initiative of doctors or others.

For those with established heart, stroke and vascular diseases, it is important to try to prevent the occurrence of further heart, stroke and vascular events such as heart attack or stroke. This subset of prevention is known as secondary prevention.

General practice

General practice care—or primary care—is often the first port of call for people with heart, stroke and vascular diseases or their associated risk factors. GPs have an important role in identifying and managing risk factors, and in detecting and treating disease. Continuity of care, including ongoing secondary prevention for people with chronic conditions, is often provided by GPs through their role of monitoring and coordinating patient care over the longer term.

In 2002–03, heart, stroke and vascular problems represented 11% of all problems managed. These encounters often involved prescription of medication, advice or counselling, referral to a specialist or ordering of a pathology test.

Specialist care

People with the more severe cases of heart, stroke and vascular diseases, including acute cases, are likely to receive care from a specialist medical practitioner at some stage. Of the approximately 19,000 registered medical specialists in 2001, 3.6% indicated cardiology, 0.6% cardiothoracic surgery and 1.5% neurology as their main specialty.

Emergency care

Treatment and care for emergency cases—such as a heart attack or stroke—is an important phase of care for these patients. It includes emergency care before reaching hospital (such as paramedic/ambulance care) and care in the emergency departments of hospitals. It is well established that prompt emergency care is associated with better outcomes. Currently, there are no national data on emergency care available to include in this report.

Acute care

Heart, stroke and vascular diseases are responsible for a large proportion of hospitalisations, many of which are for acute care. In 2001–02, 6.9% of hospitalisations involved a principal diagnosis of one of these diseases. When both principal and additional diagnoses were examined, heart, stroke and vascular diseases were involved in 9.8% of all hospitalisations. Hospital care for these patients often involves some care in a specialist unit. Coronary care units are well-established, having been introduced first in the 1960s. In 2001–02, there were around 120 coronary care and 31 cardiac surgery units in Australian public hospitals, and 26 coronary care and 23 cardiac surgery units in private hospitals.

A similar type of specialised unit—stroke units— has been demonstrated to be very effective for stroke care. These units provide organised, specialist stroke care in an inpatient setting. Use of stroke units is still developing in many OECD countries, including Australia.

Rehabilitation

Rehabilitation is multidisciplinary care aimed at enabling persons with disabilities to improve their functional capacity, to retrain in lost skills, and/or change their psychosocial adaptation. Although there has traditionally been a focus on physical medicine, rehabilitation is now acknowledging the patient's social context.

Rehabilitation begins in the acute hospital environment and, depending on each individual's needs, may continue in a specialised admitted patient rehabilitation unit, or be provided through hospital outpatient services, in the patient's home or at a community rehabilitation facility.

There are currently no comprehensive national data available on patients receiving rehabilitation care after a heart, stroke or vascular disease event.

Long-term care

Long-term or ongoing care is continuing supportive and after-care services provided to an individual with an impairment. It may be provided in an ambulatory or residential setting, and can include supportive, educational, or drug therapies. The role played by informal carers (such as family members, neighbours, friends and volunteers) in providing long-term care also needs to be recognised.

Palliative care

Palliative care occurs when a person's condition has progressed beyond the stage where curative treatment is effective and attainable or where the person chooses not to pursue curative treatment. It aims to provide relief from suffering and to enhance the quality of life.

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5 General practice care

Key points

- In 2002–03 heart, stroke and vascular problems represented 11% of all problems managed in general practice. This excluded lipid disorders, overweight and obesity, smoking and diabetes, which were counted separately.
- GPs managed heart, stroke and vascular problems at a rate of 16 per 100 encounters. Extrapolated to the total number of GP encounters in Australia, this indicates that GPs managed heart, stroke and vascular problems on about 15 million occasions in that year.
- High blood pressure[24] was the most frequently managed problem in general practice in 2002–03, at 8.9 per 100 encounters, and accounted for over half of all heart, stroke and vascular problems.
- Between 1998–99 and 2002–03, the rate of management of heart, stroke and vascular problems in general practice remained steady. By contrast, there was a significant rise in the management of lipid disorders and diabetes over that period.

GPs tend to be the first port of call for a health problem and the coordinators of health care for most people. They provide services ranging from prevention of illness to treatment and rehabilitation. About 82% of the population visited a GP at least once in 2000.

Heart, stroke and vascular conditions constitute a significant proportion of the workload of GPs. This is not surprising given the high prevalence of these conditions and their risk factors. In 2002–03 heart, stroke and vascular problems represented 11% of all problems managed in general practice. This excluded risk factors for heart, stroke and vascular diseases (lipid disorders, overweight, smoking and diabetes), which were counted separately. Overall, GPs managed heart, stroke and vascular problems at 16 per 100 encounters. Extrapolated to the total number of GPs' encounters in Australia, this indicates that GPs managed heart, stroke and vascular problems on about 15 million occasions in that year.

Information on the health profile of GPs' patients also highlights the importance of GPs in preventing, treating and managing heart, stroke and vascular conditions. In 2002–03, 55% of all adult general practice patients and one-third of child patients aged 2–17 years were overweight.[25] About 17% of adult patients smoked daily and 4% smoked occasionally.

Patient characteristics

In 1998–00, patients at encounters where GPs managed heart, stroke and vascular problems were more likely to be male and were significantly older than those at other encounters—almost 60% were aged 65 years and over. Most were long-standing patients at the practice, indicating continuity of care for these chronic conditions. About one in four general practice patients had heart, stroke and vascular problems in 1998–00. Of these, 12% also had diabetes, 11% had lipid disorders, 10% were current smokers and almost two-thirds were overweight.

What problems do GPs manage?

Heart, stroke and vascular problems

High blood pressure[26] was the most frequently managed problem in general practice in 2002–03, at 8.9 per 100 encounters, and accounted for over half of all heart, stroke and vascular problems. However, new cases of high blood pressure were uncommon (0.5 per 100 encounters), indicating that most of these encounters were for ongoing monitoring and treatment.

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24   Includes ICPC-2 codes K86 (hypertension, uncomplicated) and K87 (hypertension, complicated).

25   Includes ICPC-2 codes T82 (obesity) and T83 (overweight).

26   Includes ICPC-2 codes K86 (hypertension, uncomplicated) and K87 (hypertension, complicated).

Other relatively common heart, stroke and vascular conditions were coronary heart disease[27] (1.2 per 100 encounters), cardiac check-ups (1.1 per 100 encounters), heart failure (0.7 per 100 encounters) and certain abnormal heart rhythms (atrial fibrillation or flutter at 0.7 per 100 encounters). Problems related to stroke and to other vascular disease were managed less frequently (both 0.2 per 100 encounters).

Risk factors

GPs managed smoking problems at 0.3 per 100 encounters in 2002–03. The rate of management of smoking appears quite low, given that almost one in five general practice encounters with adults are with daily smokers, but it is possible that it was addressed as part of the overall management of a chronic condition and not recorded separately.

Overweight[28] problems were managed at 1.1 per 100 encounters in 2002–03. Compared with the prevalence of overweight and obesity among GPs' patients (55%), the rate of management of this problem is very low but increased from that in 1998–99, when it was 0.1 per 100 encounters. However, GPs may have managed these problems at a different encounter.

Lipid disorders were managed at 3.0 per 100 encounters in 2002–03. Diabetes was managed at 2.9 per 100 encounters.

How do GPs manage these problems?

At 62% of contacts with heart, stroke and vascular problems in 1998–00 at least one medication was prescribed, advised or given. For 16% of heart, stroke and vascular problems, GPs provided at least one non-pharmacological treatment, mainly advice or counselling. The patient was referred at almost 6% of heart, stroke and vascular encounters, mainly to a specialist, for extra care and GPs ordered an investigation, usually pathology, at 12%.

Among the top 30 medications most frequently prescribed by GPs to all patients in 2002–03 were:

- lipid-lowering drugs (atorvastatin, simvastatin)
- blood pressure-lowering drugs (irbesartan, atenolol, frusemide)
- antithrombotic drugs (aspirin, warfarin).

GPs referred certain heart, stroke and vascular conditions for hospital admission relatively frequently in 2002–03. These included patients with heart failure, coronary heart disease and suspected heart attack. Coronary heart disease was also among the 10 problems most frequently referred to a medical specialist. By contrast, GPs rarely referred patients with high blood pressure to other health professionals or services, suggesting that high blood pressure is mostly handled in general practice.

Among the pathology tests most frequently ordered overall by GPs in 2002–03 were blood lipids (3.3 per 100 encounters) and blood glucose (2.1 per 100 encounters). High blood pressure, diabetes and lipid disorders were the top three problems for which GPs ordered pathology tests most frequently.

Trends in management

Between 1990–91 and 1998–00 the management rate of heart, stroke and vascular problems fell slightly. Breaking this down further, rates for coronary heart disease and heart failure decreased but heart, stroke and vascular check-ups increased, indicating that GPs are becoming more involved in prevention. The prescription of medications to lower blood lipids and blood pressure, and anticoagulants also rose in that period, while prescriptions for anti-angina medications fell. Counselling and advice were given significantly more frequently by the end of the decade.

