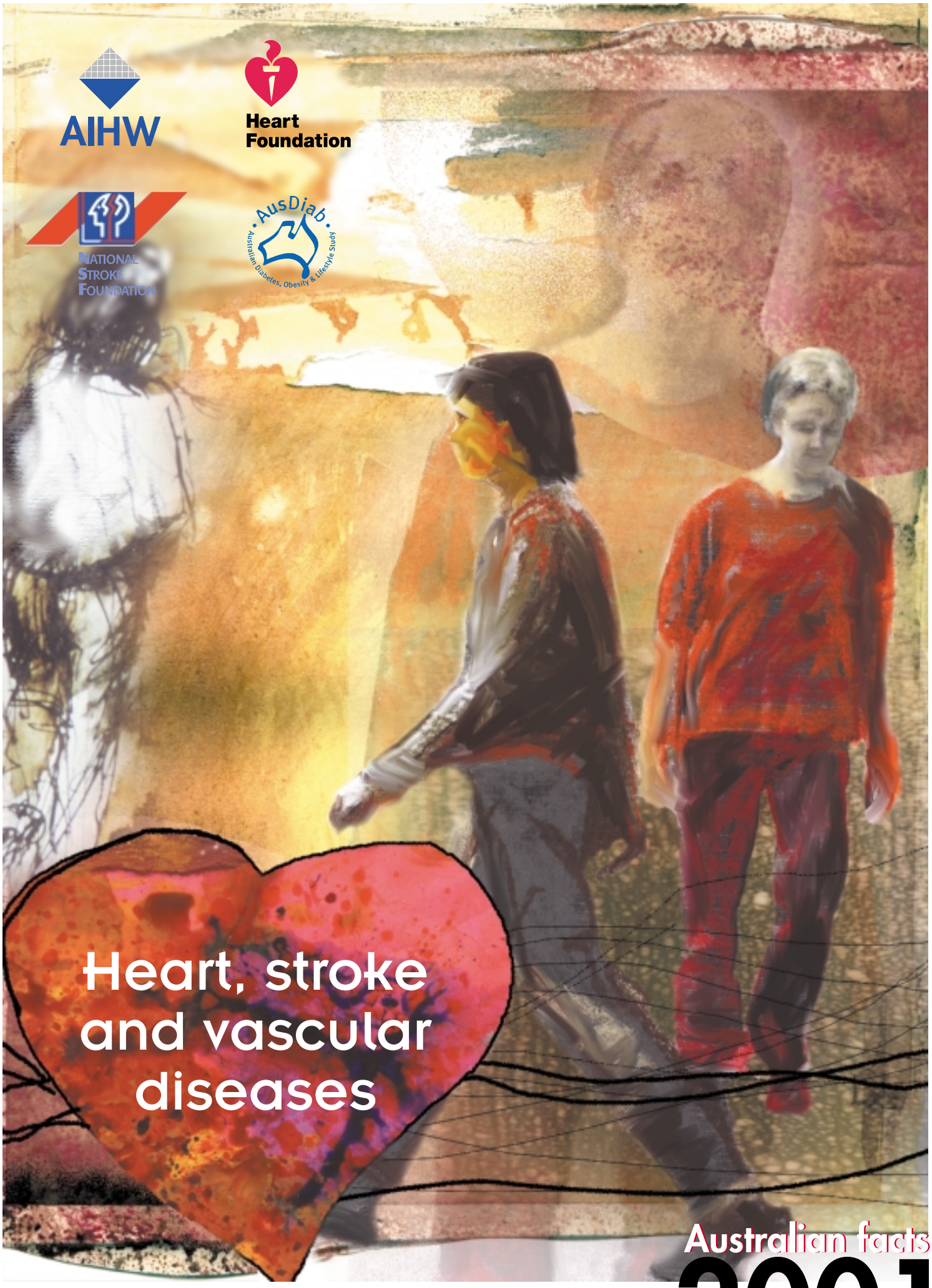
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National Stroke Foundation
AusDiab
Australian Diabetes, Obesity & Lifestyle Study
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National Centre for Monitoring Cardiovascular Disease

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Feedback

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Australian Institute of Health and Welfare

Preface

Preface

The epidemic of heart attack, stroke and other forms of vascular disease has been a prominent and constant challenge to the health of Australians and remains so as we begin the new century.

Despite major falls in death rates from these problems over the past 30 years, collectively they are still Australia's leading cause of premature death and disability.

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 the areas and groups of people that may need more attention.

This report aims to achieve this. Written and presented in a readable style and format, *Heart, Stroke and Vascular Diseases—Australian Facts 2001* provides statistics and information about:

- levels of, and trends in, heart, stroke and vascular diseases;
- how Australia compares on the international stage;
- contributing risk factors; and
- treatment, health care and costs.

This second report builds on the very successful first issue, produced in 1999, which was well received for the quality of its information and its presentation. This update incorporates extensive feedback from a wide field of relevant experts and includes several new features.

The series is produced by the Australian Institute of Health and Welfare in collaboration with the National Heart Foundation of Australia. On this occasion, the National Stroke Foundation of Australia has been a significant contributor, as has the Commonwealth Department of Health and Aged Care. The International Diabetes Institute provided access to recent risk factor and diabetes data collected in the AusDiab survey, in which it played the lead role. The report shows the benefit of collaborative effort to improve the health of Australians.

Heart, Stroke and Vascular Diseases—Australian Facts 2001 was produced by staff of the National Centre for Monitoring Cardiovascular Disease, based within the Australian Institute of Health and Welfare and funded largely by the Department of Health and Aged Care.

The report is also available on the Institute's web site (http://www.aihw.gov.au).

Australian Institute of Health and Welfare

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Australian Institute of Health and Welfare

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Australian Institute of Health and Welfare

Highlights

Highlights

Cardiovascular disease continues to place a heavy burden on Australians...

- In Australia, cardiovascular disease kills more people than any other disease and creates enormous costs for the health care system. These issues are expected to become more acute over the next decades with the growing number of elderly Australians, among whom cardiovascular disease is most common.

in terms of deaths...

- Cardiovascular disease was the leading cause of death among Australians in 1998, accounting for 50,797 deaths (40% of all deaths).
- Coronary heart disease (mainly heart attacks) was the leading single cardiovascular cause of death, accounting for 27,825 deaths (22% of all deaths) in Australia in 1998.
- Stroke was Australia's second greatest single killer after coronary heart disease, claiming 11,982 lives in 1998 (9% of all deaths). It is the leading cause of long-term disability in adults.

hospitalisations...

- In 1998–99, there were 437,717 hospitalisations where cardiovascular disease was the principal diagnosis (7% of all hospitalisations).
- The average length of stay in hospital for cardiovascular conditions fell from 7.6 days in 1993–94 to 5.5 days in 1998–99.

health care costs to the community...

- Cardiovascular disease is the most costly disease for the health system in Australia. It was responsible for 12% ($3.9 billion) of total recurrent health expenditure in 1993–94. Cardiovascular conditions consuming most health system resources were coronary heart disease ($894 million), high blood pressure ($831 million) and stroke ($630 million).

Highlights

and future risks.

- For a 40-year-old, the risk of having coronary heart disease at some time in their future life is one in two for men and one in three for women.
- For a 45-year-old, the risk of having a stroke before age 85 is one in four for men and one in five for women.

The burden is most acute among certain Australians...

- Australian Aboriginal and Torres Strait Islander peoples die from cardiovascular disease at twice the rate of other Australians. The difference is even greater among those aged 25–64 where Australian Aboriginal and Torres Strait Islander peoples' death rates were seven and ten times those of other Australian men and women, respectively.
- Aboriginal and Torres Strait Islander peoples have one of the highest rates of rheumatic heart disease in the world, at 13.3 per 1,000 population in 1999. In comparison, among other Australians, the rate is 0.34 per 1,000.
- People in lower socioeconomic groups are more likely to die from cardiovascular disease compared with people in higher socioeconomic groups. In 1997, people aged 25–64 living in the most disadvantaged group died from cardiovascular disease at around twice the rate of those living in the least disadvantaged group.

but much of the burden caused by cardiovascular disease is preventable.

- In 1995, more than 10 million adult Australians (over 80% of the adult population) had at least one of the following cardiovascular risk factors: tobacco smoking, physical inactivity, high blood pressure, or overweight. About four in five men and three in four women had at least one of these risk factors.
- In 1998, almost 3.5 million (22%) Australians aged 14 years and over smoked on a regular basis.

Highlights

Highlights

- More than 5.8 million adult Australians (43% of the population) did not undertake physical activity at the levels recommended to achieve a health benefit in 1999.
- In 1999–00, over seven million adult Australians (aged 25 and over) were overweight (BMI ≥ 25). Of these over two million (20% of the population aged 25 and over) were obese (BMI ≥ 30). The prevalence of both overweight and obesity has increased dramatically since 1980.
- In 1999–00, almost three million Australians (aged 25 and over) had high blood pressure or were on medication for that condition. High blood pressure increases the risk of cardiovascular disease by two to four times.
- In 1999–00, over six million Australian adults (aged 25 years and over) had blood cholesterol levels higher than 5.5 mmol/L, the upper limit recommended by the National Heart Foundation of Australia.

Favourable trends in some risk factors...

- The proportion of Australians (aged 25–64 years) with high blood pressure has declined since 1980.
- Smoking has declined since the 1970s, although the decline has slowed in recent years.
- The proportion of Australian adult males (aged 25–64 years) with high blood cholesterol has declined slightly since 1989.

Highlights

and advances in medical treatment and care should lead to improved outcomes.

- In 1998–99, there were 74,289 coronary angiograms performed. Coronary angiography gives a picture of the heart's arteries and is used to diagnose coronary heart disease.
- During 1998 there were 22,253 heart surgery procedures. By far the most common heart operation was coronary artery bypass grafting at 17,448 procedures.
- There were 18,094 coronary angioplasty procedures performed in 1998. Stents were inserted in 82% of these procedures. This represents a 31% increase in their use since the previous year.
- A total of 26,114 computerised tomography (CT) scans of the head were performed for stroke during 1998–99. During 1997–98 there were 4,515 carotid endarterectomies performed for stroke.
- More than 43.4 million prescriptions for cardiovascular drugs were dispensed in the community in 1998. This represents almost a quarter of all prescriptions.

Introduction

Intro

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Background

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

Nevertheless, cardiovascular disease[1] continues to impose the largest burden on Australians in terms of illness, disability and death, and the associated direct health care costs exceed those of any other disease. Current methods of treating heart disease are often 'invasive' and use a high level of health resources, and the heavy burden of disability due to stroke is of continuing concern. These issues are expected to become more acute over the coming decades due to the growing number of elderly Australians, among whom cardiovascular disease is most common.

Certain groups have higher mortality from cardiovascular disease, especially Aboriginal and Torres Strait Islander peoples and people who are at a socioeconomic disadvantage. Those who live in rural and remote areas of Australia have special needs, and cardiovascular mortality varies among the States and Territories.

A large part of the death, disability and illness caused by cardiovascular disease is preventable. Many Australians remain at higher risk of the disease 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. Any one of these factors increases the risk of cardiovascular disease on its own, and if two or more occur in an individual the risk increases even further.

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 now recognised.

National action to combat the disease

Because of the widespread nature of cardiovascular disease and its potential for prevention, Australian Health Ministers include cardiovascular health as one of six current National Health Priority Areas. The first report on cardiovascular health, released in 1999, included the following key recommendations for further improving the cardiovascular health of Australians:

- establishing a secure long-term national focus on heart, stroke and vascular disease from which policies and activities can emanate;
- coordinating primary prevention programs across Australia;
- establishing a national mechanism for the production of better practice guidelines;
- broadening the focus of cardiovascular health programs to give a specific emphasis to stroke;
- tackling the underlying causes of inequalities in health among population groups with worse cardiovascular health than the general population, particularly Australia's Indigenous population; and
- continuing and expanding the activities of the National Centre for Monitoring Cardiovascular Disease to allow for future strategic planning.

Given the size of the burden cardiovascular disease imposes on Australians, the report noted the considerable potential to improve the health of all Australians through positive changes in cardiovascular health.

Purpose and structure of this report

The National Centre for Monitoring Cardiovascular Disease at the Australian Institute of Health and Welfare produced the report in collaboration with the National Heart Foundation of Australia. The Commonwealth Department of Health and Aged Care, the National Stroke Foundation of Australia and the International Diabetes Institute also provided valuable support and made significant contributions. 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 sections on cardiovascular disease and its major components, and on each major risk factor. There are also sections on health care costs, drug treatment, procedures, rehabilitation and international comparisons. Where available, data on population groups at greater risk of cardiovascular disease are given. Each section concludes with a list of publications for further reading.

Methods and data sources and statistical tables are included at the back of the report.

New in the 2001 edition

In the 2001 edition of this report there are sections on rehabilitation, and diabetes, a disease that is closely related to cardiovascular disease. Diabetes is discussed as a disease in its own right and as a risk factor for cardiovascular disease.

Also included for the first time is a section that compares the cardiovascular health of Australia's Aboriginal and Torres Strait Islander peoples with that of the non-Indigenous population.

To coincide with the physical activity focus of Heart Week in May 2001, this edition of the series includes a special focus on physical activity. Three leading experts in the field of physical activity wrote the section for the 2001 edition. First, Professor Adrian Bauman (University of New South Wales) writes on the evidence showing that physical activity is clearly a major modifiable risk factor for cardiovascular disease. Second, Dr Tim Armstrong (Australian Institute of Health and Welfare) comments on the current patterns of physical activity participation among Australians, and finally Mr Trevor Shilton (on behalf of the National Physical Activity Program Committee, National Heart Foundation of Australia) outlines an approach to the promotion of physical activity.

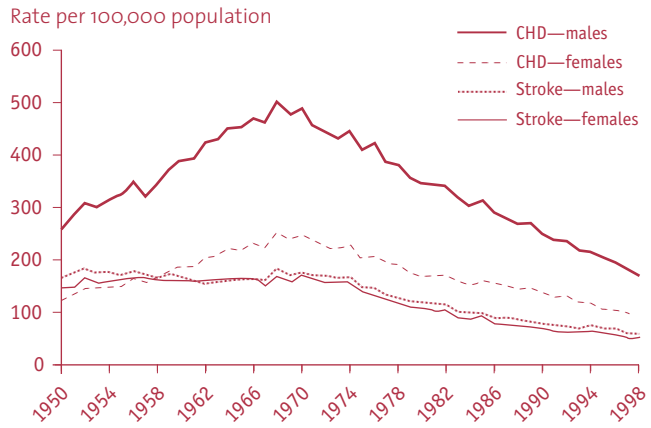
Historical perspective

Before looking at the sections which contain the latest information it is useful to look at the history of cardiovascular disease in Australia.

Death rates associated with the 20th century epidemic of coronary heart disease peaked in 1968 and have since fallen by over 60% among both males and females. Death rates from stroke were fairly steady during the 1950s and 1960s and have fallen by about 68% since 1968. These falls are dramatic, especially when compared with declines of around 20% in deaths from non-cardiovascular diseases.

Despite these declines, however, mortality rates remain higher than those in many other developed countries, indicating the potential for further declines in death rates from cardiovascular disease in Australia.

Death rates from coronary heart disease and stroke, 1950–98



Notes
1. CHD = coronary heart disease.
2. Age-standardised to the 1991 Australian population.

Source: AIHW National Mortality Database.

Reasons for the decline

There is evidence that the fall in death rates for coronary heart disease was initially due to people being less likely to have heart attacks than in previous years; however, more recently, improved survival after a heart attack has played an important part as well.

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

Changes in risk factors and medical care

The declines in heart attack and stroke rates suggest that levels of risk factors in the population may have improved, perhaps resulting from changes in lifestyle. Consistent with this, levels of blood pressure, 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.

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Improved survival rates after heart attack suggest that emergency interventions are becoming more and more effective, along with better long-term treatment in such patients (especially from beta-blocker drugs). Drugs such as ACE inhibitors, thrombolytics, aspirin and other antiplatelet agents have increased in usage and are known to reduce the risk of death if given during or soon after a heart attack.

The increased use of drugs to lower blood pressure and a dramatic increase in the use of cholesterol-lowering drugs will have reduced the risk of heart attacks. The steady rise in coronary artery bypass surgery and the similar rise in coronary angioplasty from the 1980s would also be expected to have reduced death rates.

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

In summary, the evidence suggests that the declines in death rates for coronary heart disease and stroke have been influenced by changes in some risk factors and in clinical intervention such as lifestyle advice and counselling, 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 deaths and risk factor prevalence is shown below. These diseases and risk factors are defined in the sections that follow.

Number of deaths in Australia, all ages, 1998

Disease	Males	Females
Coronary heart disease	15,024	12,801
Stroke	4,812	7,170
Other cardiovascular diseases	2,061	2,358
Peripheral vascular disease	1,171	916
Heart failure	988	1,567
High blood pressure	410	730
Rheumatic fever and rheumatic heart disease	87	171
All cardiovascular disease	*24,746*	*26,051*
All causes of death	**67,073**	**60,129**

Source: AIHW National Mortality Database.

Number of Australians with a risk factor, 1998 to 1999–00

Risk factor	Men	Women
Tobacco smoking[a]	2,084,815	1,707,414
Insufficient physical activity for health[b]	2,696,216	3,071,187
Overweight[c]	4,121,918	3,329,329
High blood cholesterol[c]	3,093,623	3,233,119
High blood pressure[c]	1,882,965	1,763,508
Diabetes[c]	476,499	433,962

(a) Data are from 1998 and include those aged 18 and over.

(b) Data are from 1999 and include those aged 18–75.

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

Sources: 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab); 1999 National Physical Activity Survey; 1998 National Drug Strategy Household Survey.

Further information

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Detailed data

Refer to the **Statistical tables** section.

Further reading

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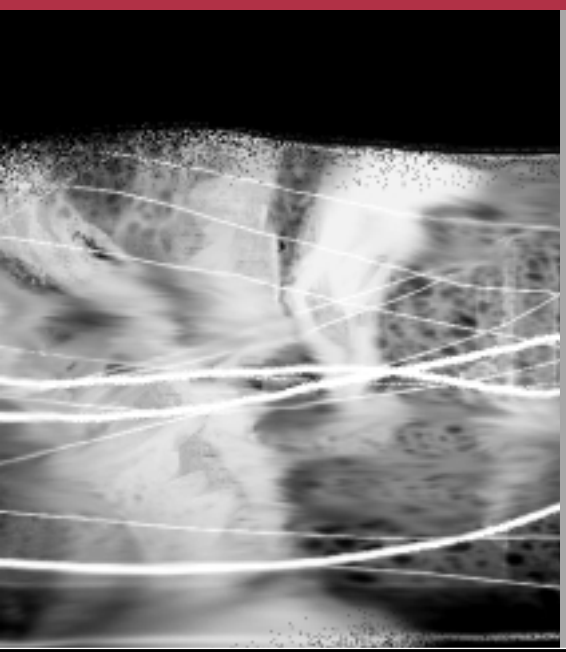

Physical activity

Focus

Australian Institute of Health and Welfare

Australian Facts

Introduction

The theme of the National Heart Foundation of Australia's Heart Week 2001 is the major cardiovascular disease risk factor, physical inactivity. As part of this important initiative, a special focus section on physical activity has been included in this report. The section is written by three leading experts in the field of physical activity in Australia. Professor Adrian Bauman of the University of New South Wales comments on the emerging evidence[2] that physical activity reduces the risk of cardiovascular disease. Dr Tim Armstrong of the Australian Institute of Health and Welfare writes on the current patterns of physical activity among Australian adults. Mr Trevor Shilton, on behalf of the National Heart Foundation of Australia's National Physical Activity Program Committee, outlines that organisation's community approach to improve the participation of all Australians in physical activity.

Physical activity's relationship to cardiovascular disease

Physical inactivity as a risk factor

The acceptance of physical inactivity as a major risk factor for cardiovascular disease has, until fairly recently, lagged behind that for the other 'established' risk factors (i.e. smoking, high blood cholesterol, high blood pressure). Interest in the effects of physical activity upon health has rapidly increased since the publication in the United States in 1996 of *Physical Activity and Health: a Report of the Surgeon General*. Now, some physiologists even describe the 'epidemic of inactivity' as a key component of the increase in chronic disease in developed countries. Given the high prevalence of inactivity, the effect on the Australian population of physical inactivity appears substantial—at least as important as a reduction of high cholesterol or high blood pressure.

Although this section focuses on physical activity and its relationship to cardiovascular disease, it should be noted that there are other benefits to being physically active. These include helping to prevent conditions and diseases such as diabetes, injury and some forms of cancer, as well as positively influencing mental and social health and wellbeing.

Quality of evidence

Much of the evidence and data appearing on these pages refer to population studies relating to the primary prevention of heart disease, stroke and vascular disease.

The quality of evidence showing physical inactivity as a risk factor for cardiovascular disease is comparable to that showing the risks of active and passive smoking. Active and passive smoking are recognised as having a causal role in heart disease and stroke. Similarly, physical inactivity is now recognised as having a causal role in heart disease and stroke.

The strength of evidence for the influence of physical activity upon cardiovascular disease is enhanced by consistency across studies. Despite small differences in study design, the association between inactivity and various cardiovascular problems (coronary heart disease, fatal heart attack, ischaemic stroke) remains remarkably consistent. Recent studies demonstrate that the effects of physical inactivity are independent of, and often more important than, other risk factors such as high blood cholesterol levels, high blood pressure or obesity. Well-designed studies tend to show stronger associations between physical activity and reduced incidence and death from cardiovascular disease. These studies, together with increasing attention to possible biological mechanisms, provide strong evidence for a highly protective relationship between physical activity and heart disease.

Effects of physical activity on preventing heart disease

Several early studies of physical activity in the population have compared people with greatly different energy expenditures at work. After socioeconomic disadvantage was taken into account, it appeared that physical activity was related to the risk of developing coronary heart disease. This led to two decades of intermittent research showing that increased physical activity at work was associated with a reduction in coronary heart disease and death.

In the 1970s, large population (epidemiological) studies appeared, focusing on the health effects of leisure-time physical activity. By the mid-1980s, these studies had showed that those in the population who did no physical activity had around twice the rate of cardiovascular disease compared with those who were physically active. More recent studies have continued to strengthen the evidence for the protective role of physical activity.

The accumulated dose and required intensity of activity required for a health benefit is well accepted for cardiovascular disease protection. In terms of intensity, current evidence suggests 'moderate' activity is sufficient. Generally, moderate intensity is defined as activities performed with an intensity of at least three times the basal or resting metabolic rate (e.g. a brisk walk).

In terms of frequency, the cardio-protective benefit of 'accumulating' this energy expenditure from short bouts throughout the day, compared with a single longer session, remains the subject of further research. However, the total daily 'dose' of energy expenditure required for a health benefit appears to equate to at least half an hour of moderate activity, such as brisk walking, on most days of the week.

There are biologically plausible mechanisms for the observed reductions in cardiovascular disease from participation in physical activity, and other potential benefits may occur through changes in other risk factor profiles induced by increased physical activity.

Physical activity and people with heart disease

It is generally accepted that physical activity has benefits for those with established coronary heart disease. Studies on people with heart disease who became active have shown increased fitness, improved oxygen consumption and decreases in ischaemic responses. The current physical activity recommendations, emphasising activities of moderate-intensity, place patients at lower risk of heart attack, and allow the adoption of exercise regimens with greater safety. There are risks of acute cardiac events, especially among those who have been inactive and suddenly resume vigorous activity, but overall the benefits outweigh the risks.

Physical activity has a range of benefits for cardiac patients, not only those with coronary artery disease but also for many with left ventricular dysfunction and heart failure. Exercise advice should generally be medically supervised in these higher risk groups.

Physical activity and stroke

The relationship between physical activity and the prevention of stroke is made more difficult by the different biological causes of stroke. Recent studies have produced some encouraging results, showing that physical activity can reduce the risk of ischaemic stroke. Physical activity may have this effect through reducing blood pressure levels, or through reducing clot formation.

Effects of physical activity on other cardiovascular risk factors

One way physical activity reduces the risk of cardiovascular disease is through its beneficial effects on other risk factors. Epidemiological studies show the independent effects of physical activity, which persist even after the effects of other cardiovascular risk factors have been taken into account. However, physical activity also appears to have a direct role in improving several cardiovascular disease risk factors, including blood pressure, overweight, and cholesterol levels, as well as in reducing the incidence of diabetes.

Specifically, in terms of high blood pressure, vigorous physical activity decreases systolic and diastolic blood pressure by approximately 6–7 mmHg. Physical activity also improves the lipid profiles of those with raised blood cholesterol levels. The effects of prolonged physical activity suggest that it will reduce total cholesterol by about 6%, reduce low-density lipoprotein by 10% and increase high-density lipoprotein by 5%.