Between 1998–99 and 2002–03, the management rate of heart, stroke and vascular problems remained steady. By contrast, there was a significant rise in

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27 Includes ICPC-2 codes K74 (ischaemic heart disease with angina) and K76 (ischaemic heart disease without angina).

28 Includes ICPC-2 codes T82 (obesity) and T83 (overweight).

the management of lipid disorders over that period, amounting to an average increase per year of 110,000 encounters. This was due to ongoing management of people with lipid disorders, rather than an increase in new cases detected. The rate of management of diabetes also rose significantly after 1998–99, translating into an estimated average increase per year of 80,000 general practice encounters for diabetes.

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Drug treatment

Key points

- The use of calcium channel blockers has risen over the last decade.
- Angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor antagonists have become the most frequently used class of blood pressure-lowering drug.
- Among lipid-lowering drugs, the use of statins has increased considerably since 1994, doubling between 1998 and 2000.
- The use of antiplatelet drugs, particularly aspirin, has risen markedly in the late 1990s.
- In 2000, the cost of heart, stroke and vascular drugs sold under the PBS amounted to $1,546 million; that is, 34% of government and patient costs for all prescription PBS drugs dispensed through pharmacies.
- Over 51 million prescriptions for heart, stroke and vascular drugs were dispensed in 2000—one-quarter of all prescriptions.

There is a wide range of effective drugs to treat people with heart, stroke and vascular diseases. These drugs can improve quality of life and lower death rates. A brief overview of the use of prescription medicines for heart, stroke and vascular diseases in Australia is presented here. These data refer to the use of prescription drugs (both privately prescribed drugs and those listed on the PBS) dispensed through pharmacies in the community only; medicines provided in public hospitals are not included.

Drug use is expressed in defined daily dose per 1,000 population per day (DDD/1,000/day). This is based on the assumed average dose per day of a drug used for its main indication in adults. The DDD enables valid comparisons between drugs independent of differences in price, preparation and quantity per prescription.

Blood pressure-lowering drugs

Although drugs in this class are grouped as 'blood pressure-lowering', they have other important and useful effects and are given to treat various conditions, not just high blood pressure. As the reason for which the drug is prescribed is not recorded, it is not possible to determine the actual drug use for specific conditions or purposes. These data therefore show the use of the drugs not only to lower blood pressure but also for other purposes.

Combinations of blood pressure-lowering drugs are often given because this increases their efficacy and also allows lower doses of each drug to be used, reducing side effects.

Diuretics

Diuretics are effective in reducing blood pressure, which reduces the occurrence of strokes and heart disease. Diuretics are also helpful for treating symptoms in people with heart failure. Although diuretics are still very popular, their prescription is falling in favour of more modern drugs such as ACE inhibitors and calcium channel blockers. Frusemide was the most commonly dispensed diuretic in 2000 (22.0 DDD/1,000/day).

Beta-blockers

Beta-blockers are used to treat patients with high blood pressure. But they also have other important uses. Through their lowering of blood pressure, these drugs prevent strokes and heart attacks. Also, in people with angina or history of heart attack, beta-blockers can reduce pain and deaths, and prevent further heart attacks. Certain beta-blockers are often used in the treatment of heart failure. Usage levels have remained relatively unchanged in the 1990s. Atenolol was the most widely prescribed beta-blocker in 2000 (10.9 DDD/1,000/day).
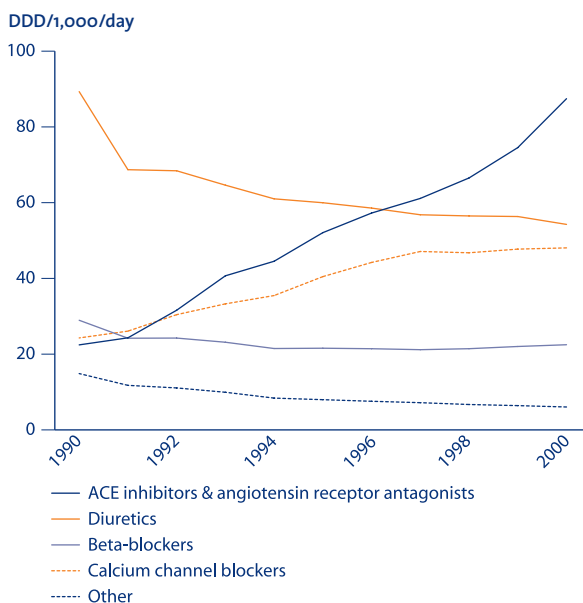
Calcium channel blockers

Calcium channel blockers are effective in reducing blood pressure and angina. Their use has risen over the last decade. Amlodipine and felodipine were the most commonly dispensed calcium channel blockers in 2000 (15.7 and 11.9 DDD/1,000/day, respectively).

ACE inhibitors and angiotensin receptor antagonists

ACE inhibitors are used widely to treat people with high blood pressure or heart failure. These drugs limit the progressive enlargement of the heart that can occur after a heart attack and relieve heart failure symptoms. If given early during a heart attack, they can reduce the risk of death. They have become the most frequently used class of blood pressure-lowering drug. Enalapril was the most used ACE inhibitor in 2000 (15.7 DDD/1,000/day). Irbesartan (14.5 DDD/1,000/day) was the most commonly used of the related group of compounds, the angiotensin receptor antagonists.

Community use of blood pressure-lowering drugs, 1990–00

DDD/1,000/day

Legend:
— ACE inhibitors & angiotensin receptor antagonists
— Diuretics
— Beta-blockers
----- Calcium channel blockers
------ Other

Source: DoHA 2003.

Lipid-lowering drugs

Lipid-lowering drugs are effective in preventing heart attacks and reducing coronary heart disease deaths. HMG CoA reductase inhibitors (statins), resin binders, nicotinic acid, fibrates and probucol all reduce blood LDL cholesterol and possibly increase HDL cholesterol to varying degrees, statins being the most effective. They also have varying effects in lowering blood triglycerides. The use of statins has increased considerably since 1994 when their value was established conclusively, doubling between 1998 and 2000. Atorvastatin is the most widely prescribed lipid-lowering agent (39.2 DDD/1,000/day in 2000), followed by simvastatin (29.7 DDD/1,000/day).

Community use of lipid-lowering drugs, 1990–00

DDD/1,000/day

Legend:
— Statins
— Fibrates
— Resin binders
----- Other
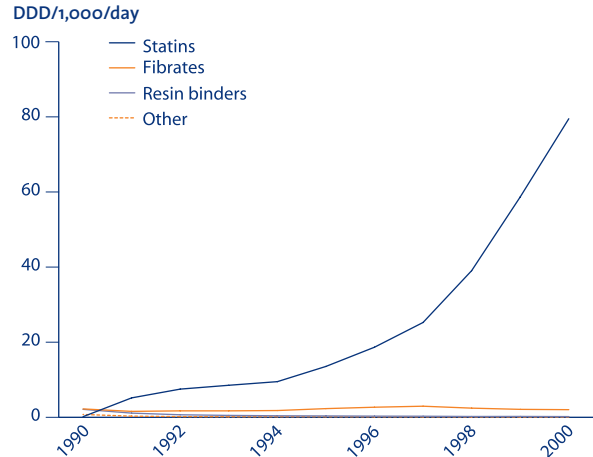
Source: DoHA 2003.

Thrombolytic and antithrombotic drugs

Thrombolytic drugs

Thrombolytic drugs dissolve blood clots. They are particularly useful in patients suffering a heart attack, where a clot blocks blood supply to part of the heart, and in people having a stroke caused by a clot impeding blood flow to part of the brain (ischaemic stroke). Thrombolytics are less commonly used in peripheral vascular disease. For best results, the drugs must be given early during the heart attack or stroke. These drugs are generally given only in hospital, under close supervision.

Aspirin and other antiplatelet agents

Antiplatelet drugs interfere with the formation of blood clots that are made of platelets. Among these drugs are aspirin, clopidogrel, dipyridamole and abciximab. If given during a heart attack, aspirin reduces the risk of death. Used long-term, it also reduces deaths and heart attacks among people with coronary heart disease. Given early during an ischaemic stroke (see above), aspirin reduces later similar strokes as well as deaths and disability. Antiplatelet agents used long-term in ischaemic stroke patients also prevent further strokes. These drugs are also routinely used during percutaneous coronary intervention procedures to reduce complications. The use of antiplatelet drugs, particularly aspirin, has risen dramatically in the late 1990s (aspirin 12.4 DDD/1,000/day in 2000, excluding over-the-counter supply without prescription).

Anticoagulants

These drugs prevent the formation of clots that could block blood vessels, by interfering with the clotting process. Anticoagulants are given to certain patients with heart disease, such as those with atrial fibrillation, after some heart attacks or with severe heart failure and less often with stroke or peripheral vascular disease (except previous embolism) to lower their risk of subsequent disease. They are also commonly used during percutaneous coronary intervention. Warfarin and heparin belong to this class of drugs. The use of anticoagulants has steadily increased during the 1990s (warfarin 4.1 DDD/1,000/day in 2000).

Community use of drugs to prevent or dissolve blood clots, 1990–00
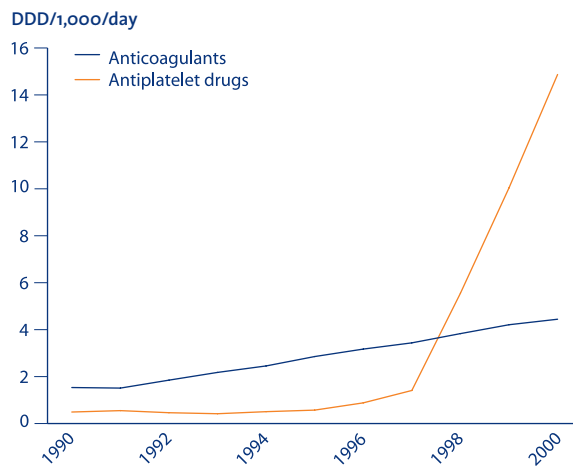
DDD/1,000/day

Source: DoHA 2003.

Other drugs

Nitrates

Nitrates relieve and prevent angina symptoms by dilating blood vessels. They are commonly prescribed heart, stroke and vascular drugs (nitrates 18.4 DDD/1,000/day in 2000).

Inotropes

Inotropes increase the force of contraction of the heart muscle. These drugs are useful in people with heart failure. There has been a slow decline in the prescription of these drugs since 1990 (inotropes 7.1 DDD/1,000/day in 2000).

Antiarrhythmics

Antiarrhythmic drugs are given to restore the normal heart rhythm or prevent serious (life-threatening) abnormal heart rhythms (arrhythmias). Amiodarone is the most commonly dispensed drug in this class (1.5 DDD/1,000/day in 2000).

The level of use of these drugs in the community has remained fairly constant during the 1990s.

Community use of other drugs for heart, stroke and vascular diseases, 1990–00
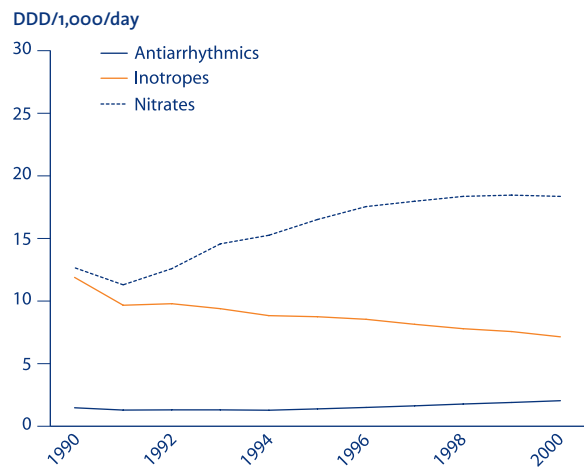
Source: DoHA 2003.

Drug costs

In 2000, the cost of heart, stroke and vascular drugs sold under the PBS amounted to $1,546 million. This corresponds to 34% of government and patient costs for all prescription PBS drugs dispensed through pharmacies. Government and patient costs on the dispensing of drugs not listed on the PBS, and the cost of drugs dispensed in public hospitals, are unavailable. Therefore, these figures underestimate the total cost of heart, stroke and vascular drugs.

Over 51 million prescriptions for heart, stroke and vascular drugs were dispensed in 2000. This represents one-quarter of all prescriptions. Simvastatin, a lipid-lowering drug, was the top drug by cost, amounting to $238 million in 2000. Also ranked in the top ten were atorvastatin and pravastatin, other lipid-lowering drugs.

The following table shows the cost of prescription PBS drugs used in the community in Australia during 2000.

Prescription drugs used in the community in Australia, 2000

Drug	No. scripts ('000)[a]	Cost ($ million)[b]
Blood pressure-lowering drugs		
ACE inhibitors	14,764	421
Calcium channel blockers	8,729	213
Beta-blockers	4,542	62
Diuretics	3,525	42
Other	987	18
Total blood pressure-lowering drugs	*32,547*	*755*
Lipid-lowering drugs		
Statins	10,744	618
Fibrates	448	20
Resin binders	46	2
Other	21	0.5
Total lipid-lowering drugs	*11,259*	*641*
Other drugs		
Nitrates	2,691	56
Antiarrhythmics	532	16
Inotropes	715	6
Peripheral vasodilators	10	0.2
Total other drugs	*3,949*	*78*
Antithrombotic drugs		
Anticoagulants	1,911	20
Antiplatelets	1,438	49[c]
Thrombolytics	1	2
Total antithrombotic drugs	*3,350*	*72*
Total heart, stroke and vascular drugs	**51,104**	**1,546**

(a) Includes prescription drugs subsidised under the PBS and Repatriation Pharmaceutical Benefits Scheme and non-subsidised prescription drugs dispensed through pharmacies.

(b) Includes government and patient costs for drugs listed in the PBS only.

(c) This figure is likely to grossly underestimate the actual cost, as over-the-counter aspirin is not included.

Source: DoHA 2003.

Further reading

Australian medicines handbook 1998. 1st ed. Adelaide: Australian Medicines Handbook Pty Ltd.

DoHA 2003. Australian statistics on medicines 1999–2000. Canberra: DoHA.

5 Procedures in hospital

Key points

In 2001–02 there were:

- 81,800 coronary angiograms performed in hospitals—a 50% increase over the last decade
- 16,252 coronary artery bypass grafting (CABG) operations—a 15% decline over the last decade
- 23,949 coronary angioplasty procedures performed—a twofold increase over the last decade. Stents were inserted in 91% of these procedures in 2001–02
- 3,553 carotid endarterectomies performed in Australia, with rates remaining stable over the last few years
- 744 lower limb amputations for people hospitalised with a principal diagnosis of atherosclerosis of the peripheral arteries and arteries of the extremities
- 1,990 abdominal aortic aneurysm operations performed in Australia.

Heart, stroke and vascular diseases are a major cause of illness and death in Australia. Medical services offer a range of procedures to diagnose and treat these diseases. A brief overview of the major procedures performed in hospital for heart, stroke and vascular diseases is presented here.

Procedures for heart disease

Coronary angiography

Coronary angiography (also known as coronary arteriography) gives a picture of the heart's arteries, known as the coronary arteries. It is used to diagnose coronary heart disease and is essential before either coronary artery bypass surgery or coronary angioplasty.

In 2001–02, there were 81,800 coronary angiograms performed in hospitals, an increase in age-standardised rates of 46% for males and 62% for females since 1993–94.

Males were twice as likely as females to have this diagnostic procedure in 2001–02, and most patients (78%) were aged 55 years and over. The vast majority (71%) of these patients were admitted to hospital with a principal diagnosis of coronary heart disease—comprising 32% with angina, 24% chronic coronary heart disease and 14% acute myocardial infarction (AMI).

Coronary artery bypass grafts

Coronary artery bypass grafting (CABG) usually involves opening a patient's chest and using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood supply to the heart muscle. The graft material is usually taken from the chest wall or elsewhere, or veins in the patient's legs, or both. CABG is a treatment and not a cure for coronary artery disease, and there is a risk of recurrent disease. Re-operations are uncommon within the first five years but become more frequent later. According to the National Cardiac Surgery Register in 1999, the average number of bypass grafts per operation was three per patient, and 6% of CABGs were for re-operations.

In 2001–02, there were 16,252 CABG operations, with an in-hospital death rate of 2%. While the use of this procedure increased rapidly in the 1970s, 1980s and early 1990s, between 1993–94 and 2001–02 the age-standardised rate declined by 16% among males and 13% among females. CABG is increasingly being used to treat older patients and over the last decade procedure rates among people aged 75 years and over increased by 66%.

Males were over three times as likely as females to undergo this procedure in 2001–02, despite the incidence of coronary heart disease in men being only twice that of women. Most patients (73%) were aged 60 years and over. The vast majority of

patients undergoing CABG (86%) were admitted to hospital with a principal diagnosis of coronary heart disease—comprising 45% with angina, 30% chronic coronary heart disease and 11% AMI. Around 6% of patients were admitted for non-rheumatic mitral/aortic valve disorders.

State and territory

During 2000, there was considerable variation in CABG procedures across states and territories, even after accounting for different age structures. Procedure rates varied from 12% above the national average (in Queensland) to 28% below the national average (in Western Australia).

International comparisons

The United States had the highest rates of CABG use of 16 OECD countries compared in 1999—their age-standardised procedure rates were twice those of Australia. Australia was at the higher end of the countries compared and had similar procedure rates to the Netherlands, New Zealand and Finland (around 90–100 CABGs per 100,000 population).

Coronary angioplasty

Coronary angioplasty (also known as percutaneous transluminal coronary angioplasty), as with coronary artery bypass surgery, is used to restore adequate blood flow to blocked coronary arteries. It involves inserting a catheter with a balloon into a narrowed coronary artery. The catheter is first inserted into a leg (or occasionally, arm) artery through the skin and then is threaded through the vessel back towards the heart and into the coronary arteries to the area of vessel blockage. The balloon is then inflated against the blocked area to create a wider passage for blood flow. Together with coronary stenting, which is usually done at the same time, it is referred to as percutaneous coronary intervention (PCI).

Coronary angioplasty avoids the major trauma of CABG surgery because it does not require the opening of the patient's chest. However, the technique cannot be used to treat all patients with coronary artery obstruction.