Physical activity has a role in weight loss as well as weight maintenance. Those who are active show lower body mass indexes and more favourable waist-to-hip ratios. In long-term trials, physical activity alone can produce a weight loss of 2–3 kg, lasting to 12-month follow-up (long-term studies are lacking at present). It should be noted here that prolonged physical activity, perhaps as much as 60–80 minutes of moderate physical activity per day, is generally required for weight loss. This represents more physical activity than is required for overall cardiovascular disease benefit or blood pressure control.

There is also some evidence that physical activity by young people and adolescents can also improve their blood lipid profiles, and may further have a favourable impact upon blood pressure levels.

Current patterns of physical activity in Australia

Data from the 1999 National Physical Activity Survey indicate that most Australian adults (around 90%) were well aware that participation in moderate-intensity physical activity would improve their health. Further, between surveys in 1997 and 1999, there was an increase in overall knowledge of the health benefits of physical activity and in the awareness of public health messages about physical activity. However, despite this knowledge, the proportion of people undertaking physical activity at levels sufficient to improve their health actually declined during that period. People did physical activity on fewer occasions each week in 1999 than in 1997. Further, on the occasions they did do physical activity, they spent, on average, less time doing it. The proportion of people doing no physical activity at all in the week prior to interview (i.e. being sedentary) actually increased between 1997 and 1999.

In 1999, just over half the Australian population were undertaking physical activity at the level recommended to achieve health benefits. Detailed data on participation in physical activity for a health benefit can be found in the **Physical inactivity** section of this report.

Certain groups in the population were less likely to participate in physical activity in 1999. These included obese people, older people, women and people with at least one child at home.

Perhaps one heartening result from the 1999 National Physical Activity Survey was that one-third of adults surveyed said that they intended to become more physically active in the next month.

Promoting physical activity

Physical activity—a public health priority and a community concern

The scientific evidence for the benefits of physical activity, and the worrying trends of decreasing physical activity and increasing overweight, has given rise to a need for greater focus on physical activity as a public health issue.

Making people aware of the health benefits of physical activity is a major challenge for public health policy makers, health care providers and communities. Effective interventions are required to fulfil the overall population-health aim to increase total physical activity in the community. One process in Australia has been the development of National Physical Activity Guidelines, which serve to bring public attention to the minimum amount of physical activity required to achieve health benefits.

The guidelines are as follows:

- Think of movement as an opportunity, not as an inconvenience.
- Be active every day in as many ways as you can.
- Put together at least 30 minutes of moderate activity on most, preferably all, days.
- If you can, also enjoy some regular vigorous exercise for added health and fitness.

These guidelines operate within a broader physical activity initiative in Australia, namely the Active Australia campaign. This campaign brings together the major stakeholders from government and other government sectors to provide the structures for effective promotion of, and opportunities to participate in, physical activity in Australia. In addition to the public health benefits that may accrue from a physically active community, physical activity has the potential to deliver major social, economic, environmental and community benefits.

An approach to increase physical activity in communities has been recommended by the National Heart Foundation of Australia. These recommendations are derived from the public health principles outlined in the Ottawa Charter.

Recommendations from the National Heart Foundation of Australia[3]

The recommendations that follow outline ten broad strategies for increasing physical activity in communities. There is growing recognition that, while some strategies may prove independently effective in raising community levels of physical activity, a combination of strategies is best for increasing population levels of physical activity.

1. *Provide a supportive physical and social environment through settings where Australians live and work.*

   Physical activity choices can be made convenient, easier, safer and more enjoyable through modifications in the physical and social environment. Efforts should be made

to ensure that environments are designed to enable people to be active as part of their everyday tasks, e.g. walking to the shop to buy the newspaper.

Settings such as schools, workplaces and neighbourhoods offer practical opportunities for carrying out comprehensive strategies to increase physical activity. The environments with high priority are parks, green spaces, streetscapes, beaches and recreation facilities, as these are the most frequently used environments for physical activity.

2. *Build 'active' public policy.*

Across all sectors and at all levels in the community, policy decisions can influence the choices individuals make about physical activity. Policy can be responsible for creating or removing barriers to participation in physical activity.

3. *Provide education and publicity about the benefits of physical activity, and access to information and life skills to enable participation.*

Education, information and mass media campaigns are useful to promote awareness of the benefits of being active. They may also motivate people to take part, and publicise options for participation. Education programs and mass media, when used in combination with environment change and policy strategies may also affect behaviour.

4. *Focus on the different levels of behaviour change and identify aspects of behaviour change that need addressing most and tailor programs accordingly.*

The different approaches used to promote activity often focus on different stages of behavioural change. That is, some people are ready for action yet others have not even thought about it, and interventions must be adapted accordingly.

This stages of change approach is much more relevant when dealing with individuals. Applications of this approach have the most relevance in clinical and educational settings. Approaches that focus on stages of change have less relevance when targeting whole communities in which individuals will be at different stages, or in community-wide health promotion.

5. *Provide program options to suit varying social and cultural circumstances and motivations throughout the life cycle.*

Within communities, particular groups of people have been identified as being less likely to achieve adequate levels of physical activity. For example, inactive people are more likely to be older, less well-educated, and on lower incomes.

Physical activity for health and wellbeing should be a lifelong pursuit. Physical activity planners need to be aware that the circumstances, interests and capacity of individuals change throughout life. Activities likely to appeal to children, youth, seniors, ethnic groups, people with disabilities, people in the full-time workforce and women with dependent children may vary considerably.

6. *Provide accurate advice on physical activity to key professionals within government, non-government, community and private sectors that influence physical activity participation.*

The physical activity workforce is potentially very broad. Health professionals, local government planners, sport and recreation professionals, general practitioners, allied health professionals and volunteers could all have an influence on population levels of physical activity.

7. *Establish partnerships to ensure cross-community and intersectoral approaches.*

Partnership programs in physical activity have been recommended as the most prudent in achieving broad change in communities. Achieving sustainable increases in levels of community physical activity, and changes in the physical and social environment that will support physical activity choices, will require forging new partnerships and collaborations with sectors outside health.

Successful partnerships between sectors requires hard work and good will, as well as commitment to action, a considerable investment in building relationships, an agreed plan of action and planning to sustain outcomes.

Partnerships across sectors may be complex and constrained by factors relating to the language and culture of the sectors concerned. It is important to work towards a shared understanding of physical activity and a clear understanding of the goals and activities of all collaborating partners.

8. *Ensure quality physical education is provided to all children in all schools, and ensure physical activity options are available to children and youth in the broader community.*

Children and youth are a special target group for physical activity programs. There is a strong rationale for commencing primary prevention of cardiovascular and other chronic diseases at an early age.

Schools provide an important and convenient setting for reaching the vast majority of Australian children (aged 6–17 years). The school's environment and its interaction with parents, and community sport and recreation provide opportunities to maximise physical activity for children. In addition it is important to ensure that non-school settings such as local government and community groups give adequate priority to providing physical activity opportunities for children and youth.

9. *Ensure equitable access to physical activity opportunities.*

There are important and significant inequalities in health status in the Australian community, as outlined in this report for cardiovascular disease. It is important that physical activity programs give due attention to equality of access, opportunity and benefit. In keeping with this it is important to ensure that interventions target the most disadvantaged groups in the Australian community, and the most inactive. Physical activity interventions should also consider the needs of people of different cultures, ages, and with disabilities. The implications of geography, climate and remoteness on participation in physical activity should also be considered when designing interventions.

10. *Advocate for due priority to be given to physical activity.*

While there have been promising investments in a coordinated approach to physical activity through initiatives from the National Health and Medical Research Council and Active Australia, these are modest beginnings. Thus advocacy remains the priority strategy. Based on principles outlined in the nine recommendations above, government, non-government and commercial organisations promoting physical activity have a responsibility to advocate an increased focus on physical activity programs.

In conclusion, physical activity has been described as 'today's best buy in public health', and physical inactivity is recognised as a leading cardiovascular risk factor. Efforts to increase the levels of physical activity in the general community, as well as among those with heart disease are warranted as important strategies to reduce the burden of disease and costs associated with cardiovascular disease in Australia.

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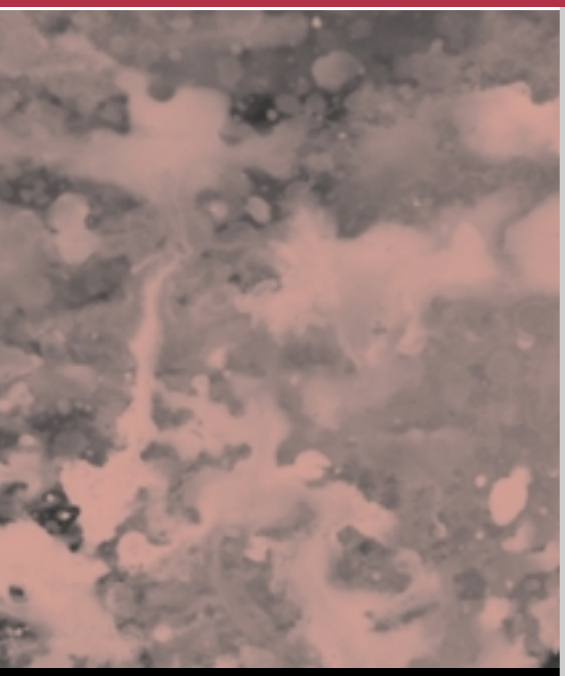


Cardiovascular disease

Coronary heart disease

Stroke

Heart failure

Peripheral vascular disease

Rheumatic fever and rheumatic heart disease

International comparisons

Australian Institute of Health and Welfare

Australian Facts

Cardiovascular disease is Australia's greatest health problem. It kills more people than any other disease (almost 51,000 deaths in 1998) and creates enormous costs for the health care system. It also places a heavy burden on individuals and the community due to the resulting disabilities. However, over the last few decades there have been substantial and continuing falls in death rates, improvements in some risk factor levels, and major advances in treatment and care.

What is cardiovascular disease?

In this report, cardiovascular disease refers to all diseases involving the heart and blood vessels. It includes International Classification of Diseases codes 390–459 in ICD-9 and codes G45, G46 and I00–I99 in ICD-10 (see **Methods and data sources** section for an explanation of the codes).

In Australia, the types of cardiovascular disease that pose the biggest cardiovascular problems are coronary heart disease, stroke, peripheral vascular disease and heart failure. Rheumatic fever and rheumatic heart disease are also significant conditions among Aboriginal and Torres Strait Islander peoples. These different forms of cardiovascular disease are discussed in later sections of this report.

The main underlying problem in cardiovascular disease in Australia is atherosclerosis, a process that clogs blood-supply vessels with deposits containing cholesterol and other substances, often associated with blood clots. 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.

Risk factors for cardiovascular disease

The major preventable risk factors for cardiovascular disease are tobacco smoking, high blood pressure, high blood cholesterol, overweight and obesity, insufficient physical activity and diabetes. For stroke, atrial fibrillation is a further risk factor. Risk strongly increases with age and is higher for males, Indigenous Australians and people from lower socioeconomic groups. Research continues on other possible risk factors, including stress and social factors.

How many Australians have cardiovascular conditions?

In 1995, an estimated 2.8 million Australians, 16% of the population, had cardiovascular conditions.[4]

Sex and age

There was no significant difference in the proportion of males and females reporting cardiovascular conditions in 1995—16% for females and 14.5% for males.

The prevalence of cardiovascular conditions increases dramatically with age. For example, more than 60% of people aged 75 and over had a cardiovascular condition in 1995 compared with less than 9% of those aged under 35.

Aboriginal and Torres Strait Islander peoples[5]

Aboriginal and Torres Strait Islander peoples are more likely to have cardiovascular conditions than other Australians across almost all age groups. For example, in the 25–44 age group, 23% of Indigenous Australians reported cardiovascular conditions compared with 16% among other Australians.

General practice consultations

In 1999–00, cardiovascular problems represented 11% of all problems managed by general practitioners. Hypertension was the most common cardiovascular problem managed and was the most frequent problem seen in general practice overall, accounting for 5.7% of all problems. Other common cardiovascular problems managed were coronary heart disease (1.1% of all problems), presentation for a cardiac check-up (0.9%) and heart failure (0.6%).

Burden of disease

Cardiovascular disease was estimated to account for 22% of the disease burden in Australia in 1996, 33% of premature mortality and 9% of years of equivalent 'healthy' life lost through disease, impairment and disability. Coronary heart disease and stroke accounted for almost 57% and 25% of the cardiovascular disease burden, respectively.

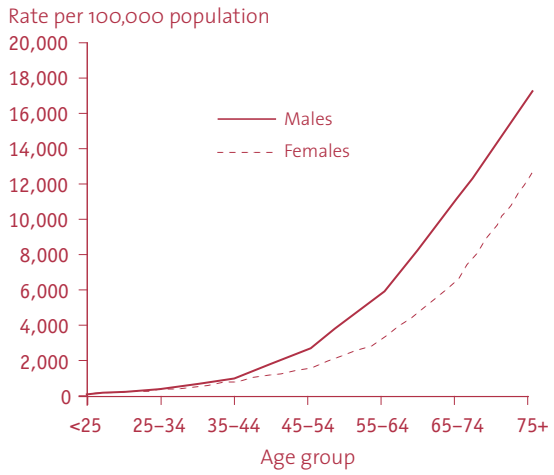
Hospitalisation[6]

In 1998–99, there were 437,717 hospitalisations where cardiovascular disease was the principal diagnosis (7% of all hospitalisations). Of these, 36% were attributed to coronary heart disease, 12% to stroke, 10% to heart failure, 3% to peripheral vascular disease and 0.5% to rheumatic fever and rheumatic heart disease.

Sex and age

Males are more likely to be hospitalised for cardiovascular disease than females. Hospital use for cardiovascular disease increases with age. For example, although men and women aged 65 and over represent only 12% of the total population, they accounted for almost 60% of hospitalisations for cardiovascular disease in 1998–99.

HOSPITALISATIONS FOR CARDIOVASCULAR DISEASE, 1998–99



Source: AIHW National Hospital Morbidity Database.

Length of stay in hospital

There was a marked decline in the average length of stay in hospital for cardiovascular disease from 7.6 days in 1993–94 to 5.5 days in 1998–99. Those hospitalised for stroke in 1998–99 tended to stay the longest (on average 9.5 days), followed by heart failure (8.2 days), peripheral vascular disease (8.0 days), rheumatic fever and rheumatic heart disease (7.5 days), and coronary heart disease (4.7 days). In comparison, the average length of stay for non-cardiovascular disease was 3.7 days.

Although males are more likely than females to be hospitalised for cardiovascular disease, females tended to stay in hospital longer (on average 5.8 days compared with 5.2 days for males).

Number of hospital beds occupied

Patients hospitalised for cardiovascular disease occupied approximately one in ten hospital beds on any day in 1998–99 (an average of 6,581 beds per day). Those hospitalised for coronary heart disease accounted for 30.7% of these, followed by stroke (20.7%), heart failure (14.3%), peripheral vascular disease (4.6%), and rheumatic fever and rheumatic heart disease (0.7%).

Males were more likely than females to occupy hospital beds for cardiovascular disease, with an average of 3,509 beds per day for males compared with 3,072 beds per day for females.

Deaths in hospital

In 1998–99, there were 18,606 hospitalisations for cardiovascular disease where the patient died in hospital (4.3% of cardiovascular disease hospitalisations). Those hospitalised for stroke tended to have the highest in-hospital mortality (10.7% of stroke hospitalisations), followed by heart failure (8.9%), peripheral vascular disease (8.2%), coronary heart disease (2.9%), and rheumatic fever and rheumatic heart disease (2.4%).

Females hospitalised for cardiovascular disease are more likely than males to die in hospital (4.7% compared with 3.9%).

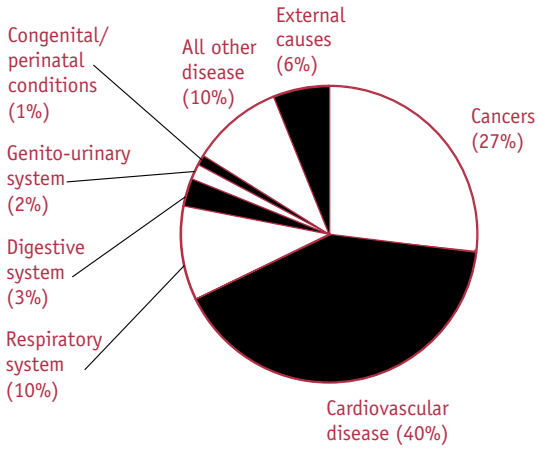
Deaths[7]

Cardiovascular disease was the leading cause of death among Australians in 1998, accounting for 50,797 deaths (40% of all deaths).

Coronary heart disease was the major cardiovascular cause of death, accounting for 55% of all such deaths, followed by stroke (24%), heart failure (5%), peripheral vascular disease (4%) and rheumatic fever and rheumatic heart disease (0.5%).

Congenital anomalies related to the circulatory system accounted for 204 deaths in 1998, accounting for one-third of deaths from congenital anomalies and 0.2% of all deaths.

Proportion of deaths by major disease categories, 1999



Source: ABS 2000.

Trends

Over the period 1987–98, death rates from cardiovascular disease declined at a rate of 3.9% per year for males and 3.7% per year for females, a faster rate than for all causes combined (2.3% and 1.9% respectively). This produced a total decline of 37.0% among males and 35.2% among females over this 12-year period. This decline is partly due to improved survival following cardiovascular events, and partly due to falls in the rate at which people get the disease, owing to improvements in and better management of the associated risk factors.

Deaths from congenital anomalies related to the circulatory system have been declining since the early 1970s. Over the period 1972–98, there was a decline in death rates of 64% for both males and females.

Sex and age

Males are more likely to die from cardiovascular disease than females across all age groups, with males aged under 75 experiencing death rates up to three times those of females of the same age in 1998. Among the elderly (75 and over age group), more women die from cardiovascular disease than men, with the death rates among elderly women approaching those of men of the same age. This excess number among elderly women can be explained by the much greater number of women than men who live into old age.

Although cardiovascular disease is a common cause of death among middle-aged Australians, it kills an even greater proportion of older people. Among those aged 75 and over, cardiovascular disease accounts for 49% of all deaths.

Socioeconomic groups

People from lower socioeconomic groups are more likely to die from cardiovascular disease than those from higher socioeconomic groups. In 1997, people aged 25–64 living in the most disadvantaged group of the population died from cardiovascular disease at around twice the rate of those living in the least disadvantaged group. This difference in death rates has existed since at least the 1970s.

Aboriginal and Torres Strait Islander peoples[8]

Aboriginal and Torres Strait Islander peoples died from cardiovascular disease at twice the rate of other Australians in 1996–98. The difference is especially great among those aged 25–64, where Indigenous Australian death rates were seven and ten times those of other Australian men and women, respectively.

Urban, rural and remote areas

Death rates from cardiovascular disease were higher in rural areas than in urban areas in 1996–98. Rates in remote areas were not significantly different from those in rural and urban areas.

States and Territories

Death rates for cardiovascular disease varied between the States and Territories from 27% above the national average to 10% below the national average in 1996–98. Death rates were generally higher in Tasmania, New South Wales and the Northern Territory, and lowest in Western Australia.

Further information

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

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National Hospital Morbidity Database (Australian Institute of Health and Welfare).

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Did you know?

- No other group of diseases in Australia costs the health care system more than cardiovascular disease. In 1993–94, it accounted for $3.7 billion, 12% of total direct health system costs.
- People born in Australia are more likely to die from cardiovascular disease than Australian residents who were born overseas.
- Australians are 26% more likely to die from cardiovascular disease than from cancer.
- Every day around 139 Australians die from cardiovascular disease.

Coronary heart disease

Coronary heart disease, one type of cardiovascular disease, is the largest single cause of death in Australia, claiming almost 28,000 lives in 1998. It kills almost three times more people than the third most common cause of death in Australia which is lung and breast cancer combined. However, death rates from coronary heart disease have fallen substantially, by almost 65% since the late 1960s.

What is coronary heart disease?

Coronary heart disease (ischaemic heart disease), ICD-9 codes 410–414 and ICD-10 codes I20–I25, is the most common cause of sudden death in Australia. It consists mainly of acute myocardial infarction (heart attack) and angina. A heart attack occurs when a vessel supplying blood to the heart muscle suddenly becomes blocked by a blood clot. This is a medical emergency and the blockage will lead to death of some heart muscle unless the clot can be quickly dissolved by drugs or treated by catheter procedures in hospital. Angina is a temporary chest pain or discomfort caused by a reduced blood supply to the heart muscle.

Among Australians having a heart attack, over four in ten will be dead within a year but over half of all heart attack deaths will 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 may increase dramatically.

Risk factors for coronary heart disease

The major preventable risk factors for coronary heart disease are tobacco smoking, high blood pressure, high blood cholesterol, overweight and obesity, and insufficient physical activity. Dietary factors and diabetes have also been associated with a higher risk of coronary heart disease. Men, older Australians, Indigenous Australians and people from lower socioeconomic groups are at greater risk of developing coronary heart disease than other Australians.

How many Australians have coronary heart disease?

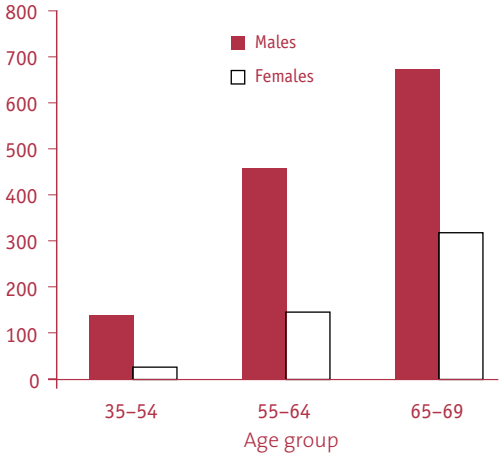
No national data are available on the number of Australians who have coronary heart disease. However, the Universities of Newcastle and Western Australia and the Queensland Department of Health have developed a method to estimate the rate of heart attacks among people aged 35–69.

In 1997–98 there were an estimated 18,817 coronary heart disease events (mainly heart attacks) in Australia among people aged 35–69. Non-fatal heart attacks represented two-thirds of all such cases (12,457 cases).

Sex and age

Non-fatal heart attacks were three times more common among men than women in the 35–69 age group in 1997–98. Rates of heart attacks also increase dramatically with age.

Non-fatal heart attacks, 1997–98



Source: AIHW National Hospital Morbidity Database.

Trends

Trends in rates of heart attacks among men and women aged 35–64 have been monitored in Newcastle and Perth, as part of the World Health Organization's multinational Monitoring of Trends and Determinants in Cardiovascular Disease (MONICA) project. Rates of non-fatal heart attacks have fallen significantly, between 2.5% and 3.7% per year during the period 1984–93.

Rates of first heart attacks (both fatal and non-fatal) among middle-aged Australians also fell during the period 1984–93.

General practice consultations

Data from the 1999–00 study of general practice activity in Australia show that coronary heart disease accounted for 1,650 of a total 153,857 problems. This equated to 1% of all problems managed.

Burden of disease

Coronary heart disease was the leading cause of disease burden in Australia in 1996. It accounted for 12% of disease burden, 20% of premature mortality and 3% of years of equivalent 'healthy' life lost through disease, impairment and disability. Coronary heart disease accounts for almost 57% of the cardiovascular disease burden.

Hospitalisation[9]

In 1998–99, there were 158,131 hospitalisations where coronary heart disease was the principal diagnosis (3% of all hospitalisations). Coronary heart disease accounted for 36% of all hospitalisations for cardiovascular disease.

Acute myocardial infarction (heart attack) accounted for 33,908 hospitalisations in 1998–99, 21% of hospitalisations for coronary heart disease.

Sex and age

Males were more than twice as likely to be hospitalised for coronary heart disease as females. Hospital use for coronary heart disease increases rapidly with age, with 59% of such cases being aged 65 and over in 1998–99.

Length of stay in hospital

The average length of stay in hospital for coronary heart disease was 4.7 days in 1998–99, a decline from 1993–94 when the average length of stay was 5.9 days. Those hospitalised for coronary heart disease tended to stay for a shorter period than those hospitalised for other major cardiovascular conditions, diabetes and most cancers. Males tended to have a shorter average length of stay than females, 4.5 days compared with 4.9 days in 1998–99.

Patients hospitalised for coronary heart disease occupied 3.3% of hospital beds on any day in 1998–99 (an average of 2,018 beds per day).