In 2001–02, there were 23,949 coronary angioplasty procedures performed, with an in-hospital death rate of 1%. Over the last decade its use has increased rapidly, with age-standardised rates doubling between 1993–94 and 2001–02. Coronary angioplasty is increasingly being used to treat older patients, and among those aged 75 years and over there has been a fourfold increase in the use of these procedures between 1993–94 and 2000–01, compared with an increase of around 60% for those aged 30–64 years. Since 1997–98 coronary angioplasty has replaced CABG as the most common revascularisation treatment for coronary heart disease in Australia.

Males were three times as likely as females to undergo coronary angioplasty in 2001–02, despite the incidence of coronary heart disease in men being only twice that of women. Most patients (77%) were aged 55 years and over. Almost all patients (94%) undergoing coronary angioplasty were hospitalised with a principal diagnosis of coronary heart disease—comprising 42% with angina, 26% AMI and 25% chronic coronary heart disease.

State and territory

During 2000, there was considerable variation in coronary angioplasty procedures across states and territories, even after accounting for different age structures. Procedure rates varied from 20% above the national average (in Victoria) to 13% below the national average (in Queensland).

International comparisons

The United States had the highest rates of coronary angioplasty of 16 OECD countries compared in 1999—their age-standardised procedure rates were three times those of Australia. Australia was at the higher end of the countries compared, exceeded only by the United States, Iceland and France.

Coronary stenting

Although success rates for initial coronary angioplasty are high, there is a risk of early acute closure of the coronary artery and a high rate of recurrence of obstruction (restenosis). This led to the development of other catheter-based techniques, with coronary stenting being the most successful because it is associated with lower rates of restenosis compared with coronary angioplasty alone. Coronary stenting involves expanding a metal mesh tube within the artery to form a supporting structure to hold the artery open at the point where there is narrowing. Since the mid-1990s there has been a rapid increase in the use of coronary stenting as an adjunct to coronary angioplasty. More recently, drug-eluting stents (also referred to as 'coated stents') have been introduced. They have been shown to more effectively reduce the likelihood of restenosis than bare metal stents.

In 2001–02, stents were inserted in 91% of coronary angioplasty procedures (21,880 procedures), a sharp increase from 1994–95 when the proportion was 12%.

Trends in coronary angiography, coronary artery bypass grafting and coronary angioplasty, 1993–94 to 2001–02

Number per 100,000 population
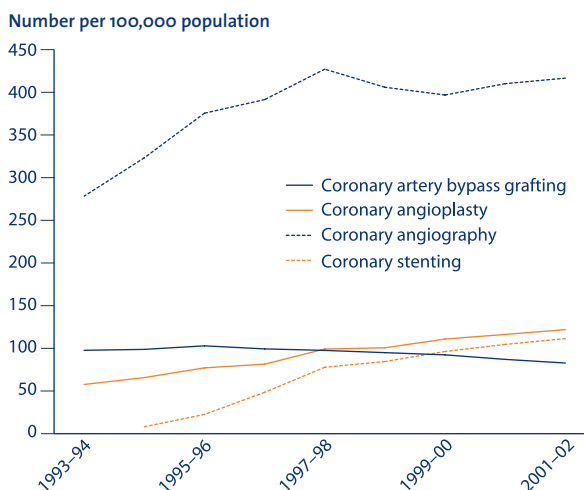
Notes

1. Age-standardised to the 2001 Australian population.

2. Coronary angioplasty includes coronary stenting.

Source: AIHW National Hospital Morbidity Database.

Heart transplants

In 2001–02, there were 72 heart transplants and three combined heart–lung transplants performed in Australia. The rate of these procedures has remained relatively stable between 1998 and 2002.

Heart valve defects

A defective heart valve is one that fails to fully open or close. Valve disease may be congenital, a result of disease such as chronic rheumatic heart disease, or age-related. Valve defects may be repaired with surgery or catheter-based techniques. Valve surgery involves repairing or replacing the mitral, aortic, tricuspid or pulmonary valves. Most valve procedures in Australia consist of replacing the damaged valve with a mechanical device, pig-derived tissue or a human graft. Reconstruction of the damaged valve by stitching techniques is less common.

In 2001–02, there were 6,298 procedures for heart valve defects, with heart valve surgery accounting for 95% of these procedures (6,005 procedures). Surgery was most frequent for the aortic and mitral valves. The number of heart valve procedures has remained relatively stable between 1999 and 2002.

Males were 57% more likely than females to undergo procedures for heart valve defects in 2001–02. Most patients (75%) were aged 55 years and over. Over half of all patients undergoing heart valve defect procedures were admitted to hospital with a principal diagnosis of non-rheumatic valve disorders (16% for mitral valve and 38% for aortic valve), 16% with chronic rheumatic heart disease, 7% with chronic coronary heart disease and 4% with angina.

Cardiac defibrillator implants

Implantable cardiac defibrillators, which monitor the heart rhythm and deliver electrical shocks to the heart when required to eliminate abnormal rhythms, are effective in preventing sudden cardiac death in people at high risk of the life-threatening arrhythmia known as ventricular fibrillation.

In 2001–02, there were 957 such devices implanted in patients around Australia. In the mid-1990s, between 200 and 300 devices were implanted each year and since then there has been a rapid increase in their use (a 26% increase since 1998–99).

Males were four times as likely to receive cardiac defibrillators as females in 2001–02, and most recipients (76%) were aged 55 years and over. Around 49% of patients receiving cardiac defibrillators were admitted to hospital with a principal diagnosis of paroxysmal tachycardia, 9% with other cardiac arrhythmias and 7% with cardiomyopathy.

Procedures for stroke

Carotid endarterectomy

Carotid endarterectomy entails surgically removing atherosclerotic plaque from the carotid arteries in the neck, which supply blood to the brain. This may reduce the risk of blood clots forming and breaking off the atherosclerotic plaque, embolising to arteries in the brain and causing a stroke.

In 2001–02, there were 3,553 carotid endarterectomies performed in Australia, with rates remaining stable over the last few years. The in-hospital death rate for this procedure was 1%.

Males were 2.7 times as likely to undergo this procedure as females in 2001–02, which is consistent with the higher incidence of strokes among men than women. Most patients (80%) were aged 65 years and over. Almost all patients (87%) undergoing carotid endarterectomies were hospitalised with a principal diagnosis of stroke.

International comparisons

A study by the OECD showed carotid endarterectomies are not a common procedure in most OECD countries. Of the countries compared, the United States had the highest number of procedures per population aged 40 years and over (80 per 100,000), followed by Australia

(60 per 100,000) and Canada (45 per 100,000). In Sweden, Norway, Hungary and the United Kingdom the procedure was used more moderately (less than 20 per 100,000 population) and was rarely used in Korea, Italy and Japan.

CT brain scan

A computerised tomographic (CT) scan of the brain uses X-rays to generate an image of the brain and is a diagnostic procedure used in acute stroke to distinguish between the major stroke types (ischaemic stroke, caused by blocked blood supply to a part of the brain, or haemorrhagic stroke, caused by bleeding within a part of the brain or on a part of its surface). This distinction guides treatment. The test may also help to confirm a clinical diagnosis of stroke, or its likely cause, when it is difficult to make otherwise.

In 2001–02, there were 29,532 CT scans of the brain for people hospitalised with a principal diagnosis of stroke or TIA. This is an underestimate of the total number of CT scans of the brain performed in Australia, as this imaging procedure is also performed outside hospital. In recent years, the rate of CT scans of the brain for those hospitalised with a stroke has remained relatively stable.

Males were more likely than females to undergo CT scans of the brain in hospital for a diagnosis of stroke in 2001–02, which is consistent with the higher incidence of strokes among men than women. Most patients (76%) were aged 65 years and over.

Magnetic resonance imaging scan and ultrasound of carotid arteries

Magnetic resonance imaging (MRI) of the brain and ultrasound of the carotid arteries are non-invasive investigations done to help diagnose stroke and its cause, or assess the risk of stroke, respectively.

In 2001–02, there were 3,769 MRI scans of the brain for people hospitalised with a principal diagnosis of

stroke. This is an underestimate of the total number of MRI scans of the brain performed in Australia, as this imaging procedure is also done outside hospital. In recent years, the rate of MRI scans of the brain for those hospitalised with a stroke has remained relatively stable.

Procedures for peripheral vascular disease

Lower limb amputations

In severe cases of peripheral vascular disease the reduced blood supply to the lower limbs can result in an amputation. In 2001–02, there were 744 lower limb amputations for people hospitalised with a principal diagnosis of atherosclerosis of the peripheral arteries and arteries of the extremities. Since 1999–00 there has been a general decline in the age-standardised rates of these procedures, 24% for males and 18% for females. Males were twice as likely as females to undergo this procedure in 2001–02, and most (78%) were done in people aged 70 years and over.

Surgery for abdominal aortic aneurysm

Abdominal aortic aneurysm is an abnormal widening of the aorta (the main artery leading from the heart) below the level of the diaphragm. It is life-threatening if it ruptures, so surgery is performed in severe cases. In 2001–02, there were 1,990 abdominal aortic aneurysm operations performed in Australia. Since 1998–99 there has been a steady decline in the rate of these procedures, 23% among males and 5% among females. Males were five times as likely as females to undergo this procedure in 2001–02, and most (70%) were done in people aged 70 years and over.

Number and rate of procedures, 2001–02

Procedure	Number	Rate
For heart disease		
Coronary angiography	81,800	416.6
Coronary artery bypass grafting	16,252	82.8
Coronary angioplasty (includes coronary stenting)	23,949	121.9
Coronary stenting	21,880	111.4
Heart transplants	72	0.37
Heart valve defects	6,298	32.1
Cardiac defibrillator implants	957	4.9
For stroke		
Carotid endarterectomy	3,553	17.2
CT brain scan	29, 532	150.0
Magnetic resonance imaging	3,769	19.2
For peripheral vascular disease		
Abdominal aortic aneurysm	1,990	10.1
Lower limb amputation for peripheral vascular disease	744	3.8

Note: Rates are per 100,000 population and are age-standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Further reading

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Rehabilitation and secondary prevention

Key points

- Rehabilitation programs help heart and stroke patients reduce their risk of recurring events and help them return to daily life by offering risk factor education, counselling, support and physical activity.
- Although there are no national figures available, it appears that only a minority of eligible patients participates in a cardiac rehabilitation program.
- The proportion of stroke patients who participate in a rehabilitation program is unknown. It is estimated that in Perth in 1989–90 about 25% of hospitalised stroke patients underwent rehabilitation, and in north-east Melbourne in 1996–97 the proportion was about 39%.
- Without preventive treatment, the average death rate from heart disease in people who have had a heart attack is about 5% per year for the rest of their life. The death rate from stroke in people who have had a stroke is similar.
- Although the effectiveness of certain preventive measures is well established, they are currently underused. However, there is evidence that the care of people with heart disease and stroke improved during the 1990s, with more effort being directed to prevention.

Heart, stroke and vascular diseases have a major impact on the Australian community. In 2001, an estimated 3.67 million Australians, or 19% of the population, reported experiencing heart, stroke and vascular conditions. For those who already have such conditions, it is important to try to prevent the occurrence of further heart, stroke and vascular events (known as secondary prevention). Rehabilitation programs help heart and stroke patients reduce their risk of a recurrence of such events and help them return to daily life by offering risk factor education, counselling, support and physical activity.

Cardiac rehabilitation

What is cardiac rehabilitation and who provides it?

Cardiac rehabilitation encompasses all measures used to help heart patients return to an active life. It aims to:

1 maximise physical, psychological and social functioning to enable patients to live productively and with confidence; and

2 assist and encourage behaviours that are likely to reduce the risk of further heart, stroke and vascular events and conditions, such as identifying and modifying risk factors and encouraging adherence to recommended medical therapies.

Cardiac rehabilitation services usually include physical activity, health education and counselling programs tailored to meet the individual needs of the patient and family.

The WHO and the NHFA recommend that cardiac rehabilitation services be available, and routinely offered, to everyone with heart, stroke and vascular diseases, and be delivered by trained health professionals. Most programs in Australia are aimed at patients who have had a heart attack, heart surgery or coronary angioplasty. Some programs also cater for patients with stable angina or chronic heart failure.

Cardiac rehabilitation ideally begins in hospital as soon as possible after admission. With the trend toward shorter hospital admissions, there is a greater need for patients to continue rehabilitation services as outpatients.

Group outpatient programs, conducted in hospitals and community health centres, are the main models operating throughout Australia, but programs vary across the country. Programs generally consist of weekly or twice-weekly sessions of group education and discussion in addition to light to moderate physical activity. They are conducted by multidisciplinary groups of health professionals. Involvement by partners and other family members is encouraged. Home-based and outreach programs are also being developed in rural and remote areas of Australia.

5

Use of programs

There are no national figures on the proportion of patients who enter and complete a cardiac rehabilitation program. Some indication of use can be obtained from particular state programs.

In Victoria in 1998–99, 43% of patients discharged from hospital following coronary artery bypass surgery participated in a cardiac rehabilitation program, compared with 25% of patients with heart attack and 26% of patients after coronary angioplasty. Overall, only one in three eligible patients joined a cardiac rehabilitation program. In Western Australia in 2000, less than one in five patients admitted to hospital for a cardiac condition were likely to receive rehabilitation. In the Hunter region of New South Wales in 1998, 43% of eligible patients reported being invited to attend outpatient cardiac rehabilitation and, overall, 19% of eligible patients completed a program following discharge from a public hospital. In Queensland in 1999–00, 49% of eligible patients were referred for cardiac rehabilitation and fewer than one in three patients referred completed the program, resulting in only 39% of available cardiac rehabilitation places being fully used.

Health outcomes of patients attending outpatient cardiac rehabilitation

There is good research evidence that cardiac rehabilitation confers benefits on capacity for physical activity, blood lipid levels, reduction in smoking, physical activity habits, use of medications, social adjustment, use of health care services and risk of recurrence of cardiac events or deaths.

There are no reliable national data on outcomes for patients who undergo cardiac rehabilitation. A recent state-wide Victorian study showed that people who attend cardiac rehabilitation programs had better survival after five years than non-attendees. This study, involving 1,570 patients from 15 cardiac rehabilitation programs, showed significant improvements in physical and mental health-related quality of life scales.

Stroke rehabilitation

What is stroke rehabilitation and who provides it?

Rehabilitation is an integral part of the acute and long-term care of those who have had a stroke. It:

1 helps each affected individual to recover and provides practical ways of dealing with ongoing disability;

2 supports and trains family members and friends to help care for stroke survivors in the community; and

3 helps prevent recurrent stroke through medication and behavioural modification.

Rehabilitation can benefit most people who have suffered a stroke, from the most mildly affected to the severely disabled. Rehabilitation begins in the acute hospital environment as soon as possible after stroke. It may continue in a specialised admitted patient rehabilitation unit or be provided as a hospital outpatient service, in the patient's home, at a community rehabilitation facility, or in a hostel or a nursing home. The type of services available varies across Australia.

Rehabilitation involves retraining and practice in performing everyday tasks, and providing psychological support, education and healthy lifestyle advice to those with stroke and to their family and friends. A successful return home and resumption of previous activities may require the support of community services, e.g. Meals on Wheels or home nursing services. The duration of formal rehabilitation varies, from one or two weeks to several months.

A multidisciplinary team approach is often used, involving doctors, nurses and allied health professionals.

Informal carers (family members, neighbours, friends and volunteers) play an important part in the lives of disabled stroke survivors. Carers provide assistance

with a wide range of daily activities, some carers helping with personal tasks such as bathing and dressing. Carers themselves may face considerable psychological strain and require both emotional and practical support.

Use of programs

It is not known what proportion of stroke patients participate in a rehabilitation program (admitted patient or outpatient). It has been estimated that in Perth during 1989–90, about 25% of hospitalised stroke patients underwent a period of admitted patient rehabilitation in a specialised rehabilitation unit. In north-east Melbourne during 1996–97, it is estimated that about 39% of hospitalised stroke patients were admitted for a period of admitted patient rehabilitation.

Health outcomes of patients attending stroke rehabilitation

Rehabilitation, whether provided as an admitted patient in hospital, at a community rehabilitation centre (day hospital), a hospital outpatient clinic or in the patient's home, is effective in reducing the risk of death, dependency, institutionalisation or deterioration.

Secondary prevention

Preventing recurrences of heart attack or stroke can be a powerful way of reducing the burden of heart, stroke and vascular diseases. Without preventive treatment, the average death rate from heart disease in people who have had a heart attack is about 5% per year for the rest of their life. The death rate from stroke in people who have had a stroke is similar. These rates are much higher (about 10 times) than in people without heart, stroke and vascular diseases but with unfavourable risk factors.

It is now recognised that there is no threshold of biomedical risk factors above which people are at risk. Rather, there is a continuous relationship between risk factor levels and risk of disease— the lower the blood pressure or blood cholesterol, the less likely a person is to develop heart, stroke and vascular diseases or have a further heart attack or stroke. This is the case down to levels well below average values in Western societies and challenges the concept of what are considered 'normal' values. So there is an argument for intervening to reduce all risk factors, irrespective of their level, in anyone with existing heart, stroke and vascular diseases. Preventive measures need to be maintained indefinitely in such persons.

Rehabilitation and secondary prevention should begin soon after a cardiac event or stroke since the risk of further events is greatest in the first few months after the first event. Starting these therapies in hospital can lead to better long-term use and better clinical outcomes.

Prevention of recurrent coronary events

Measures that may be used to reduce the risk of further coronary events in people with established coronary heart disease include:

- modification of risk factors and behaviours (lowering high blood pressure, stopping smoking, controlling weight if appropriate, eating a healthy diet, undertaking regular physical activity);
- drug use (using antiplatelet drugs (aspirin) long-term; lowering blood cholesterol with drugs (statins), even when cholesterol levels are in the 'normal' range in patients with heart attack or unstable angina; using beta-blockers in patients with heart attack or heart failure; using ACE inhibitors in patients with heart attack or heart failure); and
- tight control of diabetes.