Deaths in hospital

In 1998–99, there were 4,622 hospitalisations for coronary heart disease where the patient died in hospital (2.9% of coronary heart disease hospitalisations). Females hospitalised for coronary heart disease were more likely to die in hospital than males (3.9% compared with 2.4%).

While the in-hospital mortality rate for coronary heart disease was only 2.9%, for acute myocardial infarction (a major presentation of coronary heart disease) the rate was more than three times as high at 10.4% in 1998–99 (3,534 hospitalisations). Females hospitalised for acute myocardial infarction are more likely to die in hospital than males (14.8% compared with 8.1%).

Expenditure

The average total expenditure per admission for acute myocardial infarction (heart attack) was $5,898 in 1998–99. This figure includes overhead and administrative costs, which account for 22% of the average total expenditure per admission.

Australian Facts

Deaths[10]

Coronary heart disease (mainly heart attacks) was the leading cardiovascular cause of death, accounting for 27,825 deaths (22% of all deaths) in Australia in 1998. Acute myocardial infarctions (heart attacks) account for 59% of deaths from coronary heart disease.

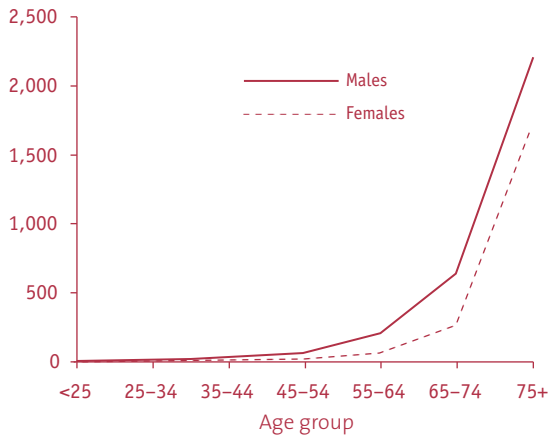
Trends

Coronary heart disease death rates have continued the decline that began in the 1960s and fell at a rate of 4.3% per year among males and 4.1% per year among females for the period 1987–98. This produced a total decline of 39.0% among males and 38.0% among females over this 12-year period.

Sex and age

Overall, males were almost twice as likely to die from coronary heart disease as females in 1998, with males aged 25–64 having death rates three to five times those of females. However, in the 85 and over age group, twice as many women died from coronary heart disease as did men. This can be explained by the much greater number of women than men who live into old age.

DEATH RATES FROM CORONARY HEART DISEASE, 1998



Source: AIHW National Mortality Database.

Socioeconomic groups

People from lower socioeconomic groups are more likely to die from coronary heart disease than those from higher socioeconomic groups. In 1997, people aged 25–64 from the most disadvantaged group were around twice as likely to die from coronary heart disease as those from the least disadvantaged group. This pattern has been observed for at least the last 30 years.

Aboriginal and Torres Strait Islander peoples[11]

Aboriginal and Torres Strait Islander peoples died from coronary heart disease at around twice the rate of other Australians in 1996–98. The difference is even greater among adults aged 25–64, where Indigenous Australian death rates were six and eight times those of other Australian men and women, respectively.

Urban, rural and remote areas

Among males, death rates from coronary heart disease were slightly higher in rural areas than in urban areas in 1996–98. For females there were no significant differences in coronary heart disease death rates across urban, rural and remote areas of Australia.

States and Territories

Death rates from coronary heart disease in 1996–98 were generally lower in Western Australia and Victoria, while for the remaining States and Territories there were no significant differences in coronary heart disease death rates.

Further information

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

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Mathers C, Vos T & Stevenson C 1999. The burden of disease and injury in Australia. AIHW Cat. No. PHE 17. Canberra: AIHW.

Did you know?

- For a 40-year-old, the risk of having coronary heart disease at some time in their future life is one in two for men and one in three for women.
- Every day, around 76 Australians die from coronary heart disease.
- Coronary heart disease is the most costly cardiovascular disease for the health care system, accounting for 24% of total cardiovascular disease costs. In 1993–94, coronary heart disease amounted to $894 million in direct health system costs.

Stroke

Stroke, one form of cardiovascular disease, is Australia's second greatest killer after coronary heart disease, claiming almost 12,000 lives in 1998. It is the leading cause of long-term disability in adults and it places great demands on family members and caregivers. Death rates from stroke have been falling since the 1950s. Given the rapid ageing of the Australian population, however, and a slowing down of the decline in stroke death rates in recent years, the number of people dying from stroke and those surviving with a permanent disability is likely to increase in the future.

What is stroke?

The term 'stroke' in this report refers to cerebrovascular disease, ICD-9 codes 430–438 and ICD-10 codes G45, G46 and I60–I69. Cerebrovascular disease includes ischaemic stroke, haemorrhagic stroke, transient ischaemic attack and other cerebrovascular diseases. Ischaemic stroke occurs when an artery supplying blood to a part of the brain suddenly becomes blocked, while haemorrhagic stroke is when an artery supplying blood to a part of the brain suddenly bleeds. These can damage part of the brain, which in turn can impair a range of functions including movement of body parts and communication. Ischaemic stroke occurs more than five times as often as haemorrhagic stroke.

About one-third of those who have had a stroke will die within 12 months. A further one-third are permanently disabled, with some degree of paralysis of one side of the body, difficulty in communicating, or a range of other problems that may affect their quality of life and their ability to function in society.

Risk factors for stroke

Risk factors for stroke include high blood pressure, tobacco smoking, heavy alcohol consumption, high blood cholesterol, overweight and obesity, and insufficient physical activity. Transient ischaemic attack, atrial fibrillation, diabetes and history of heart attacks are also associated with an increased risk of stroke.

How many Australians have a stroke?

Each year, around 40,000 Australians have an ischaemic or haemorrhagic stroke, with 73% of these being first-ever strokes. The 1995 National Health Survey estimated that 116,500 Australians, 0.6% of the population, had at some time in their lives had a stroke.

Sex and age

More women are affected by stroke than men, due to the larger number of elderly women. However, the proportion of men with stroke is 30% higher than for women.

Stroke is more common among older Australians, with around 50% of all strokes occurring in those aged 75 years and over.

Disability due to stroke

The 1998 Survey of Disability, Ageing and Carers found that there were an estimated 63,530 Australians with a disability whose main condition was a stroke. Over 75% of stroke sufferers with a disability needed assistance with self-care, mobility or communication.

Burden of disease

Stroke was the second leading cause of disease burden in Australia in 1996. It accounted for 5% of disease burden in Australia, 7% of premature mortality and 3% of years of equivalent 'healthy' life lost through disease, impairment and disability. Stroke accounted for 24% of cardiovascular disease burden.

Hospitalisation[12]

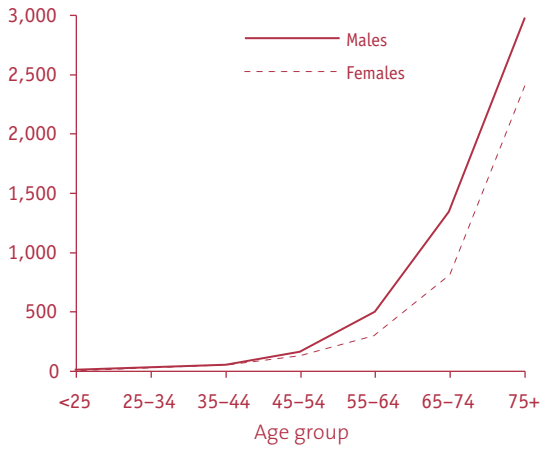
In 1998–99, there were 52,439 hospitalisations where stroke was the principal diagnosis (0.9% of all hospitalisations). Stroke accounted for 12% of all hospitalisations for cardiovascular disease.

Ischaemic stroke accounted for 43% of stroke hospitalisations, while haemorrhagic stroke accounted for 14% and transient ischaemic attack for 23%.

Sex and age

Males were more likely to be hospitalised for stroke than females. Hospital use for stroke increased rapidly among older Australians, with more than three-quarters of such cases being aged 65 and over in 1998–99.

Hospitalisations for stroke, 1998–99



Source: AIHW National Hospital Morbidity Database.

Length of stay in hospital

The average length of stay in hospital for stroke was 9.5 days in 1998–99, a decline from 1993–94 when the average length of stay was 15.6 days. The length of stay in hospital for stroke was almost twice that for other cardiovascular disease in 1998–99 (9.5 days compared with 4.9 days). Length of stay in hospital for stroke was generally higher for females than for males (10.4 days compared with 8.6 days).

Patients hospitalised for stroke occupied 2.2% of hospital beds on any day in 1998–99, an average of 1,364 beds per day.

Deaths in hospital

In 1998–99, there were 5,612 hospitalisations for stroke where the patient died in hospital. The in-hospital death rate for stroke admissions was more than three times that for other cardiovascular disease (10.7% compared with 3.4%).

Females hospitalised for stroke were more likely to die in hospital than males (12.3% compared with 9.2%).

Expenditure

The average total expenditure per admission for ischaemic stroke was $6,250 in 1998–99. This figure includes overhead and administrative costs, which account for 24% of the average total expenditure per admission.

The average total expenditure per admission for transient ischaemic attacks was $2,255 in 1998–99, with overhead and administrative costs accounting for 24% of total expenditure per admission.

Deaths[13]

Stroke was the second most common cause of death among Australians in 1998, accounting for 11,982 deaths, 9% of deaths from all causes. A comparison across OECD countries shows that Australian stroke death rates were, however, among the lowest of the 16 countries for which data were compared.

Trends

Between 1987 and 1998, death rates from stroke declined at a rate of 3.4% per year among males and 3.6% per year among females. This produced a total decline of 34.9% among males and 34.7% among females over this 12-year period.

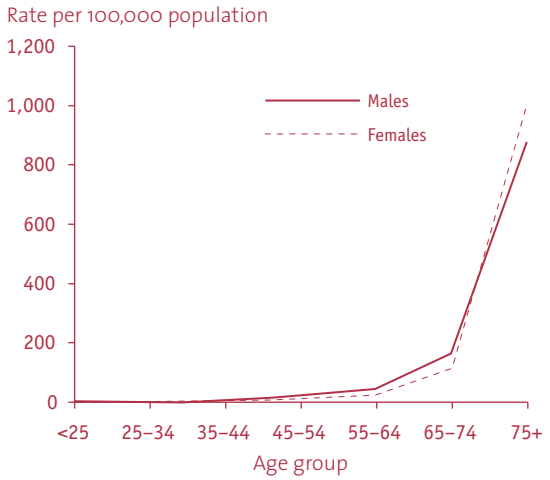
Sex and age

Males are slightly more likely to die from stroke than females across most age groups. Males aged 45–74 had death rates 1.3 times those of females in 1998. 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 75 and over and the under-25 age groups), the actual number of deaths is greater for females. This apparent inconsistency can be explained by the greater number of women than men who live into old age, where death rates from stroke are considerably higher.

Stroke death rates increase dramatically with age, with 78% of all deaths from stroke occurring among those aged 75 and over.

DEATH RATES FROM STROKE, 1998



Source: AIHW National Mortality Database.

Socioeconomic groups

In 1997, people aged 25–64 from the most disadvantaged group were almost twice as likely to die from stroke as those in the least disadvantaged group.

Aboriginal and Torres Strait Islander peoples[14]

Aboriginal and Torres Strait Islander peoples died from stroke at twice the rate of other Australians in 1996–98. The difference is even greater among adults aged 25–64, where Indigenous Australian death rates were seven and eight times those of other Australian men and women, respectively.

Urban, rural and remote areas

There were no significant differences in stroke death rates across urban, rural and remote areas of Australia in 1996–98.

States and Territories

Death rates from stroke in 1996–98 were generally lower in Victoria and higher in Tasmania and New South Wales.

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

1998 Survey of Disability, Ageing and Carers (Australian Bureau of Statistics).

National Hospital Morbidity Database (Australian Institute of Health and Welfare).

National Mortality Database (Australian Institute of Health and Welfare).

Further reading

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Did you know?

- For a 45-year-old, the risk of having a stroke before age 85 is one in four for men and one in five for women.
- About 25% of all people who have a stroke die within the first month of their stroke.
- Australians born in Europe are more likely to have a stroke than their Australian-born counterparts.

Heart failure

Heart failure, an increasingly important type of cardiovascular disease, is more common among elderly Australians and people who have had a heart attack. The prevalence of this condition is likely to increase considerably as the population ages. Heart failure accounted for more than 2,500 deaths in 1998. The cost of heart failure treatment exceeds that of all types of cancers combined.

What is heart failure?

Heart failure, ICD-9 code 428 and ICD-10 code I50, occurs when the heart is unable to pump blood adequately to the rest of the body. There are many causes of heart failure, notably heart attack, high blood pressure or a damaged heart valve. Symptoms commonly seen in people with heart failure are fatigue and breathlessness. Heart failure that causes swelling of the ankles and lung congestion is called congestive heart failure.

The most common medical treatments for heart failure are ACE (angiotensin-converting enzyme) inhibitors and diuretics.

Risk factors for heart failure

The most important predisposing factors for heart failure are coronary heart disease and high blood pressure. High blood cholesterol, diabetes, tobacco smoking, overweight and obesity, and insufficient physical activity have also been associated with an increased risk of heart failure, probably largely because they increase the risk of coronary heart disease.

How many Australians have heart failure?

No national data are available on the number of Australians who have heart failure.

General practice consultations

Data from the 1999–00 study of general practice activity in Australia show that heart failure accounted for 893 of a total 153,857 problems. This equated to 0.6% of all problems managed.

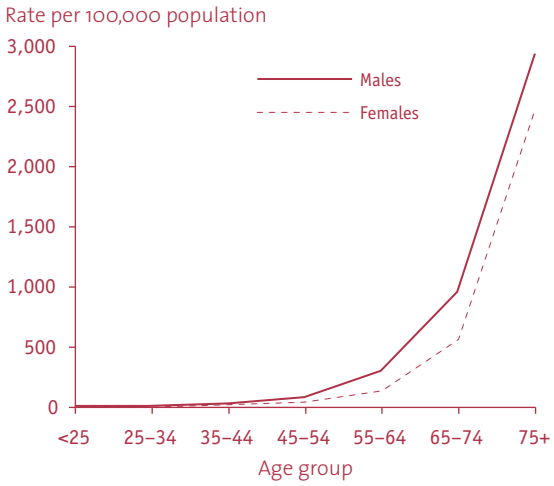
Hospitalisation[15]

In 1998–99, there were 41,894 hospitalisations where heart failure was the principal diagnosis (0.7% of all hospitalisations). Heart failure accounted for 10% of all hospitalisations for cardiovascular disease.

Sex and age

Males are more likely to be hospitalised for heart failure than females. Hospital use for heart failure tends to increase with age, with those aged 65 and over accounting for 86% of all hospitalisations for heart failure.

Hospitalisations for heart failure, 1998–99



Source: AIHW National Hospital Morbidity Database.

Length of stay in hospital

There has been a decline in the average length of stay in hospital for heart failure, from 10.6 days in 1993–94 to 8.2 days in 1998–99. Although males are more likely to be hospitalised for heart failure than females, females tended to have a longer average length of stay in hospital in 1998–99 (8.8 days compared with 7.6 days).

Patients hospitalised for heart failure occupied 1.5% of hospital beds on any day in 1998–99, an average of 941 beds per day.

Deaths in hospital

In 1998–99, there were 3,725 hospitalisations for heart failure where the patient died in hospital (8.9% of heart failure hospitalisations). Females hospitalised for heart failure were more likely than males to die in hospital (9.2% compared with 8.6% in 1998–99).

Deaths[16]

Heart failure is the third largest cause of cardiovascular deaths in Australia, accounting for 2,555 deaths, 2.0% of deaths from all causes in 1998.

Trends

Death rates from heart failure declined at a rate of 4.3% per year for males and 4.4% per year for females between 1987 and 1998. This produced a total decline of 39.4% among both males and females over this 12-year period.

Sex and age

In 1998, more females died from heart failure than males, but death rates among males aged under 75 were at least as high as for females. This apparent inconsistency can be explained by the greater number of women than men who live to be over 75, where death rates from heart failure are considerably higher.

Deaths from heart failure occur mainly among older Australians, with 90% of such deaths occurring among those aged 75 and over.

Socioeconomic groups

There was no significant difference between heart failure death rates in the most and least disadvantaged groups in 1997.

Aboriginal and Torres Strait Islander peoples[17]

Among Aboriginal and Torres Strait Islander peoples there are relatively few deaths attributed to heart failure. This may be a reflection of the younger age structure of Indigenous Australians compared with the overall Australian population. Over the five-year period 1994 to 1998, 28 Indigenous Australian males and 31 Indigenous Australian females died from heart failure. In 1996–98 Indigenous Australians were three times as likely to die from heart failure as other Australians.

Urban, rural and remote areas

Heart failure death rates among females were lower in urban areas than in rural and remote areas in 1996–98. For males living in rural areas, heart failure death rates were higher than for those living in urban areas.

HEART FAILURE DEATH RATES, 1996–98

	Males	Females
	Rate per 100,000 population	
Urban areas	12.2	10.6
Rural areas	15.3	13.2
Remote areas	17.7	16.4
Australia	**13.2**	**11.4**

Note: Death rates have been age-standardised to the 1991 Australian population.

Source: AIHW National Mortality Database.

States and Territory[18]

In 1996–98, heart failure death rates were generally lower in Queensland and Western Australia, while for the remaining States and Territory there were no significant differences in heart failure death rates.

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Detailed data

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Main data sources

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Further reading

Australian Institute of Health and Welfare 2000. Australia's health 2000: the seventh biennial health report of the Australian Institute of Health and Welfare. AIHW Cat. No. AUS 19. Canberra: AIHW.

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Did you know?

- Heart failure accounted for one of the largest number of patient days in hospital among cardiovascular conditions and ranked seventh highest for hospital patient days overall in 1998–99.
- Direct health care costs for heart failure amounted to $416 million in 1993–94 (11% of cardiovascular disease costs), the fourth highest among cardiovascular conditions after high blood pressure, coronary heart disease and stroke.

Peripheral vascular disease

Peripheral vascular disease, one form of cardiovascular disease, occurs mainly among older people, and its prevalence is likely to increase significantly as the population ages. Peripheral vascular disease directly claimed over 2,000 lives in Australia in 1998.

What is peripheral vascular disease?

Peripheral vascular disease, ICD-9 codes 441–444 and ICD-10 codes I71–I74, occurs due to a reduced arterial blood supply to the legs. It ranges from asymptomatic disease, through pain on walking, to pain at rest and limb-threatening reduced blood supply that can lead to amputation. 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 include 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.

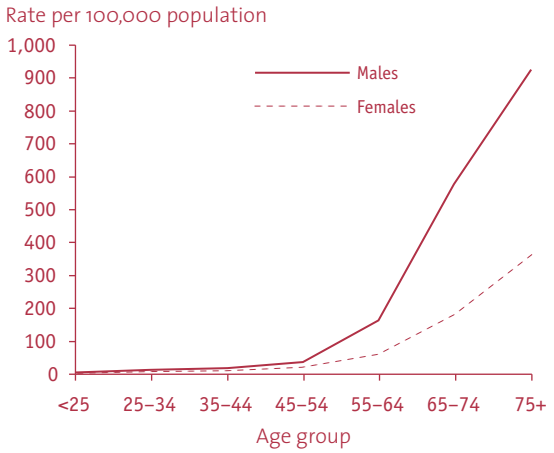
Hospitalisation[19]

In 1998–99, there were 13,612 hospitalisations where peripheral vascular disease was the principal diagnosis (0.2% of all hospitalisations). Peripheral vascular disease accounted for 3% of all hospitalisations for cardiovascular disease.

Sex and age

Males are almost three times as likely to be hospitalised for peripheral vascular disease as females. Hospital use for peripheral vascular disease tends to increase with age, with those aged 65 and over accounting for over three-quarters of all hospitalisations for peripheral vascular disease in 1998–99.

Hospitalisations for peripheral vascular disease, 1998–99



Source: AIHW National Hospital Morbidity Database.

Length of stay in hospital

The average length of stay in hospital for peripheral vascular disease was 8.0 days in 1998–99, a decline from 1993–94 when the average length of stay was 10.4 days. Males had a similar length of stay to females, 8.0 days compared with 8.2 days in 1998–99.

Patients hospitalised for peripheral vascular disease occupied 0.5% of hospital beds on any day in 1998–99, an average of 300 beds per day.

Deaths in hospital

In 1998–99, there were 1,118 hospitalisations for peripheral vascular disease where the patient died in hospital (8.2% of peripheral vascular disease hospitalisations). Females hospitalised for peripheral vascular disease were more likely than males to die in hospital (9.6% compared with 7.5%).

Australian Facts

Deaths[20]

Peripheral vascular disease accounted for 2,087 deaths, 1.6% of deaths from all causes in 1998.

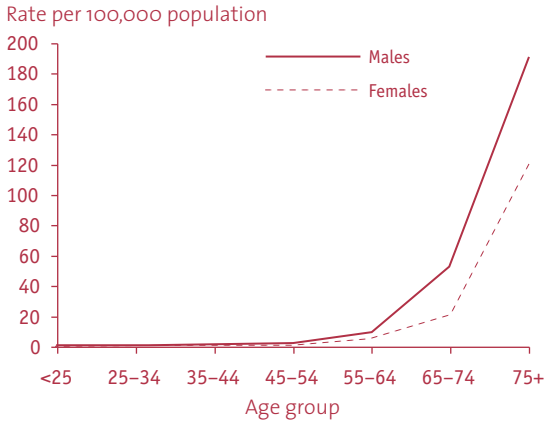
Trends

Deaths from peripheral vascular disease declined at a rate of 2.9% per year for males and 1.2% per year for females between 1987 and 1998. This produced a total decline of 27.8% among males and 6.8% among females over this 12-year period. Death rates from this disease have been falling at a slower rate than for the other major forms of cardiovascular disease.

Sex and age

In 1998, males were twice as likely to die from peripheral vascular disease as females. Peripheral vascular disease increases dramatically with age, with 69% of deaths occurring among those aged 75 and over.

DEATH RATES FROM PERIPHERAL VASCULAR DISEASE, 1998



Source: AIHW National Mortality Database.

Socioeconomic groups

Males from the most disadvantaged group were 1.6 times as likely to die from peripheral vascular disease as those from the least disadvantaged group in 1997. Among females there was no significant difference in peripheral vascular disease death rates between the most and least disadvantaged groups.

Aboriginal and Torres Strait Islander peoples[21]

Among Aboriginal and Torres Strait Islander peoples there are relatively few deaths attributed to peripheral vascular disease. This may be a reflection of the younger age structure of Indigenous Australians compared with the overall Australian population. Over the five-year period 1994 to 1998, eight Indigenous Australian males and seven Indigenous Australian females died from peripheral vascular disease. In 1996–98, there were no significant differences in peripheral vascular disease death rates between Indigenous Australians and other Australians.

Urban, rural and remote areas

There were no significant differences in peripheral vascular disease death rates among urban, rural and remote areas of Australia in 1996–98.

States and Territory[22]

Death rates from peripheral vascular disease in 1996–98 were generally lower in Victoria, while for the remaining States and Territory there were no significant differences in peripheral vascular disease death rates.

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Detailed data

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Waters A-M, Armstrong T & Senes-Ferrari S 1998. Medical care of cardiovascular disease in Australia. Cardiovascular Disease Series No. 7. AIHW Cat. No. CVD 4. Canberra: AIHW.

Did you know?

- Direct health care costs for peripheral vascular disease amounted to $179.5 million in 1993–94, 5% of all cardiovascular disease costs.
- There were 788 amputations for peripheral vascular disease in 1998–99.

Rheumatic fever and rheumatic heart disease

Rheumatic fever and rheumatic heart disease accounted for less than 300 deaths in 1998. Although this type of cardiovascular disease is rare among the Australian population overall, rates among Indigenous Australians living in remote areas are very high. Since the 1950s, acute rheumatic fever and rheumatic heart disease have largely become diseases of economically disadvantaged people.

What is rheumatic fever and rheumatic heart disease?

Rheumatic fever, ICD-9 codes 390–392 and ICD-10 codes I00–I02, is caused by Group A *Streptococcus* bacteria associated with infections of the throat and skin. It occurs mainly in children and young adults and may affect the heart valves, the heart muscle and its lining, the joints and the brain. Recurrences of rheumatic fever lead to cumulative heart damage and can be almost completely prevented by strict follow-up and monthly injections of penicillin.

Rheumatic heart disease, ICD-9 codes 393–398 and ICD-10 codes I05–I09, is the damage done to the heart muscle and heart valves by an attack of acute rheumatic fever.

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 this disease in Australia.

Disease rates in the Top End of the Northern Territory

A register of people with known or suspected rheumatic fever and rheumatic heart disease has been established in the Top End of the Northern Territory. This section draws on data from this register.

Acute rheumatic fever

Current rates

In 1999, Indigenous children aged 5–14 years accounted for almost half of all cases of acute rheumatic fever among Indigenous Australians in the Top End of Australia's Northern Territory (17 cases). There were 191 cases for every 100,000 Indigenous children aged 5–14. In contrast, there were no reported cases of acute rheumatic fever among other Australian children in 1999.

Trends

Acute rheumatic fever among Indigenous children in the Top End has declined over the last six years. In 1994–99 the rate of Indigenous children aged 5–14 years with acute rheumatic fever was 202 per 100,000 population, compared with 254 per 100,000 population in 1988–93.

Acute rheumatic fever among Aboriginal and Torres Strait Islander peoples in the Top End of the Northern Territory, 1988–99

	5–14 years		All ages	
Year	Rate[(a)]	No.	Rate[(a)]	No.
1988–93	*254*	*91*	—	—
1994	204	18	84	27
1995	148	13	78	25
1996	238	21	105	38
1997	159	14	69	25
1998	270	24	101	36
1999	191	17	101	37
1994–99	*202*	*107*	*90*	*188*

(a) Rate per 100,000 population.

Source: AIHW Rheumatic Heart Disease Register.

Rheumatic heart disease

Current rates

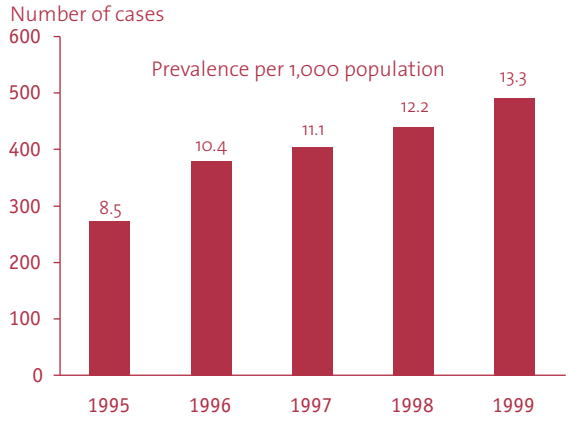
In 1999, there were 528 people with rheumatic heart disease in the Top End of Australia's Northern Territory, of whom 93% were Aboriginal and Torres Strait Islander peoples (490 cases). Rheumatic heart disease was present in 49 children aged 5–14 (9% of all cases), of whom all were Indigenous

Australians. The prevalence of rheumatic heart disease among Indigenous Australians was 13.3 per 1,000 in 1999. In contrast, among other Australians the rate was 0.34 per 1,000.

Trends

The prevalence of rheumatic heart disease is increasing in the Top End of the Northern Territory. In 1999, there were 13.3 cases per 1,000 Indigenous people, compared with 8.5 per 1,000 in 1995. This increase could be due to an improvement in the reporting and awareness of the condition and its symptoms rather than an actual rise in the number of cases.

Rheumatic heart disease among Indigenous Australians, Top End of the Northern Territory, 1995–99



Source: AIHW Rheumatic Heart Disease Register.

Hospitalisation[23]

In 1998–99, there were 2,122 hospitalisations with rheumatic fever and rheumatic heart disease as the principal diagnosis in Australia (0.04% of all hospitalisations). Rheumatic fever and rheumatic heart disease accounted for 0.5% of all hospitalisations for cardiovascular disease.

Although Aboriginal and Torres Strait Islander peoples represent about 2% of the population, they accounted for 14% of hospitalisations for rheumatic fever and rheumatic heart disease in 1998–99.

Sex and age

Females were more likely to be hospitalised for rheumatic heart disease and rheumatic fever than males in 1998–99. Hospital use for rheumatic heart disease increased with age up to 80 years, with 60% of such cases aged 50–79. Rheumatic fever is more common among the younger age groups. Of the hospitalisations for rheumatic fever, 57% occurred among those aged 5–19.

Length of stay in hospital

The average length of stay in hospital for rheumatic fever and rheumatic heart disease in 1998–99 was 7.5 days, a marginal decline from 1993–94 when the average length of stay was 7.9 days. Males had a longer average length of stay than females for these conditions, on average 8.0 days compared with 7.3 days; however, this difference was not statistically significant.

Patients hospitalised for rheumatic fever and rheumatic heart disease occupied 0.07% of hospital beds on any day in 1998–99, an average of 44 beds per day.

Deaths in hospital

In 1998–99, there were 51 hospitalisations for rheumatic fever and rheumatic heart disease where the patient died in hospital (2.4% of rheumatic fever and rheumatic heart disease hospitalisations). For rheumatic fever and rheumatic heart disease there was no significant difference between male and female in-hospital death rates.

Deaths[24]

Rheumatic fever and rheumatic heart disease accounted for 258 deaths in Australia, 0.2% of deaths from all causes in 1998.

Trends

Death rates from rheumatic fever and rheumatic heart disease declined at a rate of 5.2% per year for males and 4.8% per year for females between 1987 and 1998. This produced a total decline of 52.4% among males and 48.3% among females over this 12-year period. These death rates have been falling faster than for many of the other cardiovascular diseases. The rapid decline in death rates from this disease may be due to improvements in living conditions and better access to medical care among disadvantaged Australians.

Australian Facts

Sex and age

Women aged over 65 were almost twice as likely to die from rheumatic fever and rheumatic heart disease as males in the same age group in 1998. Half of the deaths occurred among those aged 75 and over.

Socioeconomic groups

The number of deaths from rheumatic fever and rheumatic heart disease in each group of socioeconomic disadvantage is too small to draw any reliable conclusions.

Aboriginal and Torres Strait Islander peoples[25]

Aboriginal and Torres Strait Islander peoples are far more likely to die from rheumatic fever and rheumatic heart disease than other Australians. In 1996–98, Indigenous Australian males were 13 times and Indigenous Australian females 14 times as likely to die from rheumatic fever and rheumatic heart disease as other Australians.

Urban, rural and remote areas

Among females, death rates from rheumatic fever and rheumatic heart disease were higher in remote areas than in urban and rural areas in 1996–98. For males, there were no significant differences in rheumatic fever and rheumatic heart disease death rates across urban, rural and remote areas of Australia.

States and Territories

Most deaths from rheumatic fever and rheumatic heart disease occurred in New South Wales, Victoria and Queensland. The remaining States and Territories accounted for 27% of all such deaths in 1996–98. There were no significant differences in rheumatic fever and rheumatic heart disease death rates across the States and Territories.

Further information

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Detailed data

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Main data sources

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National Mortality Database (Australian Institute of Health and Welfare).

Rheumatic Heart Disease Register (Australian Institute of Health and Welfare and Department of Health and Aged Care).

Further reading

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Did you know?

- Prevalence of rheumatic heart disease among Aboriginal and Torres Strait Islander peoples is one of the highest in the world.
- Rheumatic heart disease remains the leading cause of heart disease among children and young adults in many developing countries.
- The World Health Organization estimates that 12 million people worldwide are affected by rheumatic fever and rheumatic heart disease, with 400,000 deaths annually.

International comparisons

Cardiovascular disease is a major health and economic burden throughout the world, especially in developed countries. However, rates of cardiovascular disease are increasing dramatically in developing countries. It is estimated that coronary heart disease will become the single leading public health problem for the world by 2020, replacing transmissible diseases such as infections. The following mortality comparisons are presented using data for selected countries from 1996. Where 1996 data were not available, 1995 data were used (Spain, Norway and Italy). While providing an overview of the global impact cardiovascular disease has, caution must be used when comparing death rates between countries as data were collected in different years, using different methods.

Cardiovascular disease

Cardiovascular disease includes coronary heart disease, stroke and other forms of heart and vascular disease. In the mid-1990s the Russian Federation had the worst death rates from cardiovascular disease of the 18 countries compared. Their death rate was three times that of Australia for both males and females. Males in Japan had the lowest death rate for cardiovascular disease, the Russian Federation rate being about four and a half times greater. For females, the lowest death rates were found in France and Japan, with rates less than a quarter of those in the Russian Federation.

Australian death rates ranked towards the lower end of the 18 countries compared (sixth lowest for males and fifth lowest for females). The Australian death rate for males was one and a half times the lowest rate—that of Japanese males. Similarly, for Australian females the death rate was one and a half times the lowest rate—that of French females.

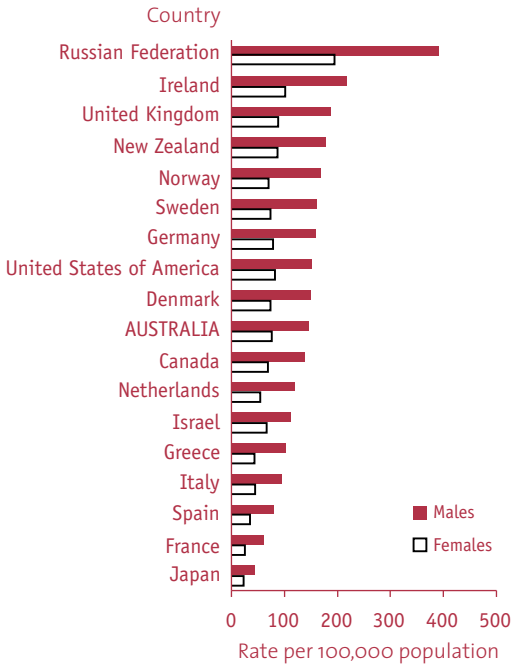
Trends

During the period 1950 to 1993–94, death rates for cardiovascular disease declined in the eleven countries compared for which data are available. Among males, Australia and Canada experienced the greatest fall in death rates (57%). Australian females recorded a greater decline (62%) than Australian males. Canada, France and Japan were the only countries to exceed Australia's decrease in female death rates.

Coronary heart disease

Coronary heart disease is the major cause of death in Australia. It is caused by blockages in the coronary arteries that supply blood to the heart muscle. Australian death rates from coronary heart disease rank towards the middle of those countries compared (ninth lowest for males and tenth lowest for females). Coronary heart disease death rates tend to be lower in Asian and Mediterranean countries. There have been significant errors in recording coronary heart disease deaths in numerous developed countries, including Spain, Italy, Japan and France. However, even after correcting for these errors, these countries are still found to have low death rates. The highest death rates were recorded in the Russian Federation. Their death rates were more than two and a half times higher than those in Australia.

DEATH RATES FROM CORONARY HEART DISEASE FOR SELECTED COUNTRIES, 1995–96



Note: Death rates have been standardised to the 2000 WHO standard population.

Sources: WHO 2000; AIHW National Mortality Database.

Australian Facts

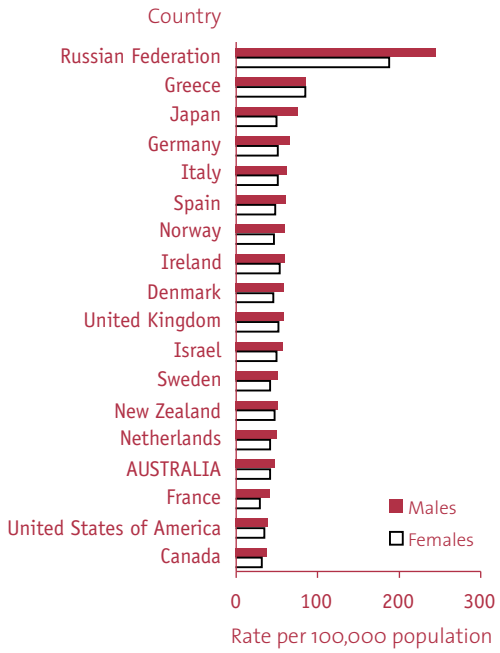
Trends

In recent decades, death rates for coronary heart disease have declined in Australia and other Western countries. In particular, in Australia, Canada, Italy, Japan and the United States, the male and female coronary heart disease death rates more than halved between 1960 and 1993. However, rates have actually increased in Eastern Europe, the Russian Federation, and a number of other countries in the developing world.

Stroke

Stroke death rates in Australia were among the lowest of those countries compared here (fourth lowest for both males and females). The Australian stroke death rate for males was 20% higher than that recorded in the United States. Females in France had the lowest death rates for stroke, and the rate for Australian females was one and a half times that in France.

DEATH RATES FROM STROKE FOR SELECTED COUNTRIES, 1995–96



Note: Death rates have been standardised to the 2000 WHO standard population.

Sources: WHO 2000; AIHW National Mortality Database.

Trends

Between 1970 and 1993, declines in stroke death rate were rapid for the 13 countries compared for which data are available. Almost all countries saw falls in stroke death rates of greater than 30% except for Greece, where the rate of decline was around 10%. Australian stroke death rates declined by 61% for males and 64% for females during 1970–94. France and Japan were the only countries to exceed Australia's rate of decrease in stroke death rates.

Risk factors

Cardiovascular disease is related to a number of risk factors. Some of these are smoking, high blood pressure, high blood cholesterol, overweight and obesity, and poor nutrition. Variation in cardiovascular disease death rates for different countries may be partly attributed to different diets and lifestyles. It is difficult to make accurate risk factor comparisons between countries as there are often differences in survey designs, definitions of risk and data collection methods. Further, data for international comparisons tend to be dated and do not reflect current levels. However, from available data, Australia appears to have similar risk factor patterns to other Western countries.

Further information

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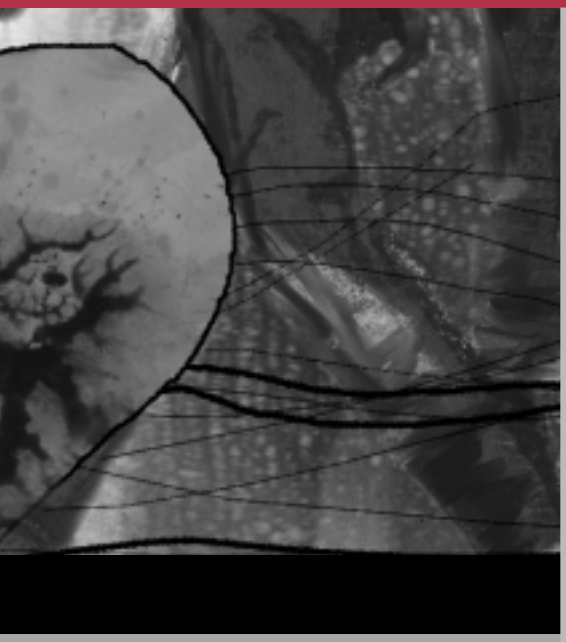
Did you know?

- Asian and Mediterranean countries generally have the lowest coronary heart disease death rates.
- The highest stroke death rates are recorded in the Russian Federation and the lowest rates are recorded in North America.



Risk factors

Physical inactivity

Tobacco smoking

Poor nutrition

High blood pressure

High blood cholesterol

Overweight and obesity

Diabetes

risk

Australian Institute of Health and Welfare

Australian Facts

Risk factors are determinants, characteristics or exposures that are associated with a greater risk of ill health. For cardiovascular disease they include genetic, behavioural and physiological factors. Cardiovascular disease and its risk factors are strongly influenced by the circumstances in which people live and work.

What are the risk factors for cardiovascular disease?

Increasing age and being male are risk factors for heart, stroke and vascular disease. That is, the risk for both males and females increases sharply with age. However, at any age the risk for males is greater than for females.

Behavioural risk factors can influence physiological risk factors (e.g. poor diet and physical inactivity promote overweight and obesity, high blood pressure and high blood cholesterol). Behavioural and physiological risk factors can be modified, unlike heredity, sex and age.

There is a growing body of evidence that the determinants of ill health go beyond the genetic, behavioural and physiological risk factors to the underlying social, economic and cultural factors that can contribute to disease.

Although this report presents sections on individual risk factors, the reality is that many people have more than one risk factor. Risk for a cardiovascular disease rises progressively with the number of risk factors.

Burden of risk factors

Tobacco smoking is estimated to be the risk factor responsible for the greatest burden of disease in Australia (about 12% of the total burden of disease and injury in males and 7% in females). This is followed by physical inactivity, responsible for about 7% of the total burden (although it is responsible for the highest burden among women). High blood pressure accounts for over 5% of the total burden, and overweight and obesity around 4%.

How many Australians have a modifiable cardiovascular disease risk factor?

In 1995, over 10 million adult Australians (over 80% of the adult population) had at least one of the following risk factors: tobacco smoking, physical inactivity, high blood pressure, or overweight and obesity. This information is from the 1995 National Health and Nutrition surveys. These surveys did not measure blood cholesterol and hence this risk factor is not included here. Data from 1995 is used here to assess multiple risk factor levels as the 1999–00 AusDiab data were not available for this type of analysis at time of printing.

Trends

Between 1980 and 1989 there was a decrease in the proportion of men and women with two or more major risk factors.

Over the past decade it appears that there have been reductions in the number of Australians who smoke or have high blood pressure. The proportion of people undertaking physical activity remained relatively static during the 1980s but has declined during the latter part of the 1990s. The proportion of Australians who are overweight or obese has risen at an alarming rate over the past 20 years.

Sex and age

In 1995, 85% of men and 75% of women (18+ years) had at least one major modifiable risk factor (i.e. tobacco smoking, high blood pressure, overweight and obesity, physical inactivity). Around 15% of men and 10% of women had three or more of these risk factors.

Prevalence of risk factors was low among younger Australians and generally increased with age, peaking around 'middle age', after which it remained relatively stable. Over 90% of men aged 45–79 years and almost 89% of women aged 55–79 years had at least one major modifiable risk factor.

Socioeconomic groups

In 1995, 82% of women in the lowest socioeconomic group had a cardiovascular disease risk factor (i.e. tobacco smoking, high blood pressure, overweight and obesity, physical inactivity) compared with 69% in the highest group. Almost 13% of women in the lowest socioeconomic group had three or more risk factors, compared with 7% of women in the highest group.

Men in the lowest socioeconomic group were twice as likely to have three or more risk factors than were men in the highest group (18% and 9% respectively). However, for one or more risk factors, there was no significant difference between men in the lowest socioeconomic group (87%) and those in the highest group (82%).

Aboriginal and Torres Strait Islander peoples

There are no age-standardised national data to directly compare multiple risk factor prevalence rates in Aboriginal and Torres Strait Islander peoples and other Australians. For individual risk factors, however, Indigenous Australians are more likely than other Australians to smoke tobacco, not participate in leisure-time physical activity and be obese.

Urban, rural and remote areas

In 1995, there were no significant differences between prevalence of at least one risk factor (i.e. tobacco smoking, high blood pressure, overweight and obesity, physical inactivity) among people living in urban, rural or remote areas. Although there was no significant difference by area, almost 89% of men in remote areas of Australia had at least one risk factor, compared with 87% of men in rural areas and 84% of men in urban areas. Similarly, 78% of women in remote areas had at least one risk factor compared with 76% in rural areas and 74% in urban areas.

States and Territories

In 1995, there were no significant differences in the prevalence of at least one risk factor (tobacco smoking, high blood pressure, overweight and obesity, physical inactivity) between the States and Territories. The highest rate was in Tasmania (84%) and the lowest was in the Northern Territory (73%).

Further information

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (International Diabetes Institute & Commonwealth Department of Health and Aged Care).

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Physical inactivity

Physical activity reduces the risk of 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 participate. Insufficient physical activity is recognised as being almost as important as smoking and as important as high blood pressure and high blood cholesterol in contributing to Australia's level of cardiovascular disease.

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

Insufficient physical activity is likely to be associated with other risk factors for cardiovascular disease such as overweight and obesity, high blood pressure and high blood cholesterol. There is also evidence that people who increase their level of physical activity will reduce their levels of these risk factors.

The annual direct health care cost attributable to physical inactivity is around $377 million. Costs have been estimated to be $161 million for coronary heart disease, $101 million for stroke and $28 million for type 2 diabetes.

Burden of physical inactivity

Physical inactivity ranks second only to tobacco smoking in terms of the burden of disease in Australia. It accounts for 6% (second highest burden for men) of the total burden of disease and injury among males and 8% among females (highest burden for women).

What is physical activity?

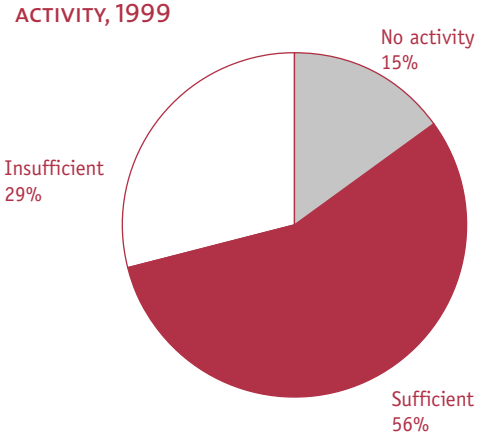
The National Physical Activity Guidelines for Australians released in 1999 recommend that at least 30 minutes of physical activity of at least a moderate intensity be accumulated on most, if not all, days of the week to obtain a health benefit. Moderate physical activities include, for example, brisk walking, swimming, doubles tennis and cycling.

Physical activity can be measured in different ways, so results from different surveys provide different estimates of the proportions of physically active or inactive Australians. Most of the information presented here is obtained from the 1999 National Physical Activity Survey and the 1997 Active Australia Baseline Survey. 'Sufficient' activity to obtain a health benefit is defined as the accrual of at least 150 minutes of at least moderate-intensity physical activity in the week before the interview. Other information presented here is from the 1995 National Health Survey. Information from the National Health Survey is not comparable with that of the National Physical Activity Survey as different collection methods were used.

How many Australians are sufficiently physically active?

In 1999, around 5.8 million Australians aged 18–75 years (44% of that population) did not undertake physical activity at the levels recommended to achieve health benefits (called 'sufficient' physical activity here). Almost 15% of people did no physical activity at all in their leisure time and around 29% did some activity, but not enough to achieve a sufficient level to obtain health benefits (called 'insufficient' physical activity here).

PROPORTION OF PEOPLE UNDERTAKING 'SUFFICIENT', 'INSUFFICIENT' AND NO PHYSICAL ACTIVITY, 1999



Source: Armstrong et al. 2000.

Trends

There was little change in physical activity patterns during the 1980s and much of the 1990s. However, between 1997 and 1999 there was a significant decline in the proportion of people doing recommended levels of physical activity (from 62% to 57%). The decline was seen for both men (from 63% to 60%) and women (from 61% to 54%). The fall was greatest for people aged 30–44 years (from 64% to 54%). There was no decrease in activity among people aged 60–75 years.

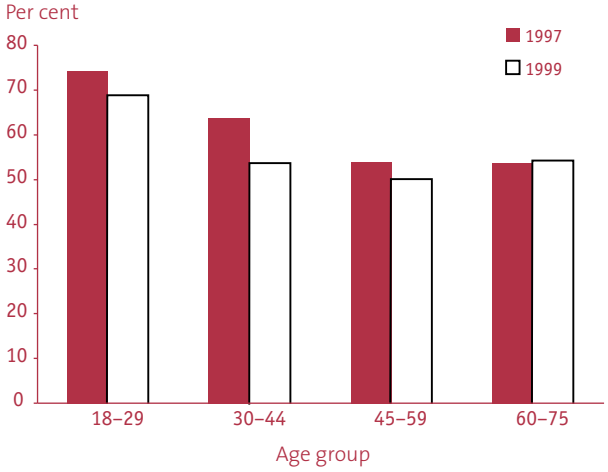
Sex and age

In 1999, men (60%) were more likely than women (54%) to participate at sufficient levels of activity for health benefits.

Rates of sufficient physical activity were highest among 18–29-year-olds (69%) and lowest among 45–59-year-olds (50%).

For men, participation at a sufficient level was greatest for those aged 18–29 years (74%) and lowest among those aged 45–59 years (50%). Among women, participation at a 'sufficient' level decreased with age from 64% in those aged 18–29 to 48% in those 60–75 years of age. Men and women were similarly inactive (15%).

People achieving a 'sufficient' level of physical activity, 1997 and 1999



Source: Armstrong et al. 2000.

Socioeconomic groups

Data collected in the 1995 National Health Survey showed men and women in the lowest socioeconomic group to be more likely to do no physical activity in their leisure time (37% and 40% respectively) than those in the highest group (27% and 29% respectively).

Data from 1999 showed that people with less than 12 years of education were almost twice as likely to be physically inactive as people with a Higher School Certificate or equivalent, or with tertiary qualifications.