Prevention of recurrent stroke

Measures that may be used to prevent the occurrence of subsequent stroke events include:

- modification of risk factors and behaviours (lowering high blood pressure, stopping smoking, controlling weight if appropriate, eating a healthy diet, undertaking regular physical activity);
- medication use (using antiplatelet drugs (aspirin, aspirin + dipyridamole, or clopidogrel) long-term for patients with ischaemic stroke or TIA and a normal heart rhythm; using anticoagulation drugs (warfarin) long-term for patients with ischaemic stroke or TIA and atrial fibrillation; lowering blood pressure; lowering blood cholesterol with drugs (statins) in patients with established coronary heart disease);
- carotid endarterectomy for patients with recent ischaemic stroke or TIA and severe narrowing of the internal carotid artery on the symptomatic side and who are fit for surgery; and
- tight control of diabetes.

Uptake of secondary prevention measures

Although the effectiveness of certain preventive measures is well established, they are currently underused. Stroke unit care is appropriate for all patients, but appears not to be currently widely available in Australia. Similarly, only about one in four patients with TIA or ischaemic stroke in whom long-term anticoagulant drugs are indicated actually receive this treatment. Cardiac rehabilitation programs are underused. Medications including aspirin and statins are likewise underused for secondary prevention of vascular disease. High blood pressure remains untreated in a large proportion of people in whom treatment is warranted.

However, there is evidence that the care of people with heart disease and stroke improved during the 1990s, with more effort being directed to prevention. There have been significant rises in the prescription of blood pressure-lowering drugs,

aspirin, anticoagulants and blood cholesterol-lowering drugs. GPs are also more likely than in the past to perform check-ups and to provide counselling and advice to their patients with a history of heart disease or stroke. It is reasonable to assume that this involves discussions about the patients' lifestyle and suggestions to change risk behaviours if indicated.

Further reading

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Appendixes

6

Methods and data sources

Prevalence

Prevalence refers to the number or proportion (of cases, instances, etc.) present in a population at a given time. Prevalence data in this report have been obtained from national sample surveys.

Much of the prevalence data in this report has been reported by the respondent (self-report) and was not medically verified or necessarily based on a diagnosis by a medical practitioner. Conditions which have considerable effect on well-being or lifestyle are expected to be better reported than those with small effects. There may also be a degree of under- or overreporting of certain conditions/behaviours. For example, there appears to be a tendency for respondents in the general population to underreport alcohol and tobacco consumption levels, underestimate their weight and overestimate their height. These issues are particularly relevant when interpreting results from the National Health Survey, the Disability, Ageing and Carers Survey and the National Drug Strategy Household Survey.

Incidence

Incidence refers to the number of **new** cases (of a disease, condition or event) occurring during a given period. Incidence is calculated by counting the number of **new** cases of an event obtained from registers and extrapolating these estimates to the Australian population. National registers of new cases are not always available and in these cases data from local regional registers have been used (for instance, for stroke: Perth and Melbourne; for rheumatic fever and rheumatic heart disease: Top End region of the Northern Territory and Central Australia).

For coronary heart disease there are no national data sources for measuring incidence. However, counting the number of deaths from coronary heart disease and the number of non-fatal hospitalisations for AMI has been shown to provide a reasonable approximation of the incidence of all coronary heart disease events in the population.

Age-specific rates

Age-specific rates were calculated by dividing the number of events (such as prevalence, incidence, hospitalisations or deaths) occurring in each specified age group by the mid-year estimated resident population for the corresponding age group.

Age standardised rates

Age standardised rates for prevalence, incidence, hospitalisations and deaths were used to remove the influence of age when comparing populations with different age structures. This was done by applying age-specific rates to a standard population. The 2001 Australian population was used as the standard population in all Australian comparisons, unless otherwise stated.

Direct age standardisation

Direct age standardisation is the most common method of age standardisation, and is used in this report for prevalence, incidence, hospitalisations and deaths data. This method is generally used when the populations under study are large and the age-specific rates are reliable. The calculation of direct age-standardised rates comprises three steps:

Step 1: Calculate the age-specific rate for each age group.

Step 2: Calculate the expected number of cases in each age group by multiplying the age-specific rate by the corresponding standard population for each age group.

Step 3: Sum the expected number of cases in each age group and divide this sum by the total of the standard population to give the age-standardised rate.

Indirect age standardisation

In situations where populations are small or where there is some uncertainty about the stability of age-specific rates, indirect standardisation has been used. This effectively removes the influence of the age structure, but does not provide a measure of prevalence in terms of a rate. Rather, the summary

measure is a comparison of the number of observed cases compared to the number expected if the age-specific prevalence rates of the standard population are applied to the study population. The method used for this calculation entails three steps:

Step 1: Calculate the age-specific rates for each age group in the standard population.

Step 2: Apply these age-specific rates to the number in each age group of the study population and sum to derive the total expected number of cases for the study population.

Step 3: Sum the observed cases in the study population and divide this number by the expected number derived in Step 2 to calculate the Standardised Prevalence/Morbidity/Mortality Ratio (SPR/SMR).

An SPR/SMR of 1 indicates the same number of observed cases as were expected (suggesting rates in the study and standard populations are similar). A result greater than one indicates more cases than expected. A result less than one indicates fewer cases than expected. The indirect method is more appropriate when calculating standardised rates for the Indigenous population. In this report, the indirect method has been used for comparing death rates between Indigenous and other Australians. Other Australians has been used as the standard population in these analyses.

For example, if there are twice as many deaths as expected (SMR of 2.0) then the rate of death in the Indigenous population can be assumed to be twice that of other Australians.

Significance testing

Many significance tests have been performed throughout this report, particularly when comparing populations with different age structures, such as comparisons between Indigenous and other Australians, or between regional and remote areas of Australia. The method varies slightly depending on the type of data source—population data (hospitalisations or deaths) or survey data (risk factors).

In both cases significance tests for a difference between two quantities (age-standardised rates for population data; sample proportion estimates for survey data) were performed by comparing confidence intervals. The difference between the two quantities was calculated and 95% confidence intervals were constructed around this value. Adjustments were made for multiple comparisons. If the confidence interval did not contain zero, the two quantities were considered to be significantly different. For population data the confidence intervals were constructed using a standard pooled variance formula, however for survey data an estimate of the pooled variance was used (see Armitage & Berry 1994 in the further reading list).

International rates

Death rates

Data on death rates were extracted from the 2003 OECD Health Database. The 1980 OECD standard population is used in calculating the age-standardised death rates. It is important to note that the age-standardised death rates which appear in this report are not directly comparable to the rates published in the 1999 and 2001 editions of this report as a different standard population was used (WHO standard population).

Risk factor prevalence

International comparisons for blood cholesterol, blood pressure and obesity were extracted from the WHO SuRF Report 1 (2003).

Data on blood pressure were reported as the prevalence of high blood pressure. In this report, only countries reporting at the national level using the WHO definition of high blood pressure were included.

Data on blood cholesterol were reported as the prevalence of high blood cholesterol and/or mean blood cholesterol levels. In this report, mean blood cholesterol was included for countries reporting this data at the national level from 1998 onwards.

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Data on excess body weight was reported as the prevalence of obesity (BMI of 30 or more). In this report, only countries reporting at the national level from 1998 onwards for adults using body mass index of 30 or more were included.

Care should be taken when making comparisons based upon data from the SuRF report, as they may apply to different years, age ranges and have not been age-standardised.

International comparisons for alcohol consumption and tobacco smoking were extracted from the 2003 OECD Health Database.

Classifications

Cause of death and hospital diagnosis

Australia uses the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) classification system for coding of causes of death. In this report deaths data before 1997 have been coded to ICD-9 (International Classification of Diseases, Ninth Revision) and thereafter to ICD-10. The tables below list the ICD-9 and ICD-10 disease and procedure codes used in this report. The introduction of ICD-10 and the move from manual coding to automated cause of death coding has resulted in a break in the deaths time series. To overcome this difficulty the ABS coded the 1997 deaths data using both ICD-9 (manual coding) and ICD-10 (automatic coding), which allowed comparability factors between ICD-9 and ICD-10 to be derived. These comparability factors for each disease can be found in ABS 2002.

For hospital diagnosis and procedures these international classifications (ICD-9 and ICD-10) have been modified for Australia. Hospital data before 1998–99 were coded using ICD-9-CM (International Classification of Diseases, Ninth Revision, Clinical Modification) and thereafter using ICD-10-AM (International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification).