Aboriginal and Torres Strait Islander peoples[26]

Indigenous Australian adults are more likely than are other Australian adults to report no physical activity in their leisure time. In 1995, 40% of Indigenous Australians reported no leisure-time physical activity, compared with 34% of other Australians. Indigenous Australian women of all ages were more likely than their other Australian counterparts to be inactive in their leisure time. For men, however, this was true only for 18–44-year-olds.

Urban, rural and remote areas

From data collected in 1995, rates of physical inactivity during leisure time were higher among people living in remote areas of Australia (37%) than for people living in urban (34%) or rural (32%) areas.

States and Territories

In 1995, rates of physical inactivity were highest in the Northern Territory (40%), and lowest in the Australian Capital Territory (25%) and Western Australia (29%).

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Australian Facts

Detailed data

Refer to the **Statistical tables** section.

Main data sources

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Did you know?

- Physical inactivity is also a risk factor for some cancers, type 2 diabetes, injury, osteoporosis, and mental health problems.
- At least 30 minutes of at least moderate-intensity physical activity on most days of the week will benefit health.
- Moderate-intensity physical activities are activities that use the large muscle groups (examples include brisk walking, swimming, cycling, doubles tennis, and dancing).
- It has been estimated that 30–50% of new cases of type 2 diabetes could be prevented by participation in physical activity.

Tobacco smoking

Tobacco smoking increases the risk of coronary heart disease, stroke and peripheral vascular disease, as well as a range of cancers (including lung, mouth, oesophagus, kidney, pancreas and cervix) and other diseases and conditions.

Tobacco use during pregnancy can lead to spontaneous abortion, low birth weight and sudden infant death syndrome. Passive exposure to smoke also has serious health consequences, including increased risk of heart disease among adults.

In 1998, an estimated 19,019 people died in Australia as a result of tobacco smoking. Around 13% of deaths from cardiovascular disease are due to smoking tobacco. In 1997–98, 142,525 hospital separations were attributable to tobacco smoking.

What is tobacco smoking?

Smoking here refers to the smoking of tobacco products, including packet cigarettes, roll-your-own cigarettes, pipes and cigars. 'Current smokers' refers to those who smoke on either a regular (daily/most days) or occasional (less often than daily/most days) basis.

Burden of tobacco smoking

Tobacco smoking is the risk factor responsible for the greatest burden of disease in Australia, accounting for 12% of the total burden of disease and injury in males and 7% in females.

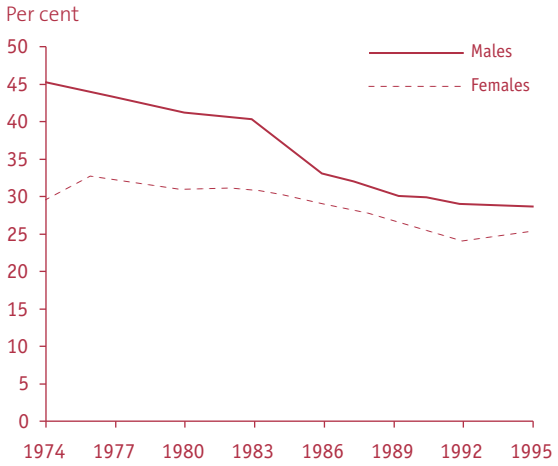
How many Australians smoke?

In 1998, approximately 3.5 million (23%) Australians aged 18 years and over smoked on a regular basis. A further 3.6% (almost 550,000 persons) reported occasional smoking and were thus also at risk of developing 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 has continued into the 1990s. However, research from the Anti-Cancer Council of Victoria has shown that this decline has slowed in more recent years.

PEOPLE SMOKING, 1974–95



Note: Age-standardised to the 1986 Australian population.

Sources: Hill 1988, Hill et al. 1991, Hill et al. 1995, Hill et al. 1998.

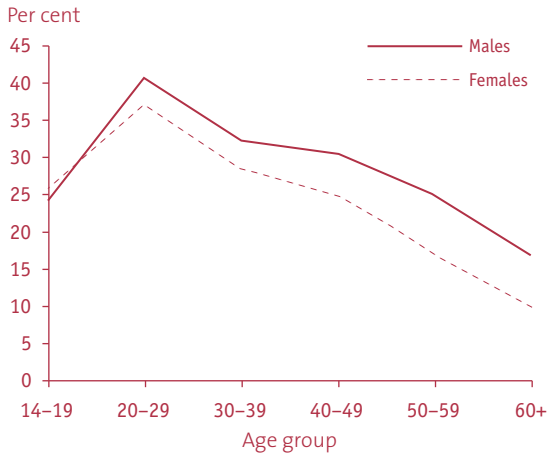
Sex and age

Approximately one in four males (26%) and around one in five females (21%) aged 18 years and over reported that they smoked on a regular basis in 1998. The highest rates of regular smoking occurred among males and females aged 18–34 years (32% and 29% respectively). From this age group, regular smoking declines with age, with those aged 75 years and over recording the lowest rates at 5% for males and 6% for females.

In 1998, around 44% of males and 37% of females aged 18 years and over reported that they were ex-smokers, while a further 26% and 39%, respectively, stated that they had never smoked.

Approximately 16% of males and females aged between 14 and 19 years smoked daily.

PEOPLE WHO ARE CURRENT SMOKERS, 1998



Source: 1998 National Drug Strategy Household Survey.

Socioeconomic groups

Smoking is more common among individuals from lower socioeconomic backgrounds, with around 27% of those from the lowest socioeconomic group reporting that they smoked daily. By comparison, approximately 18% of those from the highest socioeconomic group were daily smokers. Of those with tertiary qualifications, around 12% were daily smokers compared to 26% of those with no qualifications.

Unemployment was also associated with smoking status, with around 28% of unemployed persons indicating daily smoking status. By comparison, only 25% of employed persons smoked daily.

Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islander peoples aged 18 years and over are almost twice as likely to smoke when compared with their non-Indigenous counterparts. Around 56% of Indigenous Australian men and 46% of Indigenous Australian women were defined as current smokers. This compares to 29% of non-Indigenous Australian males and 24% of non-Indigenous Australian females over 14 years of age being defined as current smokers.

Urban, rural and remote areas

A slightly higher percentage of individuals living in rural and remote areas reported that they were daily smokers, compared to those living in urban communities. Of those living in urban areas, around one in five (21%) reported that they were daily smokers. This compared to 26% of those residing in rural and remote communities. Further, 35% of urban Australians aged over 14 years reported that they had never smoked, compared to 31% of Australians in rural and remote areas.

States and Territories

In 1998, the Northern Territory recorded the highest smoking prevalence, with around 31% of those aged 14 years and over indicating that they smoked daily. In comparison, South Australia recorded the lowest rate at around 19%.

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Note: This section was written with the assistance of Mark Cooper-Stanbury of the Australian Institute of Health and Welfare.

Main data sources

1998 National Drug Strategy Household Survey (AIHW).

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Further reading

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Did you know?

- Around 29% of men and 25% of women are at a greater risk of heart attack, stroke and peripheral vascular disease due to tobacco smoking.
- The rate of decline in current smoking status has slowed in recent years.
- One in four teenagers were current smokers in 1998, compared to one in five in 1995.

Poor nutrition

The effect of nutrition on the risk of coronary heart disease, stroke and peripheral vascular disease results from the combined effects of individual dietary factors. Cardiovascular disease cannot be attributed to any one dietary component alone. Nutrition affects several physiological conditions and other risk factors (e.g. blood pressure, blood cholesterol levels, antioxidant levels, overweight and obesity, diabetes).

Dietary guidelines for Australians recommend consumption of a wide variety of nutritious food. 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 14 years ago.

Dietary risk factors for cardiovascular disease

Total intake of fat

High intakes of fat, especially saturated fats, are associated with elevated blood cholesterol levels, overweight and obesity, and increased death from cardiovascular disease in populations in which levels of physical activity are low. Total fat (e.g. saturated, monounsaturated, polyunsaturated) accounts for about 33% of the total energy intake of Australian adults. Although total dietary fat intake has reduced from around 37% in the 1980s, the current level is still above the National Health and Medical Research Council's recommended level of 30%.

Intake of saturated fatty acids

There is good evidence to support an association between the consumption of saturated fat and an increased risk for coronary heart disease. 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 recommended maximum level of 10%. Consumption of saturated fat is slightly higher among younger Australians than among older Australians. The major sources of saturated fatty acids in the adult diet are cheese, butter and margarine, pastries, milk and meat.

Contribution of saturated fat as a proportion of total energy intake, 1983 and 1995

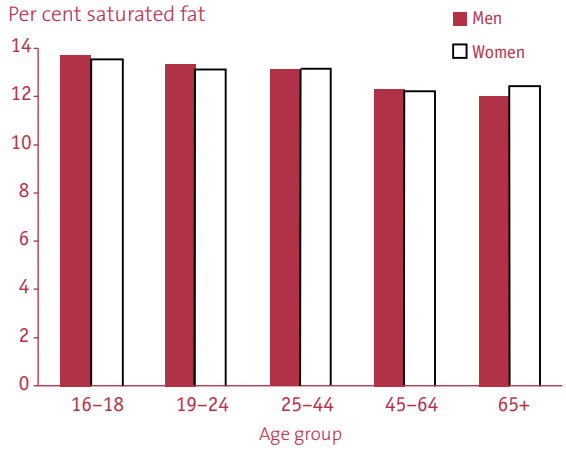
Sex	1983	1995
	Per cent	
Men	15.9	12.7
Women	16.3	12.8

Notes:

1. Age-standardised to the 1991 Australian population.
2. 1983 estimates are for State capital cities only.
3. Includes persons aged 25–64.

Sources: AIHW analysis of data from the 1995 National Nutrition Survey; 1983 National Dietary Survey of Adults.

Saturated fat as a proportion of total energy intake, 1995



Source: ABS & DHFS 1997.

Intake of trans fatty acids

High intake of trans fatty acids increases blood cholesterol levels and risk of coronary heart disease. The major sources of trans fatty acids are fat spreads (e.g. some but not all margarines), meat and meat products. Currently there are no national data to assess trans fatty acid intake among Australians.

Intake of dietary cholesterol

There is some evidence that dietary cholesterol contributes to an increased risk of coronary heart disease. The major sources of dietary cholesterol are eggs, meat, poultry and milk. In 1995, the average daily intake of dietary cholesterol among Australian men was 358 mg, and among women, 240 mg. The National Heart Foundation of Australia recommends that people at low risk of coronary heart disease can consume moderate quantities of cholesterol-rich foods. People with blood cholesterol levels >5.0 mmol/L or with other cardiovascular risk factors should restrict their intake of cholesterol-rich foods.

High consumption of alcohol

High intake of alcohol (and particularly binge drinking) is associated with higher blood pressure and death from stroke. Evidence shows that each increment of 10 g of alcohol consumed per day increases systolic blood pressure by an average of 1–2 mmHg and diastolic blood pressure by 1 mmHg. It has been estimated that the harm associated with alcohol consumption in 1996 was around 4.9% of the total burden of disease. However, low to moderate levels of alcohol consumption can provide some protection against high blood pressure, coronary heart disease and stroke. The net harm associated with alcohol consumption after taking these benefits into account is around 2.2% of the total disease burden. It is difficult to make recommendations about safe levels of alcohol consumption for cardiovascular disease because there is a curvilinear relationship between the levels of alcohol consumption and death rates due to cardiovascular disease.

In 1998, around 8% of adult male drinkers and about 4% of female drinkers usually drank at levels considered to be hazardous or harmful to their overall health.

Abstinence from alcohol

Many studies indicate that non-drinkers have a greater risk of heart attack and death from coronary heart disease than do those with 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 cardiovascular health benefit of low to moderate alcohol consumption (1–2 drinks per day) relates mainly to men over 40 years of age and post-menopausal women.

In 1995, 45% of Australian adults reported that they do not drink alcohol.

Consumption of vegetables and fruit

There is increasing evidence that fresh vegetable and fruit consumption offers some protection against coronary heart disease and stroke. In 1995, the proportion of people aged over 25 years who consumed less than five serves of vegetables or fruit per day ranged from a low of 46% for women aged 55–64 years to a high of 70% for men aged 35–44. It has been estimated that inadequate vegetable and fruit consumption was responsible for 3% of the total burden of disease among Australians in 1996.

High consumption of salt

For some people, high salt consumption is associated with an increase in blood pressure and possible risk of cardiovascular illness and death. No national data exist to assess levels of salt consumption among Australians. However, in one study conducted in Hobart, only 6% of men and 36% of women were below the recommended maximum intake of 100 mmol/day.

Further information

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Note: This section was written with the assistance of Professor Geoff Marks of the Australian Food and Nutrition Monitoring Unit.

Australian Facts

Detailed data

Refer to the **Statistical tables** section.

Main data sources

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Did you know?

- In 1995, only 37% of 19–24-year-old Australians reported eating fruit.
- Adults in rural and remote areas of Australia are more likely to consume fats and oils than those in urban areas.
- Heavy alcohol consumption increases risk of heart attack and stroke.

High blood pressure

High blood pressure (often referred to as hypertension) is a major risk factor for coronary heart disease, stroke, heart failure and peripheral vascular disease. It increases overall cardiovascular risk by two to three times. The risk of disease increases as the level of blood pressure increases. When high blood pressure is controlled by medication, the risk of cardiovascular disease is reduced, but not to the levels of unaffected people.

Research has shown that people who are overweight or physically inactive, have high dietary salt intakes, or are under mental stress are more likely to develop high blood pressure.

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').

Although high blood pressure can be defined as above a particular level, there is in fact no threshold level of risk. Starting from quite low levels, as the pressure increases so does the risk of stroke, heart attack and heart failure.

The continuous relationship between blood pressure levels and cardiovascular disease risk, and the 'arbitrary' nature of the definition of high blood pressure, have contributed to the variation in the definitions issued by various national and international authorities for population surveys and clinical guidelines.

For the purposes of this report, high blood pressure is defined as:

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

This classification for the clinical management of high blood pressure has recently been released by the World Health Organization. Previously, in Australia, high blood pressure was defined as an SBP of 160 mmHg or greater and/or a DBP of 95 mmHg or greater and/or receiving medication for high blood pressure.

A review of the classification of high blood pressure used in Australia will be undertaken to establish national standards for population surveys.

Burden of high blood pressure

High blood pressure is estimated to account for over 5% of the total burden of disease and injury among men and almost 6% for women (note: this is for a high blood pressure classification of 160/95 mmHg).

General practice consultations

Data from the 1999–00 study of general practice activity in Australia show that hypertension accounted for 8,821 of a total 153,857 problems. This equated to 6% of all problems managed.

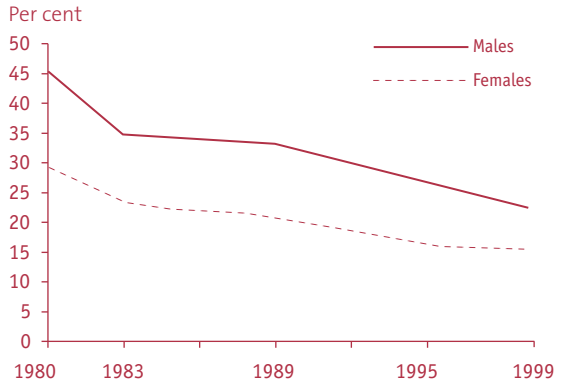
How many Australians have high blood pressure?

In 1999–00, almost three million Australians over the age of 25 had high blood pressure or were on medication for that condition.

Trends

There have been significant declines in the proportion of people with high blood pressure and/or receiving treatment since the 1980s. The proportion of men (aged 25–64 years) with high blood pressure has fallen steadily from 45% in 1980 to 22% in 1999–00. The rate for women (aged 25–64 years) has fallen steadily from 29% in 1980 to 16% in 1995, and has not changed since.

People with high blood pressure, 1980–99



Notes

1. Age-standardised to the 1991 Australian population.
2. Includes only persons living in capital cities or urban areas, aged 25–64.

Sources: AIHW analysis of 1980, 1983, 1989 Risk Factor Prevalence Study, 1995 National Nutrition Survey, 1999 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

There has also been a significant decline in average blood pressure levels during the same period. This decline occurred equally among those not on medication for high blood pressure as among those on treatment.

Sex and age

In 1999–00, 31% of men and 26% 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 men aged 65–74 years, 70% had high blood pressure or were on medication for treatment for high blood pressure. Almost 67% of women in that age group had high blood pressure.

Socioeconomic groups

In 1995, the prevalence of high blood pressure among women increased with increasing socioeconomic disadvantage. Although not significantly different, 25% of women in the lowest socioeconomic group had high blood pressure compared with 17% of those in the highest group. There was no significant difference in the prevalence of high blood pressure among men in the lowest socioeconomic group (31%) and those in the highest group (29%).

People with high blood pressure, 1999

Source: AIHW analyses of the 1999 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Data from 1989 showed that high blood pressure was more common among people with low levels of education, and among single men living alone than among men with partners and/or dependent children.

Aboriginal and Torres Strait Islander peoples

There are no measured national data to assess the rates of high blood pressure among Aboriginal and Torres Strait Islander peoples. Data from the Kimberley region suggest that high blood pressure is two to three times more common among Indigenous people than among other Australians.

Urban, rural and remote areas

In 1995, there were no significant differences in the prevalence of high blood pressure between urban, rural and remote areas. Around 22% of urban, rural and remote women had high blood pressure. For men, estimated rates were 29–30% in urban, rural and remote regions.

States and Territories

In 1995, there were no significant differences in the prevalence of high blood pressure between the States and Territories. The highest rates were in Tasmania and South Australia (around 30%), and the lowest were in the Northern Territory (22%).

Further information

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (International Diabetes Institute & Commonwealth Department of Health and Aged Care).

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Did you know?

- High blood pressure can increase the risk of cardiovascular disease by two to four times.
- Older people with high blood pressure have a greater absolute risk of cardiovascular disease than do younger people with the same blood pressure levels.
- Lifestyle interventions to reduce blood pressure may reduce or remove the need for drug treatment.
- Reducing excess weight, participating in 30 minutes of moderate-intensity physical activity each day, limiting alcohol intake to two standard drinks per day and reducing salt in the diet are lifestyle modifications that will reduce blood pressure.

High blood cholesterol

High blood cholesterol is a major risk factor for coronary heart disease and probably for ischaemic stroke. 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. Risk of heart disease increases steadily in a curvilinear manner from a low base with increasing blood cholesterol levels.

For most people, 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 than saturated fat does. Heredity affects blood cholesterol and a few people have high cholesterol levels regardless of their dietary intake of saturated fat and cholesterol.

Clinical trials have shown that lowering cholesterol in people with and without existing cardiovascular disease reduces rates of death and illness from coronary heart disease and even reduces rates of death from all causes. A large Australian and New Zealand study (LiPiD, conducted under the auspices of the National Heart Foundation) has shown that the cholesterol-lowering drug treatment pravastatin reduces death and illness from cardiovascular disease and the need for bypass surgery and angioplasty compared to coronary heart disease patients on a placebo treatment.

What is high blood cholesterol?

Total blood cholesterol levels above 5.5 mmol/L are an indication of an increased risk of developing coronary heart disease. Levels above 6.5 mmol/L are considered to indicate high risk. However, these values are arbitrary and coronary heart disease risk increases continuously from very low cholesterol levels.

Burden of high cholesterol

High blood cholesterol accounts for 3.2% of the total burden of disease and injury for males and 1.9% for females. However, it is likely that the total burden attributable to blood cholesterol is actually higher than this, because of the continuous gradient of risk associated with increasing blood cholesterol levels, not just for 'high' blood cholesterol.

How many Australians have high blood cholesterol?

The 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) assessed blood cholesterol levels in Australia. Preliminary findings show that over six million Australian adults (aged 25 years and over) had cholesterol levels higher than 5.5 mmol/L.

Trends

Average blood cholesterol levels have declined only slightly for men and women during the period 1980 to 1999–00.

Although there was no clear change in the proportion of men (aged 25–64 years) with high blood cholesterol during the 1980s, there appears to have been a decline from 1989 (51%) to 1999–00 (47%). There has been no change for women (aged 25–64 years) over the same period.

AVERAGE BLOOD CHOLESTEROL LEVELS, 1980 TO 1999–00

Sex	1980	1983	1989	1999–00
		mmol/L		
Men	5.55	5.61	5.66	5.50
Women	5.42	5.57	5.55	5.41

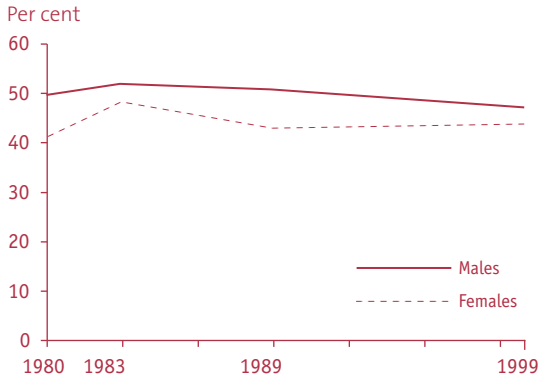
Notes

1. Estimates adjusted for age.

2. Includes persons aged 25–64.

Sources: AIHW analysis of the 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab), Bennett & Magnus 1994.

People with high blood cholesterol, 1980–99



Notes

1. Age-standardised to the 1991 Australian population.

2. Includes only persons living in capital cities, aged 25–64.

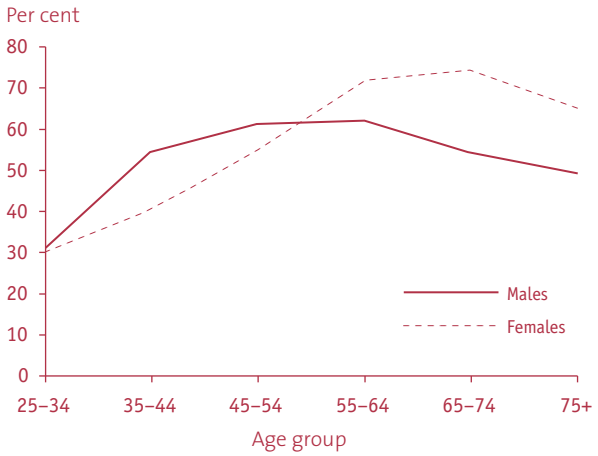
Sources: AIHW analysis of the 1980, 1983, 1989 Risk Factor Prevalence Surveys; 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Sex and age

In 1999–00, around 50% of both men and women, aged 25 years and over, had blood cholesterol levels above 5.5 mmol/L.

In 1999–00, the prevalence of high blood cholesterol increased overall with age. In women there was a steady increase to age 75. For men, prevalence increased steadily with age until age 64, after which it declined.

People with high blood cholesterol, 1999



Source: AIHW analyses of the 1999 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Socioeconomic groups

In 1989, there were no strong associations between cholesterol levels and socioeconomic status. However, high blood cholesterol (≥ 6.5 mmol/L) was more common among unemployed women (25–64 years) than among women in full-time employment. Among men aged 25–64 years, those living alone or previously married had around one and a half times higher rate of high blood cholesterol (≥ 6.5 mmol/L) than those with partners or dependents.

Aboriginal and Torres Strait Islander peoples

There are no national data on blood cholesterol levels among Aboriginal and Torres Strait Islander peoples. A New South Wales survey in 1987–88 on cardiovascular risk factors showed that a greater proportion of Indigenous women in Wilcannia had cholesterol levels above 6.5 mmol/L compared with other Australian women. However, other studies have shown no difference in cholesterol levels between Indigenous Australians and other Australians.

Urban, rural and remote areas

There are no national data on blood cholesterol levels across urban, rural and remote areas of Australia.

States and Territories

AusDiab collected data for each State and Territory. The results were not available in time for this publication.

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (International Diabetes Institute & Commonwealth Department of Health and Aged Care).

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Did you know?

- For children, high blood cholesterol is defined as a level of 4.5 mmol/L or greater.
- People with high blood cholesterol feel perfectly well and will usually have no warning signs that they are at risk of heart disease.
- Highly effective drugs to lower high blood cholesterol are now available.
- Prescriptions of pharmacy drugs dispensed to lower blood cholesterol increased over the period 1990–98 from 1.2 million to 7.6 million.
- Lifestyle changes that prevent or lower high blood cholesterol include eating a diet low in saturated fat and cholesterol, increasing physical activity, and reducing excess body weight.

Overweight and obesity

There is a well-documented association between being overweight or obese and suffering from ill health. Diseases and conditions such as coronary heart disease, heart failure, stroke, type 2 diabetes, osteoarthritis, sleep apnoea, gallstones and reproductive problems are all more likely in overweight or obese individuals. Overweight and obesity are also associated with high blood pressure and high blood cholesterol. Life expectancy is reduced by obesity.