Codes for deaths and hospital data used in this report

Disease codes	ICD-9 & ICD-9-CM code	ICD-10 & ICD-10-AM code
Acute rheumatic fever and chronic rheumatic heart disease	390–398	I00–I09
Coronary heart disease	410–414	I20–I25
Acute myocardial infarction	410	I21
Heart failure	428	I50
Stroke[b]	430–438	I60–I69
Peripheral vascular disease[a]	440–444	I70–I74
Abdominal aortic aneurysm	441.3, 441.4	I71.3, I71.4
Heart, stroke and vascular diseases (diseases of the circulatory system)	**390–459**	**I00–I99**
Congenital heart diseases	745–747	Q20–Q28
Diabetes	250	E10–E14
Kidney failure	584–586	N17–N19
Transient ischaemic attack	435	G45

(continued)

Codes for deaths and hospital data used in this report (continued)

Procedure codes	ICD-9-CM code	ICD-10-AM code
Abdominal aortic aneurysm[c]	38.44	33112-00, 33115-00, 33118-00, 33121-00, 33151-00, 33154-00, 33157-00, 33160-00, 90213-02 (blocks: 715, 710)
Cardiac defibrillator implants	37.94–37.98	38524-00, 38521-01, 38521-02, 38521-03 (block: 653)
Carotid or jugular endarterectomy	38.12	33500-00 (block: 700)
Coronary angiography	88.55–88.57	38215-00, 38218-00, 38218-02 (block: 668)
Coronary angioplasty (without coronary stent)	36.01, 36.02, or 36.05	35304-00, 35305-00 (block: 670)
Coronary artery bypass grafting	36.1	38497, 38500, 38503, 90201 (blocks: 672–679)
Coronary stenting	36.06 or 36.07	35310 (block: 671)
CT scan of the head[d]	87.03	56001-00, 56007-00, 56010-02, 56010-03 (blocks: 1952,1953)
Embolectomy or thrombectomy of renal artery	n.p.	33806-06 (block: 702)
Haemodialysis or peritoneal dialysis		13100-00, 13100-06, 13100-07, 13100-08 (blocks: 1059–1060)
Heart transplant	37.59, 33.6, 33.5	90172-00, 90172-01, 90205-00, 90205-01 (blocks: 660, 555)
Heart valve defect	n.c.	38456-10, 38483-00, 38480-00, 38481-00, 38488-00, 38488-01, 38489-00, 38489-01, 38487-00, 38485-01, 38480-01, 38481-01, 38475-00, 38477-00, 38488-02, 38488-03, 38489-02, 38456-11, 38480-02, 38481-02, 38475-01, 38477-01, 38488-04, 38488-05, 38489-03, 38456-01, 38488-06, 38488-07, 38489-04, 38489-05 (blocks: 621–638)
Kidney transplantation	n.p.	36503-00 (block: 1057)
Lower limb amputation[e]	84.15–84.17	44367 (blocks: 1484, 1505)
MRI of the brain[d]	n.c.	90901-00 (block: 2015)
Renal artery endarterectomy	n.p.	33524-00, 33527-00 (block: 700)
Renal bypass	n.p.	32721-00, 32724-00, 32721-01, 32724-01 (blocks: 711–712)

n.c. = Not comparable.

n.p. = Not presented.

(a) In this report atherosclerosis of the aorta and renal artery (ICD-9 code 440 and ICD-10 code I70) are included in the peripheral vascular disease category. In previous editions of this report this was not the case.

(b) In ICD-10 transient ischaemic attack is not included in the heart, stroke and vascular diseases (circulatory system) chapter but is included in the chapter relating to diseases of the nervous system. In ICD-9 it was part of the heart, stroke and vascular diseases (circulatory system) chapter.

(c) Principal diagnosis of abdominal aortic aneurysm, ICD-9-CM codes 441.3, 441.4 and ICD-10-AM codes I71.3, I71.4.

(d) Principal diagnosis of stroke, ICD-9-CM codes 430–438 and ICD-10-AM codes I60–I69.

(e) Principal diagnosis of atherosclerosis of aorta and atherosclerosis of arteries of extremities, ICD-9-CM codes 440.0, 440.2 and ICD-10-AM codes I70.0, I70.2.

International Classification of Primary Care (ICPC)

In the BEACH data, patient reasons for encounter, problems managed, procedures, other non-pharmacological treatments, referrals, pathology and imaging are classified according to the International Classification of Primary Care—Version 2, a product of the World Organization of Family Doctors (WONCA).

ICPC codes (BEACH survey data)

Disease/problem name	ICPC-2 code
Atherosclerosis/peripheral vascular disease	K92
Atrial fibrillation or flutter	K78
Cardiac check-up	K30, K31
Cerebrovascular disease (stroke and TIA)	K89, K90
Coronary heart disease	K74–K76
Diabetes	T89, T90
Heart failure	K77
High blood cholesterol/lipid disorders	T93
Hypertensive disease	K86, K87
Overweight/obesity	T82, T83
Tobacco abuse	P17
Urological problems	U70–U72, U75–U80, U85, U88, U90, U95, U98, U99

Aboriginal and Torres Strait Islander peoples

Indigenous Australians refers to people who identify themselves as being of Aboriginal and/or Torres Strait Islander origin. Data quality issues exist in the identification of Indigenous Australians across population surveys and administrative data collections. In the 1996 census, the number of people who identified themselves as Indigenous Australians was about a third higher than the number who did so in 1991. Between the 1996 and 2001 Census, the total Indigenous population increased by around 16%.

These differences are much larger than can be explained by natural increase alone. While factors such as propensity to identify as Indigenous in the census can be identified, it is not possible to estimate how these factors are likely to change over time. In addition, accurate births and deaths data, required to estimate the natural growth in the Indigenous population between censuses, are not nationally available. These uncertainties affect the quality of the population estimates and make the assessment of trends difficult and potentially misleading.

Deficiencies in health data for Indigenous Australians occur in the AIHW National Mortality Database and the AIHW National Hospital Morbidity Database. Indigenous Australians are not completely identified in these administrative data collections due to different methods of data collection and failure to record the person's Indigenous status. At present, there is considerable variation across the states and territories in the quality of mortality data for Indigenous Australians. For the years 1998–02, deaths data for only Queensland, Western Australia, South Australia and the Northern Territory are considered to have sufficient coverage of Indigenous Australian deaths. The variation in Indigenous hospitalisations across the states and territories suggests that there was variation in the proportion of Indigenous Australians who were identified as such in the AIHW National Hospital Morbidity Database. The quality of the data provided on Indigenous Australians in 2001–02 continues to improve; however, there is still need for further improvement. In this report, hospitalisations for Indigenous Australians should be interpreted with caution.

Data quality issues also exist when interpreting Indigenous data from the National Health Survey relating to the collection of individual and household survey data about Aboriginal and Torres Strait Islander Australians living in remote areas and the relevance of the questions and concepts used. Furthermore, differences between the Indigenous and non-Indigenous populations should be interpreted

with caution as the Indigenous population was sampled over a six-month period and other Australians over a 10-month period; seasonal effects may be exaggerated in the Indigenous sample.

Socioeconomic status

The ABS has constructed a number of socioeconomic indexes to classify areas on the basis of social and economic information collected in the Census of Population and Housing.

In this report, the index of relative socioeconomic disadvantage (IRSD) is used. This is derived from social and economic characteristics of the local area such as low income, low educational attainment, high levels of public sector housing, high unemployment and jobs in relatively unskilled occupations.

Individual records were classified into quintiles of socioeconomic disadvantage according to the value of this index for the statistical local area of usual residence. Quintile 1 includes the most disadvantaged households and quintile 5 the least disadvantaged households. Statistical local areas were grouped into quintiles so that each quintile contained approximately 20% of the total Australian population.

It is important to note that the index of socioeconomic disadvantage relates to the average disadvantage of all people living in the statistical local area. These measures of socioeconomic inequality will thus generally understate the true inequality in health at the individual level in Australia. In this report 0.8% of deaths could not be mapped to a quintile of socioeconomic disadvantage. These deaths were excluded from the analysis.

Highest level of education was used to form socioeconomic groups where the index of socioeconomic disadvantage was not available (insufficient physical activity, high blood pressure, high blood cholesterol, overweight and diabetes).

The three categories used were: did not complete secondary school; completed secondary school; and TAFE/tertiary.

Region

Most comparisons of region in this report have been defined using the Australian Standard Geographical Classification (ASGC) Remoteness structure (see ABS 2001).

The categories include Major Cities, Inner Regional, Outer Regional, Remote, Very Remote and Migratory. For the purposes of this report, Inner and Outer Regional were collapsed to form Regional, and Remote and Very Remote were collapsed to form Remote. The population spread in 2001 across these categories was as follows: Major Cities (66%), Regional (31%) and Remote (3%). In this report all deaths were assigned to these three categories, with 0.4% of deaths being classified as migratory.

Other comparisons of region use the rural, remote and metropolitan areas (RRMA) classification, developed in 1994 by the then Commonwealth Department of Primary Industries and Energy and the then Commonwealth Department of Human Services and Health.

The RRMA classification assigns each statistical local area in Australia into one of seven categories— 2 metropolitan, 3 rural and 2 remote zones. These can be regrouped into three larger zones: urban (metropolitan), rural and remote. The classification is based primarily on population numbers and an index of remoteness.

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Main data sources

AIHW National Hospital Morbidity Database contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital. The data collection is maintained by the AIHW using data supplied by state and territory health authorities. The database is episode-based and it is not possible to count patients individually. In this report, disease data relate to the principal diagnosis reported for hospitalisations unless otherwise specified. Data presented in this report were extracted over the period February—March 2004.

AIHW National Mortality Database contains information on the cause of death supplied by the medical practitioner certifying the death or by a coroner. Registration of deaths is the responsibility of the state and territory registrars of Births, Deaths and Marriages. Registrars provide the information to the ABS for coding of cause of death and then provided to AIHW. In this report, unless otherwise specified, death data relate only to the underlying cause of death. Data presented in this report were extracted over the period February—March 2004.