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

What is overweight and obesity?

Health risks associated with overweight and obesity are part of a continuum and cut-offs provide a guide for assessment and comparison.

The body mass index (BMI) is the main classification used to estimate the prevalence of overweight and obesity in a population. BMI is calculated by weight (kg) divided by height squared (m^2). A BMI of 25 or greater indicates overweight, and 30 or greater indicates obesity. Waist circumference is also a useful measure of increased disease risk due to overweight and obesity. The World Health Organization reports that waist circumferences greater than 94 cm in men and 80 cm in women indicate increased risk. Waist circumferences greater than 102 cm and 88 cm for men and women respectively indicate substantially increased risk. There are currently no national standard cut-offs for waist circumference.

Burden of overweight and obesity

Overweight and obesity are responsible for about the same proportion of the total disease burden (4.3%) in both males and females.

How many Australians are overweight?

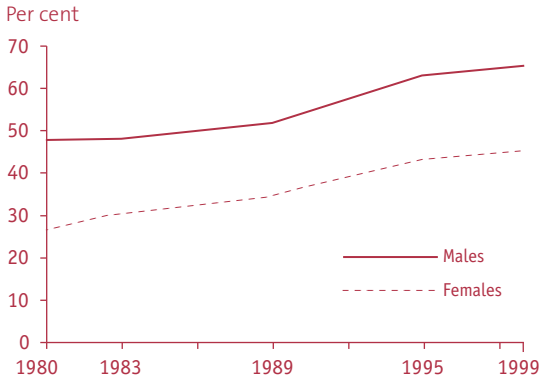
In 1999–00, over seven million adult Australians (aged 25 and over) (60%) were overweight (BMI ≥ 25). Of these, over two million (20% of the population aged 25 and over) were obese (BMI ≥ 30).

Trends

There have been significant increases in the proportions of overweight and obese Australians over the last 20 years. These data indicate that the proportion of overweight women aged between 25 and 64 years has increased from 27% in 1980 to 45% in 1999–00.

The proportion of overweight men in that age group increased from 48% to 65% over the same period. The proportion of obese men in that age group has increased dramatically from 8% in 1980 to 17% in 1999–00 and the proportion of obese women has increased from 7% to 19%.

RATE OF OVERWEIGHT PEOPLE, 1980–99



Notes

1. Age-standardised to the 1991 Australian population.
2. Includes only persons living in capital cities or urban areas, aged 25–64.

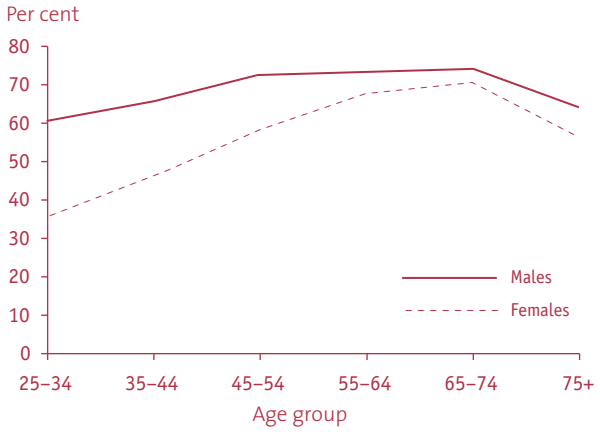
Sources: AIHW analysis of the 1980, 1983, 1989 Risk Factor Prevalence Surveys; 1995 National Nutrition Survey; 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Sex and age

Using BMI as a classification for overweight, in 1999–00, men were more likely to be overweight than were women. Around 67% of men and 52% of women aged 25 years and over were overweight. The proportion of overweight people increased with age and peaked at 55–74 years for men (74%) and 65–74 years for women (71%). Around 20% of adult Australians aged 25 and over were obese.

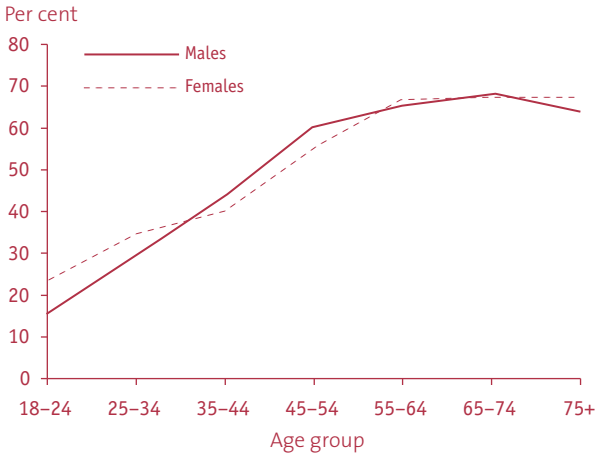
In 1995, 35% of men had a waist circumference greater than 94 cm and 37% of women had a waist circumference greater than 80 cm. Almost 19% of men had a waist circumference greater than 102 cm and 23% of women had a waist circumference greater than 88 cm. For both men and women, waist circumferences generally increased with age.

Overweight people, 1999



Source: AIHW analyses of the 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Proportion of adults with waist circumference greater than 94 cm for men and greater than 80 cm for women, 1995



Source: AIHW analyses of the 1995 National Nutrition Survey.

Socioeconomic groups

Being overweight and/or obese is more common among women in lower socioeconomic groups. In 1995, around 53% of women in the lowest socioeconomic group were overweight, compared with 44% of women in the highest socioeconomic group. Twenty-four per cent of women in the lowest socioeconomic group were obese compared with 14% of those in the highest group.

In 1995, there was no significant difference among the rate of overweight (around 61%) or obese men (around 18%) in the highest and lowest socioeconomic groups.

Aboriginal and Torres Strait Islander peoples

From data collected in 1994 (Aboriginal and Torres Strait Islander peoples) and 1995 (all Australians), there was little difference between the age-adjusted proportion of overweight Indigenous Australian men (62%) and all Australian men (63%). However, almost 25% of those Indigenous Australian men were obese, a rate somewhat higher than that for all Australian men (18%).

Almost 60% of Indigenous Australian women were overweight, a rate much higher than that seen among all Australian women (49%). Rates of obesity among Indigenous Australian women were also much higher than among all Australian women (28% compared with 18%).

Urban, rural and remote areas

In 1995, more than half (53%) of women living in remote areas were overweight. In comparison, around 47% of women living in urban and rural areas were overweight. Twenty-two per cent of women living in remote areas were obese, compared with around 18% living in urban or rural regions.

For men, there was no significant difference, with 65% of men in remote and rural areas being overweight, compared with 62% in urban areas. Twenty per cent of men living in rural and remote regions were obese compared with 18% living in urban areas.

States and Territories

In 1995, there were no significant differences between the proportions of overweight and obese people in the States and Territories. The rate of overweight ranged from 61% in Tasmania to 49% in the Northern Territory.

Children and adolescents

Although most of the cardiovascular effects of unhealthy weight do not manifest in childhood, a link has been demonstrated between childhood obesity and adult obesity. Type 2 diabetes is for the first time now being seen among overweight children. Furthermore, children with obese parents have more than double the risk of obesity in adulthood.

In 1995, the proportion of overweight and/or obese children and adolescents aged 2–17 years was 21% for boys and 23% for girls.

Further information

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (International Diabetes Institute & Commonwealth Department of Health and Aged Care).

1995 National Nutrition Survey (Australian Bureau of Statistics & Commonwealth Department Health and Aged Care).

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Did you know?

- Unhealthy body weight is due mainly to an imbalance between energy intake (diet) and energy expenditure (physical activity).
- Being significantly underweight is also associated with poor health, including conditions such as osteoporosis, ulcers, mental conditions such as depression and eating disorders.
- On average, women in 1995 weighed 4.8 kg more than their counterparts in 1980, and men 3.6 kg more.
- Overweight and obesity accounted for over 4% of the total burden of disease in Australia in 1996.
- A BMI of between 20 and 24.9 indicates a healthy weight range.

Diabetes

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 cardiovascular disease. People with diabetes are at an increased risk of developing coronary heart disease, stroke and peripheral vascular disease. Diabetes is the seventh 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 cardiovascular disease and also as a condition in its own right. This reflects the importance of diabetes in the development of cardiovascular disease and the emerging public health issue that diabetes itself presents.

Determining the prevalence of diabetes in the population is very difficult. Until this year it has been necessary to rely on self-reports of diabetes having been diagnosed by a health professional. This method is limited, as people may not know that they have diabetes and the criteria used by health professionals in making diagnoses vary. However, a recent survey carried out in 1999–00, the Australian Diabetes, Obesity and Lifestyle Study (AusDiab), collected objectively measured information on the prevalence of diabetes in Australia.

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, insulin action, or both. The chronic high blood sugar levels (hyperglycaemia) of 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 take 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 4–6% of females not previously diagnosed with diabetes and is a marker of greater risk of developing type 2 diabetes later in life.

For the purposes of this report, 'diabetes' refers to all types of diabetes (ICD-9 code 250 and ICD-10 codes E10–E14) unless otherwise stated.

Risk factors for diabetes

Both genetic and environmental factors contribute to the onset of diabetes. Diabetes shares several of the risk factors with, and is itself a risk factor for, cardiovascular disease. 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 risk factors including 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 cardiovascular disease such as abnormal cholesterol levels, central obesity, hypertension and smoking. Further, people with diabetes are more likely to have a clustering of risk factors, a condition called the metabolic syndrome. That is, an individual with a high level of one risk factor is likely to have high levels of other risk factors if they suffer from diabetes.

Australian Facts

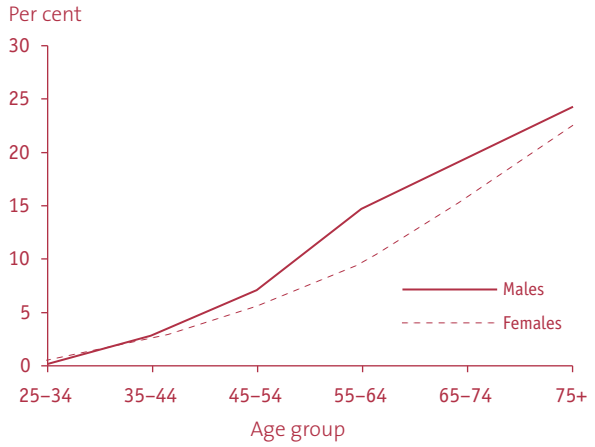
How many Australians have diabetes?

In 1999–00, approximately 910,000 people aged 25 years and over (around 7% of that population) were affected by diabetes.

Sex and age

For both men and women, the proportion of Australians with diabetes increases with age. Less than 1% of men aged 25–34 years had diabetes compared with around 20% of those aged 65 and over. This pattern was similar in women, although rates were slightly lower at each age than for men.

PEOPLE WITH DIABETES, 1999



Source: AIHW analyses of the 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Trends

Although there are no national data to compare national trends of diabetes in Australia, a comparison of the 1981 Busselton study in Western Australia and the 1999–00 AusDiab results indicates that there has been a significant increase (nearly 300%) in prevalence of diabetes in Australia over that 20-year period.

Socioeconomic groups

In 1995, the prevalence of self-reported type 2 diabetes was almost two and a half times as high among the lowest socioeconomic group of the Australian population as among the highest socioeconomic group.

Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islander peoples have one of the highest rates of type 2 diabetes in the world. In 1995, the prevalence of self-reported diabetes among 25–55-year-olds was seven to eight times higher among Indigenous Australians than their non-Indigenous counterparts. For those aged 55 years or more, the proportion of Indigenous Australians with type 2 diabetes was more than twice as high as that of non-Indigenous Australians[27]. Other evidence suggests that the overall prevalence of diabetes among Indigenous Australian adults could be as high as two to four times greater than among non-Indigenous Australian adults.

Urban, rural and remote areas

In 1995, there was no significant difference in reported rates of type 2 diabetes across urban, rural and remote areas of Australia.

States and Territories

AusDiab collected data for each State and Territory. The results were not available in time for this publication.

Non-English-speaking backgrounds

Certain migrant groups residing in Australia have a higher prevalence of diabetes than their Australian-born counterparts. In particular, diabetes is very common among Micronesians, Polynesians and Melanesian Islanders; migrant Asian Indians, Chinese and other Asian groups, and people from Southern Europe.

Burden of disease

Diabetes accounted for 5% of the disease burden in Australia in 1996. This equated to 5.2% in terms of premature mortality and 4.6% in terms of equivalent 'healthy' life lost through disease, impairment and disability. These estimates are based on self-reported information and therefore underestimate the total burden. Overall, diabetes causes almost as much disability burden as mortality burden.

General practice consultations

A survey of general practice activity during 1999–00 found that diabetes was managed at nearly 2% of all general practice encounters. Among people with diabetes, hypertension and lipid disorders were the most frequent conditions managed.

Hospitalisation[28]

During 1998–99, there were 23,761 hospitalisations where diabetes was the principal diagnosis (nearly 0.5% of all hospitalisations). When hospitalisations for diabetes as the principal diagnosis and as an additional diagnosis are combined, the total number of such hospitalisations rises to 324,787 (almost 6% of all hospitalisations).

When diabetes is an additional diagnosis, cardiovascular disease is most likely to be listed as the principal diagnosis (22% of such cases). Diseases of the digestive and genito-urinary systems are also prominent principal diagnoses when diabetes is an additional diagnosis (10% and 6% respectively). This is not surprising, given that diabetes can lead to a range of complications such as coronary heart disease, stroke, peripheral vascular disease and kidney disease.

Sex and age

Australian males are more likely to be hospitalised for diabetes (as the principal diagnosis) than Australian females. This holds true for almost all age groups.

Hospital use for diabetes increases steadily with age, with a seven-fold increase in hospitalisation rates between those aged less than 40 and those aged 70 years and over. Diabetes is more common among older Australians. During 1998–99 almost 50% of hospitalisations for diabetes occurred among those aged 60 and over.

Length of stay in hospital

The average length of stay in hospital for diabetes (as the principal diagnosis) was seven days in 1998–99, a decline from 1993–94 when the average length of stay was nine days. The length of stay in hospital for diabetes was almost twice as long as for non-diabetic conditions in 1998–99. The average length of stay in hospital for diabetes was similar for males and females.

The average number of beds occupied on any day for diabetes (as the principal diagnosis) was 458 in 1998–99 (almost 1% of all beds occupied).

Deaths in hospital

In 1998–99, there were 332 hospitalisations for diabetes (as the principal diagnosis) where the patient died in hospital (almost 1.5% of all hospitalisations for diabetes). The proportion of males and females dying in hospital where diabetes was the principal diagnosis was similar (about 1.5%).

Deaths[29]

Diabetes was the seventh leading underlying cause of death among Australians in 1998, accounting for 2,751 deaths (over 2% of all deaths). However, when the number of deaths from diabetes as an associated cause as well as the underlying cause of death are combined, the number of deaths increases to 9,454 deaths (7.5% of all deaths). In other words, diabetes is twice as likely to be listed as an associated cause of death rather than the underlying cause (5% compared with 2% of all deaths).

Causes of death commonly listed with diabetes

In the past, deaths from diabetes have been underestimated in Australian mortality reports. Diabetes is rarely listed alone as the underlying cause of death with no associated causes. It predominantly occurs with diseases of the circulatory system and, to a lesser extent, diseases of the genito-urinary system. Of the deaths where diabetes was recorded as the underlying cause, cardiovascular disease was listed as an associated cause in 83% of deaths in 1997 and 1998 combined. When diabetes was listed as an associated cause of death, cardiovascular disease was the underlying cause of death in 59% of these deaths.

Trends

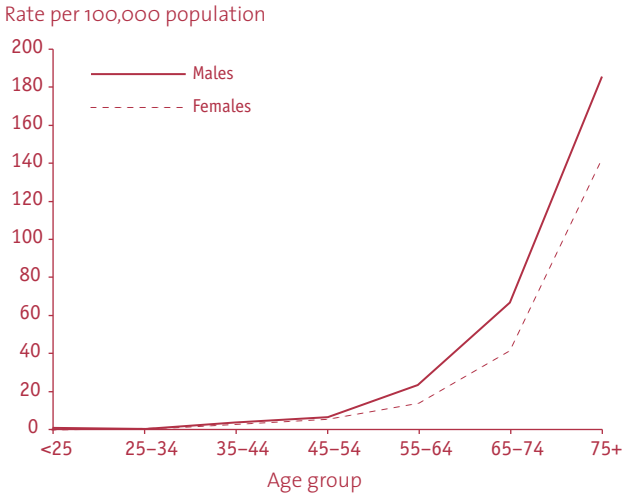
Death rates from diabetes fell substantially over the second half of last century, particularly among females where there has been a 69% decline since the early 1940s. The peak in death rates for Australian females occurred around this time. For Australian males, diabetes death rates peaked in the late 1960s and have since declined by around 26%. Between 1987 and 1998, death rates from diabetes (as the underlying cause of death) increased at a rate of more than 1% among males, while among females death rates have declined by almost 9%.

Sex and age

Overall, during 1998, Australian males were 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. In 1998, 82% of all deaths from diabetes occurred among those aged 65 and over.

Death rates for diabetes, 1998



Source: AIHW National Mortality Database.

Socioeconomic groups

During 1997 and 1998, deaths from diabetes as the underlying cause of death were 44% higher among the lowest socioeconomic group of the Australian population than among the highest socioeconomic group.

Aboriginal and Torres Strait Islander peoples[30]

Aboriginal and Torres Strait Islander peoples died from diabetes (as the underlying cause of death) at almost three times the rate of their non-Indigenous counterparts during 1997 and 1998. Indigenous Australian females were almost twice as likely as Indigenous Australian males to die from diabetes. Among non-Indigenous Australians, males and females were similar in their death rates from diabetes (as the underlying cause of death).

Urban, rural and remote areas

Diabetes death rates (as the underlying cause of death) were higher in remote and rural areas than in urban areas of Australia (3.7%, 2.3% and 2.1% respectively) during 1997 and 1998. The magnitude of this regional difference was higher among females than males, with the proportion of diabetes deaths among females in remote areas twice that of those in urban and rural areas. This regional difference is predominantly influenced by the high concentration of Indigenous Australians in remote areas, with Indigenous Australians accounting for around 70% of diabetes deaths in remote areas.

States and Territories

In 1998, death rates from diabetes (as the underlying cause of death) were highest in the Northern Territory and Victoria, and lowest in Tasmania and the Australian Capital Territory.

Further information

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Note: This section was written with the assistance of Paul Zimmett, Jonathan Shaw and David Dunstan of the International Diabetes Institute.

Detailed data

Refer to the **Statistical tables** section.

Main data sources

1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (International Diabetes Institute & Commonwealth Department of Health and Aged Care).

1995 National Health Survey (Australian Bureau of Statistics).

National Hospital Morbidity Database (Australian Institute of Health and Welfare).

National Mortality Database (Australian Institute of Health and Welfare).

Further reading

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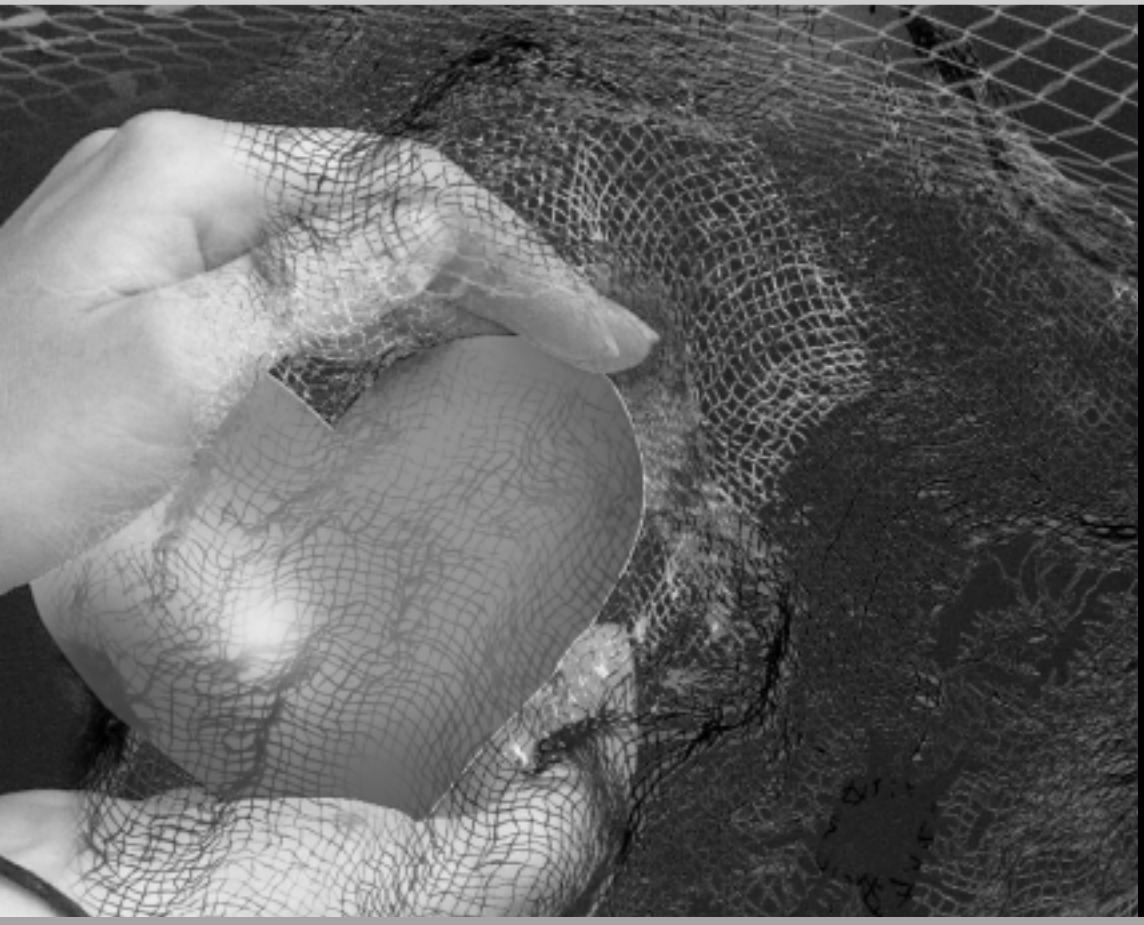
Did you know?

- Risk of death from coronary heart disease is two to four times higher among people with diabetes than among those without.
- Diabetes causes:
  - coronary heart disease
  - strokes
  - limb amputation
  - blindness
  - high blood pressure
  - impotence in men
  - kidney complications
  - congenital defects in babies of women with diabetes.
- Life expectancy of people with type 1 diabetes is reduced by at least 15 years, and is five to ten years lower for middle-aged persons with type 2 diabetes than for those without type 2 diabetes.
- The prevalence of diabetes worldwide is projected to double over the next 25 years from 135 million in 1995 to 300 million in 2025. The major increase will be in type 2 diabetes.
- The number of people with diabetes worldwide is projected to increase by 42% in developed countries and 170% in developing countries between 1995 and 2025.



Treatment and care

Drug treatment

Procedures

Rehabilitation

Health care costs

AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE

Drug treatment

There is a wide range of effective drugs to treat people with cardiovascular disease. These drugs have improved people's quality of life and lowered death rates. A brief overview of the use of prescription medicines for cardiovascular disease in Australia is presented here. The data shown refer to the use of prescription drugs only in the community (non-public hospital).

Drug use is expressed in the World Health Organization approved measurement unit—defined daily doses (DDDs) 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', in general they have other important and useful effects and are given to treat various conditions, not just high blood pressure. As the indication 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.

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 patients 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 1998 (22.6 DDD/1,000/day).

Beta blockers

Beta blockers are used to treat patients with high blood pressure. However, they also have other important uses. In people with angina or history of heart attack, beta blockers can reduce pain and deaths, and prevent further heart attacks. Through their lowering of blood pressure, these drugs prevent strokes and heart attacks. Usage levels have remained relatively unchanged in the 1990s. Atenolol was the most widely prescribed beta blocker in 1998 (10.1 DDD/1,000/day).

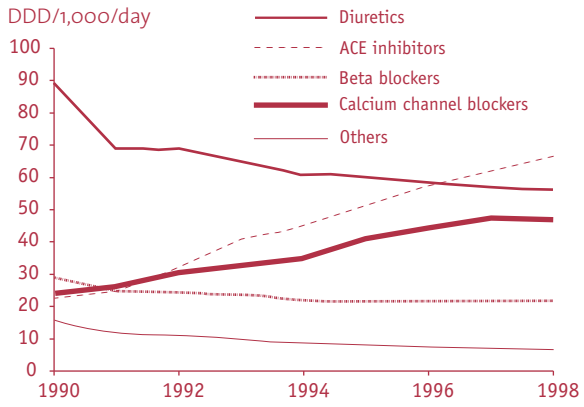
Calcium channel blockers

Calcium channel blockers are effective in reducing blood pressure and angina. The use of calcium channel blockers has risen steadily in recent years. Amlodipine and felodipine were the most commonly dispensed calcium channel blockers in 1998 (13.9 and 11.9 DDD/1,000/day, respectively).