Australia and New Zealand Dialysis and Transplant Registry (ANZDATA) collects information to monitor dialysis and transplant treatments from all renal units in Australia and New Zealand on all patients receiving kidney replacement therapy where the intention to treat is long-term. Cases of acute kidney failure are excluded. The Registry is coordinated within the Queen Elizabeth Hospital and is funded by the Australian Government Department of Health and Ageing.

Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (1999–00) conducted by the International Diabetes Institute, 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 over 20,000 people aged 25 years and above, of whom more than 11,000 underwent a physical examination.

In this report, measured prevalence data on high blood pressure, high blood cholesterol and overweight was obtained from this source.

BEACH (Bettering the Evaluation and Care of Health) Survey of General Practice, an ongoing national survey looking at aspects of general practice in Australia, is conducted by the General Practice Statistics and Classification Unit (an AIHW collaborating unit within the Family Medicine Research Centre, University of Sydney). BEACH began in April 1998 and involves a random sample of approximately 1,000 general practitioners per year, each of whom records details regarding 100 consecutive patient encounters.

Burden of Disease and Injury in Australia Study (1996) was a study that assessed the total 'burden' of disease/injury by using a common metric developed by the Global Burden of Disease Study. The burden of disease refers to the impact on a 'healthy' life of premature mortality, disability, impairment, illness and injury. The burden is described by a summary measure of population health, the disability-adjusted life year or DALY, that combines information on the effect of premature death and of disability and other non-fatal health outcomes due to heart, stroke and vascular diseases, and their risk factors.

Central Australian Rheumatic Heart Disease Register includes data related to rheumatic heart disease diagnosis, hospitalisations, compliance with prophylactic antibiotic treatment, clinical progress, surgery and mortality. The register is run by Territory Health. Confidentialised data from the register were provided to AIHW.

Disability, Ageing and Carers Survey (1998)
conducted by the ABS, collected national information
on the disability levels of Australians, their care
needs, and the role of carers. It can be used with
previous national disability surveys to monitor trends
over time. The survey collected information from a
sample of about 42,100 people over a three-month
period from March to May 1998.

Drug Utilization Sub-Committee Database, held
at the Australian Government Department of
Health and Ageing, monitors the community (i.e.
non-public hospital) use of prescription medicines
in Australia. This database combines information
on prescriptions subsidised by the PBS, the
Repatriation Pharmaceutical Benefits Scheme and an
estimate from the Pharmacy Guild Survey of those
prescriptions that are not subsidised (i.e. private
prescriptions and PBS prescriptions priced under
the general patient copayment). The Pharmacy
Guild Survey collects dispensing information
each month from a random sample of about 250
pharmacies throughout Australia. Information on
drugs prescribed in public hospitals and on highly
specialised drugs available to outpatients through
public hospital pharmacies under section 100 of the
National Health Act are not included in this database.

National Diabetes Register is a database that
collects information about people who use insulin
as part of their treatment of diabetes. It includes
data on persons who began to use insulin from 1
January 1999. Data for the register are obtained
from two main sources: the National Diabetes
Services Scheme, administered by Diabetes Australia,
and the Australasian Paediatric Endocrine Group
(APEG) state-based registers. APEG registers collect
information about children with diabetes aged less
than 15 years. Data presented in this report were
extracted in January 2004.

National Dietary Survey of Adults (1983) was
conducted as a component of the second Risk
Factor Prevalence Survey. The survey was designed
to obtain national information on dietary intake to
determine the food composition and nutrient intake
of Australians aged 25–64 years. The survey collected
information from a sample of 5,950 people living in
the six capital cities of Australia.

National Drug Strategy Household Survey (2001)
includes data on 26,744 Australians aged 14 years
and older. This was the seventh survey in a series
that began in 1985. Respondents were asked about
their knowledge of drugs, their attitudes towards
drugs, their drug consumption histories and related
behaviours. This follows on from the 1998 National
Drug Strategy Household Survey. It was conducted
between June and September 1998, with 10,030
Australians aged 14 years and older participating.

In this report, self-reported prevalence of tobacco
smoking and alcohol consumption was obtained
from this source.

National Health surveys (1989–90, 1995 and 2001),
a series of surveys conducted by the ABS, were
designed to obtain national information on the
health status of Australians, their use of health
services and facilities, and health-related aspects of
their lifestyle. The 2001 survey collected information
from a sample of 26,900 people from February to
November 2001. The 1995 survey was considerably
larger and collected information from a sample of
57,600 people over a 12-month period from January
1995 to January 1996.

In this report, data on heart, stroke and vascular
conditions, fruit and vegetable consumption,
multiple risk factors, overweight (socioeconomic
comparisons), and diabetes (regional and
socioeconomic comparisons) were obtained from
this source. Risk factor prevalence data among
Indigenous Australians were also obtained from
this source.

National Nutrition Survey (1995), conducted by
the ABS, was the largest and most comprehensive
Australian survey of food and nutrient intake, dietary
habits and body measurements. The survey collected
information from a subsample of respondents from

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the 1995 National Health Survey, approximately 13,800 people from urban and rural areas of Australia. The National Nutrition Survey was conducted over a 13-month period from February 1995 to March 1996.

In this report, self-reported prevalence of high blood pressure and overweight (for regional comparisons) was obtained from this source.

National Physical Activity Surveys (1997, 1999 and 2000). The 2000 survey was conducted 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 follows 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 1997. The 1999 survey collected information from a national sample of 3,841 people in November and December 1999.

Risk Factor Prevalence studies (1980, 1983 and 1989), a series of surveys conducted by the NHFA, were designed to obtain national information on biomedical and behavioural risk factors in Australia and to monitor trends over time. The studies collected information from a sample of around 22,000 adults living in capital cities of Australia (Canberra and Darwin were not included in the 1980 and 1983 surveys), between May/June and December of the survey year.

In this report, trend comparisons for measured prevalence of high blood pressure, high cholesterol and overweight were obtained from this source.

The Surveillance of Risk Factors report (SuRF 1), compiled by the WHO, presents available prevalence data on non-communicable risk factors at the country level for a number of member states of WHO. Risk factors included are tobacco and alcohol use,

patterns of physical inactivity, low fruit/vegetable intake, obesity, blood pressure, cholesterol and diabetes (measured by blood glucose).

Top End Rheumatic Heart Disease Register includes data related to rheumatic heart disease diagnosis, hospitalisations, compliance with antibiotic treatment, clinical progress, surgery and mortality. The register is run by Territory Health. Confidentialised data from the register was provided to AIHW.

Further reading

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Abbreviations

ABS	Australian Bureau of Statistics
ACE inhibitors	Angiotensin-converting enzyme inhibitors
ACS	Acute coronary syndrome
AIHW	Australian Institute of Health and Welfare
AMI	Acute myocardial infarction
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
APEG	Australasian Paediatric Endocrine Group
ASGC	Australian Standard Geographical Classification
ASR	Age-standardised rate
AusDiab	Australian Diabetes, Obesity and Lifestyle Study
BEACH	Bettering the Evaluation and Care of Health
BMI	Body mass index
CABG	Coronary artery bypass grafting
CHD	Coronary heart disease
CT scan	Computerised tomographic scan
DALY	Disability-adjusted life year
DBP	Diastolic blood pressure
DDD	Defined daily dose
DHAC	(Australian Government) Department of Health and Aged Care
DoHA	(Australian Government) Department of Health and Ageing
ESRD	End-stage renal disease
GP	General practitioner
HDL	High-density lipoprotein
ICD-9	International Classification of Diseases, 9th Revision
ICD-9-CM	International Classification of Diseases, 9th Revision Clinical Modification
ICD-10	International Classification of Diseases, 10th Revision
ICD-10-AM	International Classification of Diseases, 10th Revision Australian Modification
ICPC	International Classification of Primary Care
IDF	International Diabetes Federation

IRSD	Index of relative socioeconomic disadvantage
LDL	Low-density lipoprotein
MONICA Study	MONItor the trends and determinants of CArdiovascular disease Study (WHO)
MRI	Magnetic resonance imaging
NHDD	National Health Data Dictionary
NHMRC	National Health and Medical Research Council
NHFA	National Heart Foundation of Australia
OECD	Organisation for Economic Co-operation and Development
PBS	Pharmaceutical Benefits Scheme
PCI	Percutaneous coronary intervention
PVD	Peripheral vascular disease
RRMA	Rural, remote and metropolitan areas classification
SBP	Systolic blood pressure
SIGNAL	Strategic Inter-Governmental Nutrition Alliance
SMR	Standardised mortality ratio
SuRF	Surveillance of Risk Factors
TAFE	Tertiary and further education
TIA	Transient ischaemic attack
WHO	World Health Organization
WONCA	World Organization of Family Doctors

Abbreviations of places

ACT	Australian Capital Territory
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia

6 Symbols

Symbol	Meaning
g	gram
kJ	kilojoule
mmHg	millimetre of mercury
mmol/L	millimoles per litre
n.a.	not available
n.c.	not comparable
n.p.	not presented
—	rounded to zero
. .	not applicable
*	statistically significant difference at the 95% level
#	statistically significant difference from 1.0
$m	$ million