Angiotensin-converting enzyme (ACE) inhibitors

ACE inhibitors are used widely to treat people with high blood pressure or heart failure. These drugs limit the progressive enlargement of the heart after a heart attack and relieve heart failure symptoms. If given early during a heart attack, they can reduce deaths. They have become increasingly popular in the 1990s. Enalapril (19.1 DDD/1,000/day in 1998) is the most used ACE inhibitor.

Community use of blood pressure-lowering drugs, 1990–98



Notes

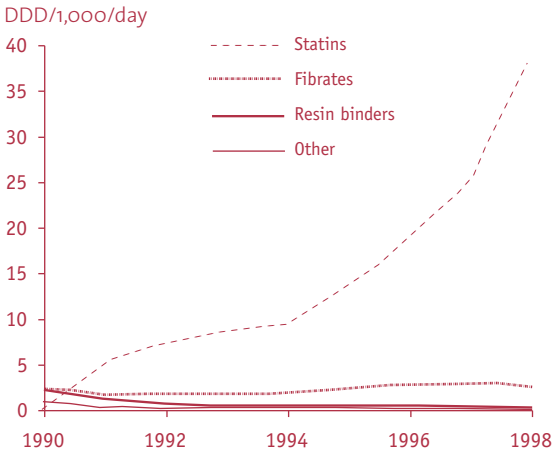
1. DDD = defined daily dose.
2. Data include use of drugs to lower blood pressure as well as for other purposes.

Source: DHAC 1999.

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 (low-density lipoprotein) cholesterol to varying degrees, statins being the most effective. They also have variable effects in lowering blood triglycerides. The use of statins has increased dramatically since 1994 when their value was established conclusively in clinical trials. Simvastatin is the most widely prescribed lipid-lowering agent (22.0 DDD/1,000/day in 1998), followed by atorvastatin (11.0 DDD/1,000/day).

Community use of lipid-lowering drugs, 1990–98



Note: DDD = defined daily dose.

Source: DHAC 1999.

Antithrombotic drugs

Thrombolytic drugs

Thrombolytic drugs dissolve blood clots. These drugs are given only in hospital, under close supervision. They are particularly useful in patients suffering a heart attack, where a clot blocks blood supply to part of the heart, and in selected patients 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. Among 35–64-year-olds, an estimated 42% of people suffering a heart attack were treated with thrombolytics in 1991–1993, a 5% increase per year since 1985. At this time, these drugs are given only in hospital.

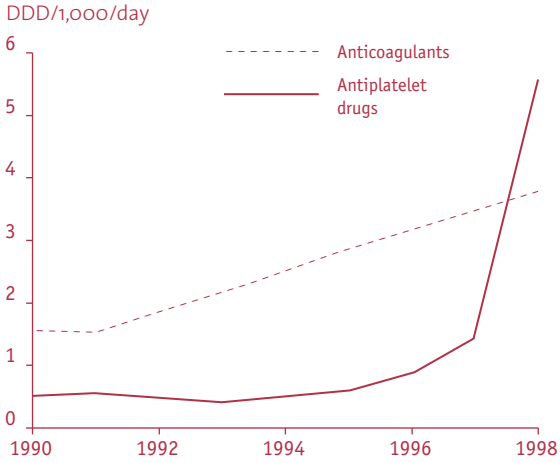
Aspirin and other antiplatelet agents

Antiplatelet drugs interfere with the formation of blood clots that are made of platelets. Among these drugs are aspirin, ticlopidine and dipyridamole. 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. The use of antiplatelet drugs on prescription, particularly aspirin, has risen dramatically in 1998 (aspirin 5.4 DDD/1,000/day in 1998, excluding over-the-counter supply, that is, 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, and less often with stroke and peripheral vascular disease, to lower their risk of subsequent disease. Warfarin and heparin belong to this class of drugs. The use of anticoagulants has steadily increased during the 1990s (warfarin 3.6 DDD/1,000/day in 1998).

Community use of drugs to prevent blood clots, 1990–98



Note: DDD = defined daily dose.

Source: DHAC 1999.

Other drugs

Nitrates

Nitrates relieve and prevent angina symptoms by dilating blood vessels. They are among the most commonly prescribed cardiovascular drugs and their use has risen over the past seven years (all nitrates 18.3 DDD/1,000/day in 1998).

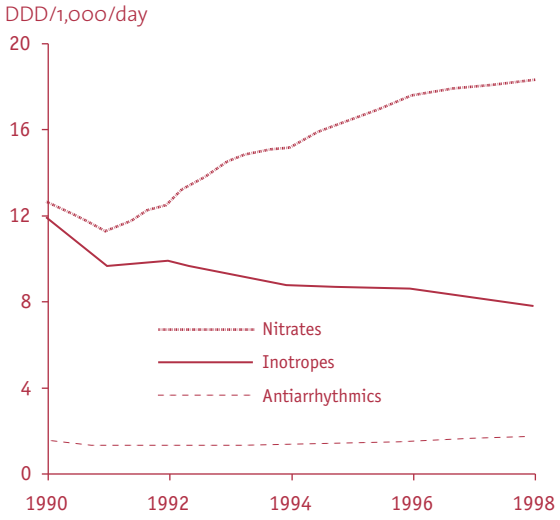
Inotropes

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 (all inotropes 7.8 DDD/1,000/day in 1998).

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. The level of use of these drugs in the community has remained fairly constant during the 1990s (amiodarone 1.2 DDD/1,000/day in 1998).

Community use of other drugs for cardiovascular disease, 1990–98



Note: DDD = defined daily dose.

Source: DHAC 1999.

Prescription drugs used in the community in Australia, 1998

Drug	No. scripts ('000)[a]	Cost ($m)[b]
Blood pressure-lowering drugs		
ACE inhibitors	11,206.6	343.3
Calcium channel blockers	8,560.0	211.2
Beta blockers	5,254.6	59.8
Diuretics	3,502.6	40.3
Other	1,220.9	20.0
Total blood pressure-lowering drugs	*29,744.7*	*674.6*
Lipid-lowering drugs		
Statins	6,986.7	373.5
Fibrates	526.7	23.9
Resin binders	51.5	2.7
Other	28.3	0.6
Total lipid-lowering drugs	*7,593.2*	*400.6*
Other drugs		
Nitrates	2,761.5	57.9
Antiarrhythmics	458.6	13.6
Inotropes	759.2	6.2
Peripheral vasodilators	7.5	0.1
Total other drugs	*4,368.2*	*95.0*
Antithrombotic drugs		
Anticoagulants	1,645.4	16.9
Antiplatelets	445.4	9.7[c]
Total antithrombotic drugs	*2,090.8*	*26.7*
Total cardiovascular drugs	**43,415.5**	**1,179.7**

(a) Includes drugs subsidised under the Pharmaceutical Benefits and Repatriation Pharmaceutical Benefits Schemes and non-subsidised drugs.

(b) Includes government and patient costs for drugs listed in the Pharmaceutical Benefits Scheme only.

(c) This figure is likely to grossly underestimate the actual cost as over-the-counter aspirin is not included.

Source: DHAC 1999.

Drug costs

In 1998, the cost of cardiovascular drugs amounted to $1,180 million; that is, 30% of government and patient costs for all prescription drugs. As government and patient costs are available only for drugs listed in the Pharmaceutical Benefits Scheme these figures underestimate the total cost of cardiovascular drugs.

The previous table shows the cost of prescription drugs used in the community in Australia during 1998.

Further information

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Main data sources

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Further reading

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Did you know?

- 43.4 million prescriptions for cardiovascular drugs were dispensed in 1998. This represents almost a quarter of all prescriptions.
- Frusemide, a diuretic, was the second most widely used drug in Australia in 1998. Simvastatin, enalapril, amlodipine and felodipine were also among the top ten.
- Simvastatin, a cholesterol-lowering drug, was the top drug by cost to the government, amounting to $192 million in 1998. Also ranked in the top ten were atorvastatin, enalapril, pravastatin and amlodipine.
- About 1.6 million Australians were on treatment for high blood pressure in 1995.

Procedures

Cardiovascular diseases are a major cause of illness and death in Australia. The most common forms of heart disease affecting Australians are coronary heart disease, acquired valve disease, conduction defects, congestive heart failure and congenital heart defects. Stroke and peripheral vascular disease also cause significant long-term suffering and disability. Medical services offer a range of procedures to diagnose and treat cardiovascular disease. A brief overview of their use in Australia is presented here.

Procedures for heart disease

Coronary angiography

Coronary angiography gives a picture of the heart's arteries. It is used to diagnose coronary heart disease and is essential before either coronary artery bypass surgery or coronary angioplasty. In 1998–99, there were 74,289 coronary angiograms performed.

Coronary artery bypass grafts

Coronary artery bypass grafting (CABG) entails using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood supply to the heart muscle. Usually the graft material comes from a vein in the patient's leg or a chest artery, or both. CABG is not a cure for coronary artery disease and there is a risk of recurrent disease. Reoperations are uncommon within the first five years but become more frequent later. Although the use of coronary angioplasty (see below) has increased and replaced some CABG procedures, the techniques are complementary. The rates of CABG and coronary angioplasty are now similar.

There were 17,448 coronary bypass graft operations in 1998, with an estimated mortality rate of 2.1%. Six per cent of coronary artery bypass graft procedures were reoperations.

The national average rate for coronary artery bypass graft surgery was 879 per million population in 1998. The rate varied markedly across States, ranging from 650 per million population in Western Australia to 951 per million population in New South Wales and the Australian Capital Territory.

Coronary angioplasty

As with coronary artery bypass grafting, coronary angioplasty is used to restore adequate blood flow to blocked coronary arteries. It involves inserting a catheter with a balloon into a major artery via the skin. The catheter is threaded through the circulation back towards the heart and into the coronary arteries to the area of the vessel blockage. The balloon is then inflated against the plaque to create a wider passage for blood flow.

Coronary angioplasty avoids the major trauma of coronary artery bypass graft surgery because it does not require the opening of the patient's chest. However, the technique can be used to treat only certain types of coronary artery obstruction.

During 1998 there were 18,094 coronary angioplasty procedures performed in 46 units throughout Australia. This was a 14% increase in procedure numbers over the previous year.

The average national rate in 1998 was 908 per million population. This varies widely across States, from 675 per million population in Queensland to 1,108 per million population in Victoria.

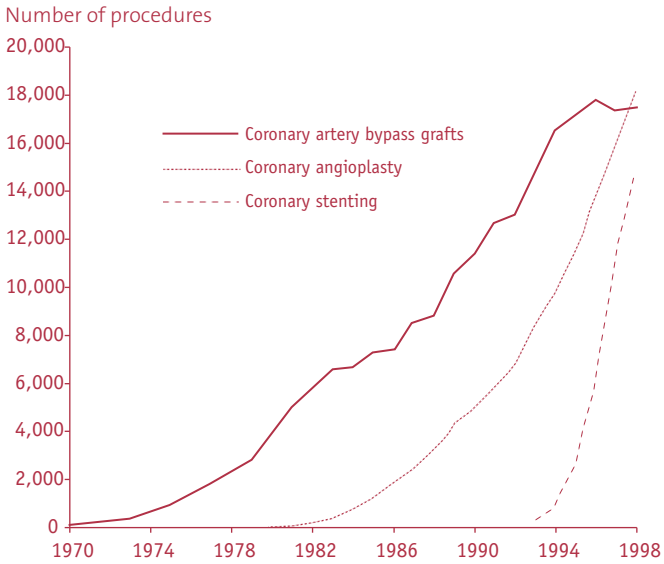
Coronary stenting

Although initial coronary angioplasty success rates are high, there is a significant risk of early acute closure of the coronary artery and a high rate of reblockage. This led to the development of other catheter-based techniques. The most successful of these newer techniques is stenting and hence its use is increasing rapidly. Coronary stenting involves expanding metal mesh tubes within the artery to form a supporting structure which holds the artery open.

Stents were inserted in 14,838 coronary angioplasty procedures in 1998 (82% of all coronary angioplasty procedures). This represents a 31% increase over their use in the previous year.

The national average rate for coronary stenting was 745 per million population in 1998. The rate varied markedly across States, ranging from 595 per million population in Queensland to 941 per million population in Victoria.

Trends in coronary revascularisation procedures, 1970–98



Sources: National Cardiac Surgery and Coronary Angioplasty Registers; AIHW National Hospital Morbidity Database.

Heart transplants

There were 72 heart transplants and four combined heart-lung transplants done in 1998. The main reasons for heart transplant are coronary heart disease and cardiomyopathy.

Operations for congenital defects

Congenital conditions include abnormalities of the heart or heart valves, defects of the great vessels, such as the aorta and pulmonary artery, or combinations of defects. Most children with congenital defects are treated with surgery, usually in infancy or early childhood.

There were 1,576 operations for congenital heart defects in 1998. Septal defects (defects in the wall which separates the left and right chambers of the heart) were the main reasons for congenital heart surgery.

Surgery for heart valve defects

Valve surgery involves repairing or replacing the mitral, aortic, tricuspid or pulmonary valves. Valve disease may be age-related, a result of disease such as rheumatic fever, or congenital. Most valve procedures in Australia consist of replacing the damaged valve with a mechanical device, a pig device or a human graft. Reconstruction of the damaged valve by stitching techniques is less common. Simpler valve procedures can be undertaken with catheter-based techniques.

Heart valve defects accounted for 4,578 procedures in 1998. Surgery was most frequent for the aortic and mitral valves. Fifty-nine procedures were reoperations for mechanical valve failures and 92 procedures were reoperations for tissue valve failures.

Electrophysiological treatments

Electrophysiology surgery involves carefully removing or destroying sections of heart muscle tissue responsible for abnormal heart rhythms (arrhythmias) which can be serious or even life-threatening. There were 133 such operations in 1998. However, surgery has now very largely been replaced by the possibility of achieving similar results, with much less risk, by delivering radiofrequency energy through heart catheters to the area of the heart involved. This is called catheter ablation.

Implantable cardiac defibrillators

Implantable cardiac defibrillators are effective in preventing sudden cardiac death in people at high risk of the life-threatening arrhythmia known as ventricular fibrillation. In 1998–99, there were 998 such devices implanted in Australia.

Procedures for stroke

CT brain scan

Computerised tomographic (CT) scan of the brain is used in acute stroke to distinguish between the major stroke types (blocked blood supply to the brain; bleeding within the brain or on its surface). This guides treatment. The test is also done to confirm a clinical diagnosis of stroke which may be difficult to make. During 1998–99 a total of 26,114 CT scans of the head were performed for a principal diagnosis of stroke. The number of CT scans of the brain is currently unavailable.

Carotid endarterectomy

Carotid endarterectomy entails surgically removing plaque from the carotid arteries in the neck which supply blood to the brain. This may reduce the risk of blockages in these arteries, which could lead to a stroke. In 1997–98 there were 4,515 carotid endarterectomies performed for a principal diagnosis of stroke. The 1998–99 data are not presented as they are not comparable.

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 or assess the risk of stroke. There are no national figures on the number of these procedures performed for stroke.

Procedures for peripheral vascular disease

Amputation for peripheral vascular disease

In severe cases of peripheral vascular disease the reduced blood supply to the lower limbs results in an amputation. There were 788 amputations for peripheral vascular disease in 1998–99. People aged 65 and over accounted for 88% of them.

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 renal arteries. They are life-threatening if they rupture so surgery is performed in severe cases. In 1998–99 there were 2,280 such operations in Australia. People aged 65 years and over accounted for 86% of these procedures.

Further information

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Main data sources

National Hospital Morbidity Database (Australian Institute of Health and Welfare).

National Cardiac Surgery Register (Australian Institute of Health and Welfare & National Heart Foundation of Australia).

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Did you know?

- During 1998 there were 22,253 heart surgery procedures performed in 50 units around Australia. The national rate of operations was 1,188 per million population with a mortality rate of 2.6%.
- By far the most common heart operation was coronary artery bypass grafting.
- Most people undergoing procedures for heart, stroke and vascular diseases are over 54 years old.
- Hospital care of heart, stroke and vascular diseases cost $1,657 million in 1993–94. In addition, medical and allied health professional services amounted to $543 million.

Rehabilitation

Heart, stroke and vascular diseases have a major impact on the Australian community. In 1995, an estimated 2.8 million Australians, or 16% of the population, reported experiencing a cardiovascular condition. For those who already have cardiovascular disease it is important to try to prevent the occurrence of further cardiovascular events. Rehabilitation programs help cardiac and stroke patients reduce their risk of a recurrence of such events and help them return to an active and satisfying life.

Over the period 1987–98, deaths from cardiovascular disease have declined at a rate of 3.9% per year for males and 3.7% per year for females, a faster rate than for total mortality. Both cardiac and stroke rehabilitation programs are likely to have contributed to this decline. To reduce still further the risk of future cardiovascular events, these rehabilitation programs offer sessions on risk factor education, counselling, support and physical activity. Stroke units incorporating a focused team approach to rehabilitation improve survival and functional outcome, and reduce the need for nursing home care.

Cardiac rehabilitation

What is cardiac rehabilitation?

Cardiac rehabilitation describes all measures used to help cardiac patients return to an active and satisfying life, and to prevent the recurrence of cardiac events (secondary prevention).

The broad aims of cardiac rehabilitation are 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 minimise the risk of further cardiac events and conditions.

More specific aims of cardiac rehabilitation include facilitating and shortening the period of recovery after an acute cardiac event, promoting strategies for achieving mutually agreed goals of secondary prevention, developing and maintaining skills for behaviour change, and promoting appropriate use of health and community services.

As well as facilitating the recovery of post-acute cardiac patients, rehabilitation programs have become increasingly focused on the secondary prevention of cardiovascular disease through the identification and modification of risk factors and encouraging adherence to recommended medical therapies. The benefits of cardiac rehabilitation and secondary prevention include reductions in mortality and further cardiac events, improvements in physical, social and emotional functioning, and earlier return to work.

Who receives cardiac rehabilitation services?

Both the National Heart Foundation of Australia and the World Health Organization recommend that cardiac rehabilitation services should be available, and routinely offered, to everyone with cardiovascular disease and be delivered by trained health professionals. In practice, most programs in Australia provide services for patients following heart attack, cardiac surgery and coronary angioplasty. Some programs also cater for patients with stable angina and, in some centres, patients with chronic heart failure.

Where is cardiac rehabilitation provided and by whom?

Cardiac rehabilitation services should include physical activity, health education and counselling programs tailored to meet the individual and cultural needs of the patient and family. Cardiac rehabilitation should begin with a program of education and mobilisation as soon as possible after admission to hospital. Group outpatient programs, conducted in hospitals and community health centres, are the predominant models operating throughout Australia; however, there is regional variation in the provision of programs. Structured programs consist of weekly or twice weekly sessions of group education and discussion in addition to light to moderate exercise. They are conducted by multi-disciplinary health professionals. Patients attend as soon as possible after leaving hospital. Partners and other family members are encouraged to attend. Home-based and outreach programs are also being developed in more rural and remote areas of Australia.

Utilisation of programs

No national data systems currently exist to monitor the proportion of patients who enter and complete a cardiac rehabilitation program.

It has been estimated that where programs exist only a minority of eligible patients are invited to, or attend, a structured outpatient cardiac rehabilitation program. In Victoria, of patients discharged from hospital following coronary artery bypass surgery, 53% participated in a cardiac rehabilitation program compared with 27% of patients with heart attack and 10% of patients undergoing angioplasty. In the Hunter region of New South Wales, 39% of eligible patients reported being invited to attend outpatient cardiac rehabilitation. Overall, 19% of eligible patients completed a program following discharge from a public hospital.

Health outcomes of patients attending outpatient cardiac rehabilitation

Health outcomes data, based on the Medical Outcomes Study 36 Item Short Form Questionnaire (SF-36), collected from 1,567 patients at entry to and exit from 15 cardiac rehabilitation programs in Victoria have shown significant improvements in physical and mental health-related quality of life scales. On completion of a cardiac rehabilitation program, mean scores on each of the eight physical and mental scales considerably exceeded those at entry to the cardiac rehabilitation program and those reported by persons with heart disease in the 1995 National Health Survey.

Stroke rehabilitation

Stroke is the leading cause of long-term disability in adults, particularly among the elderly. Approximately 50% of long-term survivors remain disabled. There may be permanent paralysis of one side of the body, speech or swallowing difficulties, problems with memory and personality changes or a range of other difficulties. Depression and anxiety are common after stroke and many stroke survivors have difficulty returning to their previous leisure activities. Stroke survivors particularly experience difficulties in the areas of physical independence and occupation.

Informal carers (family members, neighbours, friends and volunteers) play an important role in the lives of disabled stroke survivors. Carers provide assistance with a wide range of daily activities including mobility outside the home, managing money, organisation of appointments and services, housekeeping, and house and garden maintenance tasks. Some carers provide assistance with personal care tasks such as bathing and dressing. Carers themselves face considerable psychological strain in their caring role and require both emotional and practical support.

For most people who have had stroke, significant improvements occur over the weeks to months following stroke. In about 20% of people with stroke, full independence in daily tasks is regained within two weeks. For a minority of the remainder, stroke-related problems are so severe that they will require major assistance with daily tasks indefinitely. For about 60% of those with stroke, rehabilitation has a role in helping each affected individual to maximise their potential for recovery and to provide practical ways of dealing with ongoing disability. Rehabilitation also has a role in supporting and training family members and friends to assist with the ongoing care of stroke survivors in the community.

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. The process of rehabilitation is an active one and its success requires the active participation of the person with stroke and, wherever possible, the active participation of family members and other supporters. A multi-disciplinary team approach is used, involving a variety of personnel which may include doctors, nurses, physiotherapists, occupational therapists, speech pathologists, social workers, neuropsychologists, orthotists and leisure therapists.

Rehabilitation includes the setting of mutually agreed goals. Progress towards these goals is monitored at regular team meetings. Rehabilitation goals may be achieved in a variety of ways and the approach is tailored to the individual. Retraining and practice in the performance of everyday tasks are important activities. Specialised equipment and aids may be used e.g. a walking stick. Medications may also be prescribed. Other important aspects of rehabilitation include the provision of psychological support and education to those with stroke and to their family and friends. Rehabilitation aims to facilitate a successful return home and resumption of previous activities. This may require the support of community services, e.g. Meals on Wheels, home nursing services. The duration of formal rehabilitation will vary according to individual requirements from one or two weeks to several months.

Who receives stroke rehabilitation services?

Most people who have suffered a stroke have the potential to benefit from rehabilitation. For the most mildly affected people who rapidly regain complete independence in daily activities, rehabilitation may simply comprise the provision of information, healthy lifestyle advice and support to allow a successful return to previous activities. For those more severely affected by stroke, admission to a specialised rehabilitation unit for inpatient care would most likely occur. With improvement, rehabilitation may then continue as an outpatient or at home.

Where is stroke rehabilitation provided?

Rehabilitation begins in the acute hospital environment as soon as possible after stroke and, depending on each individual's needs, may continue in a specialised inpatient rehabilitation unit or be provided as a hospital outpatient, in the patient's home or at a community rehabilitation facility. Rehabilitation services may also be provided in hostels and nursing homes. Across Australia, there is regional variation in the nature of rehabilitation services available for stroke patients.

Utilisation of programs

It is not known how many people in Australia currently participate in a rehabilitation program (inpatient or outpatient) following stroke. It has been estimated that in Perth during 1989–90, about 25% of hospitalised stroke patients underwent a period of inpatient 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 inpatient rehabilitation. This latter estimate excludes cases of subarachnoid haemorrhage. The reasons for the difference in the proportion of patients receiving inpatient rehabilitation in these two cities are uncertain. Possible explanations include variation in the organisation of stroke rehabilitation services and changes in clinical practice over time.

Further information

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Note: This section was written with the assistance of Dr Steve Bunker from the National Heart Foundation and Dr Helen Dewey of the National Stroke Research Institute.

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Health care costs

Cardiovascular disease ranks as the most expensive disease group in Australia in terms of health expenditure. If its risk factors are also taken into account, cardiovascular disease is responsible for 12% of total recurrent health expenditure, or $3.9 billion in 1993–94.

The following is an overview of the direct health care costs associated with cardiovascular disease in Australia. These costs are for the period 1993–94 and are the most up-to-date data available. It should be emphasised that these figures do not represent estimates of the total economic impact of cardiovascular diseases in the Australian community. As well as the direct health system costs described here, there are substantial indirect costs relating to absenteeism, lost productivity, the burden on carers and family, and lost quality and quantity of life.

Cost of cardiovascular disease

For information presented here, the term 'cardiovascular disease' includes coronary heart disease, high blood pressure, heart failure, stroke and all other vascular diseases.

The total direct cost of cardiovascular disease in Australia during 1993–94 was $3,719 million. The cost of digestive system diseases was marginally less at $3,715 million. Costs related to musculoskeletal conditions ranked third ($3,000 million). These disease groups were followed by injury, mental disorders and respiratory conditions (each around $2,600 million).

Sex

Overall, there is no difference between males and females for the total costs of cardiovascular disease. During 1993–94, costs were around $1,850 million for each sex. Costs do vary between males and females for individual cardiovascular conditions. Total costs of coronary heart disease were higher for males ($560 million) than for females (under $340 million). The opposite was true for high blood pressure, stroke and heart failure. Females accounted for high blood pressure costs of $500 million compared with males at $335 million. Stroke costs for females were nearly $350 million compared with males at $280 million. Costs of heart failure for females were nearly $250 million compared with males at $170 million.

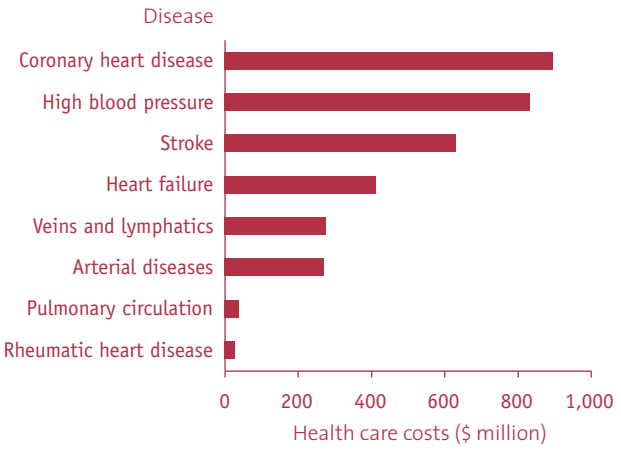
Age

Costs related to cardiovascular disease rise steeply with age from 40 years onwards, with most of the money being spent on the elderly. During 1993–94, costs of cardiovascular disease were about $1.3 billion for females over 65 years. This equates to almost 50% of the total cost for females. For males over 65 years, the costs of cardiovascular disease were around $1.1 billion. This is over 30% of the total cost for males.

Coronary heart disease

The most expensive of all cardiovascular diseases was coronary heart disease. At $894 million this was 24% of total cardiovascular disease costs. The majority of costs were related to hospital inpatients. Public hospital costs were over $410 million. Private hospital costs were nearly $150 million. The next most expensive health service was the cost of prescription drugs at nearly $100 million.

HEALTH CARE COSTS FOR CARDIOVASCULAR DISEASES, 1993–94



Source: Mathers & Penm 1999.

Stroke

Total health system costs for stroke were $630 million (17% of cardiovascular disease costs). The majority of costs were hospital inpatient costs ($269 million). Nursing home services provided the other major area of expenditure, representing almost half of all stroke health service costs at $265 million.

Heart failure

The total health system costs of heart failure were $411 million (11% of cardiovascular disease costs). The majority of these were hospital inpatient costs. Nursing home costs were $135 million, public hospital care costs around $120 million and private hospital costs were just over $20 million.

High blood pressure

More is spent on research relating to high blood pressure than on any individual cardiovascular disease. At an estimated $20 million, these research costs were double the next closest (costs for coronary heart disease research) and over three times more than the costs of stroke research. The total health system costs of high blood pressure during 1993–94 were estimated at $831 million.

High blood cholesterol

Costs for the diagnosis and treatment of high blood cholesterol are not included in the cardiovascular disease costs presented here. However, as high blood cholesterol is a risk factor for cardiovascular disease, it is of interest. The direct costs of high blood cholesterol in 1993–94 were $199 million.

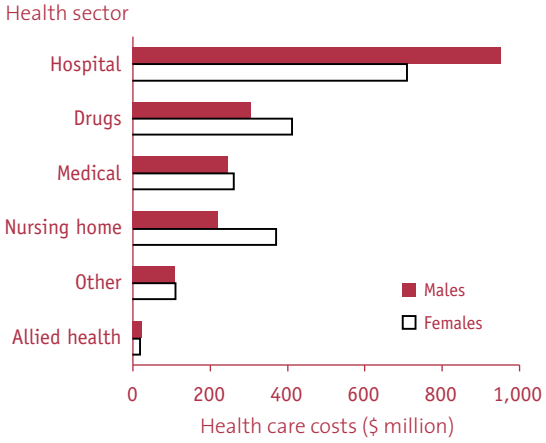
Physical inactivity

The annual direct health care cost attributable to physical inactivity is around $377 million. With specific relation to cardiovascular disease, physical inactivity costs are estimated to be $161 million when related to coronary heart disease and $101 million for stroke.

Costs by health service

In 1993–94, hospitals and nursing homes were responsible for the majority of health service costs for cardiovascular disease (more than $2,240 million, representing 60% of the total costs). The next most expensive service was drugs. Prescription and non-prescription drugs were less than half the cost of hospitals and nursing homes (approximately $715 million or 19% of total costs). Medical services ranked third most expensive (more than $500 million or 14% of total costs). These include consultations with general practitioners and specialists as well as pathology tests, screening and other diagnostic services. The least expensive services included administration, research and prevention programs (less than 1%), and allied health practitioners (totalling more than $250 million, almost 7% of total costs).

Health care costs for cardiovascular diseases by health sector, 1993–94



Notes

1. Excluding high blood cholesterol costs.
2. Other includes administration, research and prevention program costs.

Source: Mathers & Penm 1999.

Sex

Hospital inpatient costs were nearly double for males compared with females. Conversely, nursing home and drug costs were much lower for males than for females. This may be due to the higher life expectancies for females. All other services related to cardiovascular disease cost similar amounts for both sexes.

Further information

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Detailed data

Refer to the **Statistical tables** section.

Main data sources

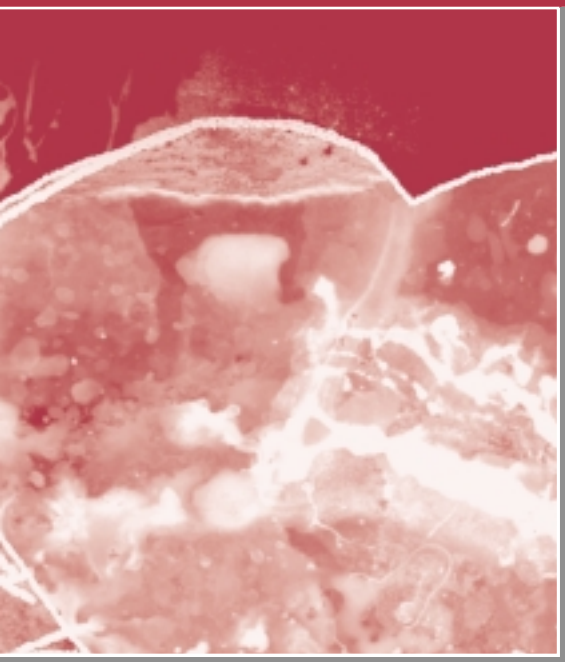
Mathers C & Penm R 1999. Health system costs of cardiovascular diseases and diabetes in Australia 1993–94. AIHW Cat. No. HWE 11. Canberra: AIHW.

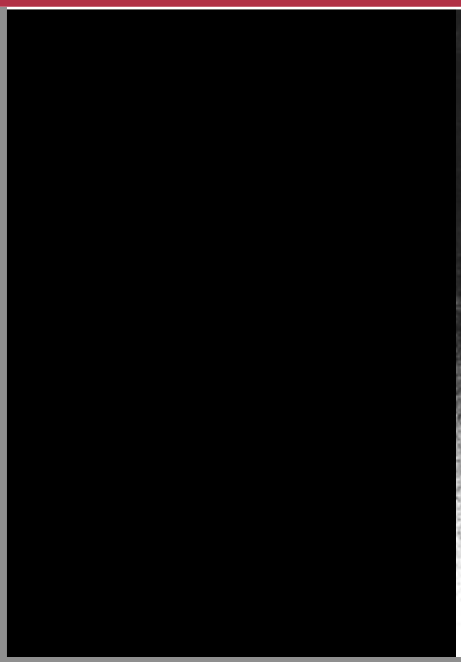
Further reading

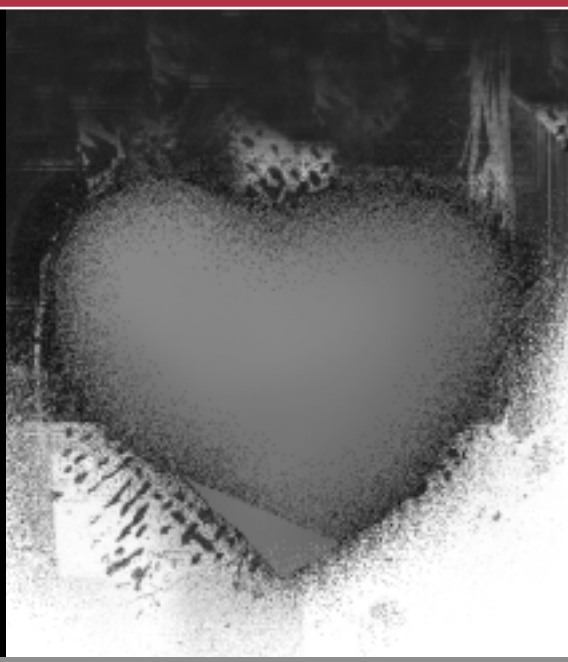
Australian Institute of Health and Welfare 2000. Australia's health 2000: the seventh biennial health report of the Australian Institute of Health and Welfare. AIHW Cat. No. AUS 19. Canberra: AIHW.

Did you know?

- The average treatment cost for a heart attack in 1993–94 was around $5,000.
- During 1993–94, public and private hospital costs due to cardiovascular diseases totalled $1.5 billion. For the same period, over $700 million were spent on drugs for the treatment and prevention of cardiovascular diseases.
- The average lifetime health care cost of stroke is around $25,000 per sufferer.







Aboriginal and Torres Strait Islander peoples

peoples

Australian Institute of Health and Welfare

Australian Facts

Aboriginal and Torres Strait Islander peoples continue to suffer a 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 Aboriginal and Torres Strait Islander peoples in Australia.

Among Indigenous Australians, hospitalisation rates for cardiovascular disease in 1998–99 were two to three times higher than among the rest of the Australian population. Death rates for cardiovascular disease among Indigenous Australians were also much higher. Indigenous Australians were more than twice as likely to die from cardiovascular disease as non-Indigenous Australians in 1996–98.

Data quality

There is a lack of quality national health data for Aboriginal and Torres Strait Islander peoples. Main factors limiting the availability, and consequently the quality, of data include:

- incomplete identification of Indigenous Australians in administrative data collections (such as death registrations and hospital records);
- uncertainties with the estimation of size and composition of the Indigenous population; and
- issues related to collecting individual and household survey data about Indigenous Australians.

In addition, changes over time in the availability and quality of data make the assessment of trends difficult and potentially misleading. In this report data from administrative collections have been based on three jurisdictions only: Western Australia, South Australia and the Northern Territory. This is because the completeness of identification of Indigenous Australians in these jurisdictions is considered adequate for reporting.

A number of recent initiatives in information development may result in some improvements to the availability and quality of data in the future. These initiatives include the National Aboriginal and Torres Strait Islander Health Information Plan, performance indicators and strategic framework agreements related to Indigenous Australian health, and work to improve the quality of identification in administrative data collections.

Life expectancy

Aboriginal and Torres Strait Islander peoples die at younger ages than non-Indigenous Australians, with life expectancy at birth estimated to be 57 years for males and 62 years for females over the period 1991–96. This is considerably lower than for all Australians, where life expectancy over this period was estimated at 75 years for males and 81 years for females. The life expectancy of Indigenous Australians is similar to that experienced by all Australians during the early twentieth century.

How many Aboriginal and Torres Strait Islander peoples have cardiovascular conditions?

In 1995, an estimated 45,100 Aboriginal and Torres Strait Islander peoples living in urban and rural areas (15% of the Indigenous population), reported having cardiovascular conditions.[31] Overall, cardiovascular conditions were less prevalent among Indigenous Australians than non-Indigenous Australians; however, in the younger age groups (those aged under 55), Indigenous Australians were more likely to report cardiovascular conditions than non-Indigenous Australians.

Hospitalisation for cardiovascular disease[32]

Aboriginal and Torres Strait Islander peoples were two to three times more likely to be hospitalised for cardiovascular disease than other Australians during 1998–99. Cardiovascular disease accounted for 2,531 hospitalisations among Indigenous Australians in 1998–99 (2.9% of all hospitalisations for Indigenous people). Rates of hospitalisation for conditions such as coronary heart disease and stroke are two and four times higher among Indigenous Australians than other Australians. The largest disparity in hospitalisations exists for rheumatic fever and rheumatic heart disease. Rates were 20–25 times higher among Indigenous Australians than among non-Indigenous Australians.

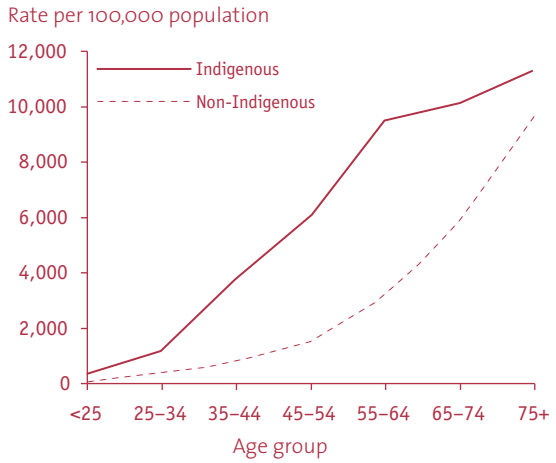
Coronary heart disease procedures were the most commonly performed procedures among Aboriginal and Torres Strait Islander peoples[33].

Sex and age

Consistent with the national pattern, Indigenous Australian males are more likely than Indigenous Australian females to be hospitalised for cardiovascular disease across most age groups. In 1998–99, a notable exception was for the 75 and over age group, where age-specific cardiovascular hospitalisation rates were almost twice as high among Indigenous Australian women as among Indigenous Australian men.

During 1998–99, Indigenous Australians were hospitalised for cardiovascular disease at younger ages than non-Indigenous Australians (average ages of 47 and 66, respectively). Hospitalisations for cardiovascular disease among Indigenous Australians exceeded those for other Australians in every age group.

HOSPITALISATIONS FOR CARDIOVASCULAR DISEASE, 1998–99



Source: AIHW National Hospital Morbidity Database.

Length of stay

Indigenous Australians tend to stay in hospital longer for cardiovascular disease than non-Indigenous Australians (on average, six days compared with five days). This difference is greatest among Indigenous Australian females where the average length of stay was 7.2 days compared with 5.5 days among non-Indigenous Australian females. For stroke the average length of stay was also considerably higher for Indigenous Australian females than for non-Indigenous Australian females (15.7 days compared with 10.8 days). For coronary heart disease the average length of stay was similar for Indigenous and non-Indigenous Australians.

Deaths[34]

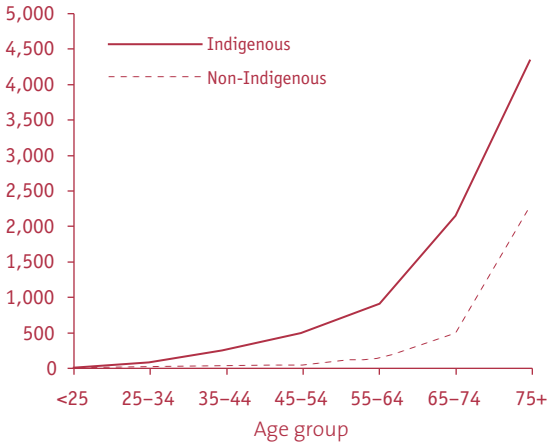
Aboriginal and Torres Strait Islander peoples suffer substantially higher death rates from all causes than non-Indigenous Australians. This is also true for cardio-vascular disease. Indigenous Australians were at least twice as likely to die from cardiovascular disease as other Australians during 1996–98. The disparity among Indigenous and non-Indigenous Australians is greater in the younger age groups, where the cardiovascular disease death rate among 25–64-year-olds is seven to ten times that of other Australians.

Cardiovascular disease accounted for a smaller proportion of all deaths among Indigenous Australians than among other Australians in 1996–98 (28% compared with 40%). This apparent inconsistency can be explained by the high number of deaths amongst Indigenous Australians.

Deaths from coronary heart disease were twice as high among Indigenous Australians as among non-Indigenous Australians in 1996–98, with this ratio increasing to six to eight times for those in the age group 25–64 years. A similar pattern was evident for stroke. However, the most striking difference between Indigenous and non-Indigenous Australians occurred for rheumatic heart fever and rheumatic heart disease. During 1996–98, death rates from rheumatic heart fever and rheumatic heart disease among Indigenous Australians were 13 to 14 times higher than for non-Indigenous Australians.

Sex and age

Consistent with their lower overall life expectancy, Aboriginal and Torres Strait Islander peoples die from cardiovascular disease at younger ages than non-Indigenous Australians (average age of 59 compared with 79). In 1998, almost two-thirds of cardiovascular deaths among Indigenous Australian males and over half of cardiovascular deaths of Indigenous Australian females occurred before the age of 65. Cardiovascular death rates among Indigenous Australians exceeded those for other Australians in every age group.



Source: AIHW National Hospital Morbidity Database.

Why do Aboriginal and Torres Strait Islander peoples experience poor cardiovascular health?

Aboriginal and Torres Strait Islander peoples clearly experience substantially higher death rates and unfavourable health status than do their non-Indigenous Australian counterparts. This health disadvantage begins at an early age and continues throughout the life cycle. The risk factor profile of Indigenous Australians could be one reason for the considerably higher cardiovascular disease sickness and death that this population group experiences. Several risk factors for cardiovascular disease are more prevalent among Indigenous Australians than non-Indigenous Australians. The higher prevalence of these cardiovascular risk factors may reflect the broader social and economic disadvantages faced by Aboriginal and Torres Strait Islander Australians.

Prevalence of risk factors for cardiovascular disease in the Indigenous population is discussed below (for more details see the **Cardiovascular disease** and **Risk factor** pages). These data do not include Aboriginal and Torres Strait Islander peoples living in remote areas.

Physical inactivity

In 1995, Indigenous Australian adults were more likely to be physically inactive in their leisure time than their non-Indigenous counterparts. During that year 40% of Indigenous Australians reported no leisure-time physical activity compared with 34% of non-Indigenous Australians. Indigenous women were more likely to be physically inactive than Indigenous men (42% compared with 38%).

Smoking

Indigenous Australian adults were more than twice as likely to smoke as their non-Indigenous counterparts in 1995 (51% compared with 23%). Consistent with the national pattern, smoking was more common among Indigenous Australian men than Indigenous Australian women.

Alcohol

The relationship between alcohol consumption and cardiovascular disease is problematic. It is difficult to make recommendations about safe levels of alcohol consumption for cardiovascular health because there is a curvilinear relationship between level of alcohol consumption and the risk of death from cardiovascular disease. Further, individuals who do not drink alcohol are at a higher risk of death from cardiovascular disease than those who consume one to two drinks of alcohol per day. The reasons for this are not clear.

In 1995, Indigenous Australian adults were more likely than non-Indigenous Australian adults to abstain from alcohol (51% compared with 45%). However, those Indigenous Australians who did drink were more likely to consume harmful quantities of alcohol than were non-Indigenous alcohol consumers. In 1995, 8% of Indigenous Australian adults were considered to have a high alcohol risk level compared with 3% among non-Indigenous Australian adults.

High blood pressure

There are no measured national data to assess the rates of high blood pressure among Aboriginal and Torres Strait Islander peoples. Data from the Kimberley region suggest that high blood pressure is two to three times more common among Indigenous Australian people than among non-Indigenous Australians.

Overweight and obesity

There is little difference in the proportion of overweight (BMI ≥ 25) people among Indigenous and non-Indigenous Australians. However, Indigenous Australians are far more likely to be obese (BMI ≥ 30) than their non-Indigenous counterparts. In 1994, 25% of Indigenous Australian men and 28% of Indigenous Australian women aged 18 and over were classified as obese compared with 18% for all Australian adults.

Diabetes

Aboriginal and Torres Strait Islander peoples have one of the highest rates of type 2 diabetes in the world. In 1995, the prevalence of self-reported diabetes among 25–54-year-olds was seven to eight times higher among Indigenous Australians than non-Indigenous Australians. Other evidence suggests that the overall prevalence of diabetes among Indigenous Australian adults could be as high as 10–30% (i.e. two to four times that of non-Indigenous Australian adults).

Further information

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Main data sources

1995 National Health Survey (Australian Bureau of Statistics).

National Hospital Morbidity Database (Australian Institute of Health and Welfare).

National Mortality Database (Australian Institute of Health and Welfare).

Further reading

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Did you know?

- Aboriginal and Torres Strait Islander peoples have substantially higher levels of coronary heart disease and stroke than Indigenous populations found in New Zealand and the United States.
- Aboriginal and Torres Strait Islander peoples have one of the highest rates of type 2 diabetes in the world.
- Prevalence of rheumatic heart disease among Indigenous Australians is one of the highest in the world.

Appendixes

Methods and data sources

Statistical tables

CVD

Australian Institute of Health and Welfare

Methods and data sources

Rates

Australian

Age-standardised rates are used to remove the influence of age when comparing populations with different age structures. The 1991 Australian population is used as the standard population in all Australian comparisons, unless otherwise stated.

International

For international comparisons the 2000 WHO 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 edition of this report as a different standard population was used.

Burden of disease

Information on the burden of disease due to heart, stroke and vascular diseases, and their risk factors are taken from the results of the Australian Burden of Disease and Injury 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 impact of premature mortality and of disability and other non-fatal health outcomes due to cardiovascular disease and stroke, and their risk factors.

Classifications

Cause of death and hospital diagnosis

The classification of cause of death is based upon the International Classification of Diseases, Ninth Revision (ICD-9). Hospital diagnosis is classified using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM). The following codes are used in this report.

Disease codes

Disease	ICD-9 code	ICD-10-AM code
Rheumatic fever and rheumatic heart disease	390–398	I00–I02 I05–I09
High blood pressure	401–405	—
Coronary heart disease	410–414	I20–I25
Heart failure	428	I50
Stroke	430–438	G45, G46 I60–I69
Peripheral vascular disease	441–444	I71–I74
Cardiovascular disease	**390–459**	**G45, G46 I00–I99**

PROCEDURE CODES

Procedure	ICD-9-CM code	ICD-10-AM code
Abdominal aortic aneurysm[a]	38.44	33112-00, 33115-00, 33118-00, 33121-00, 33151-00, 33154-00, 33157-00, 90213-02
Amputation for peripheral vascular disease[b]	84.15–84.17	n.c.
Carotid or jugular endarterectomy	38.12	n.c.
Computerised tomographic scan of the head	87.03	n.c.
Coronary angiography	88.55–88.57	38215-00, (38218-00 or 38218-02)
Coronary angioplasty	36.01, 36.02, or 36.05	35304-00, 35305-00
Coronary artery bypass grafts	36.1	38497, 38500, 38503, 90201
Coronary stenting	36.06 or 36.07	35310
Implantable cardiac defibrillators	37.94–37.98	38524-00, 38521-03

n.c. = not comparable.

(a) Primary diagnosis of peripheral vascular disease, ICD-9-CM codes 441.3, 441.4 and ICD-10-AM codes I71.3, I71.4.

(b) Primary diagnosis of peripheral vascular disease, ICD-9-CM codes 440.0, 440.2.

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, a difference much larger than can be explained by natural increase.

Deficiencies in health data for Indigenous Australians occur in both the National Mortality Database and the National Health Survey. For the years 1997 and 1998, mortality data for Western Australia, South Australia, the Northern Territory and the Australian Capital Territory only are considered to have more than 90% coverage of Indigenous Australian deaths. Data for the Australian Capital Territory are not included in this report due to the small number of deaths and the short period in which death data have been collected there. No data are available from the National Health Survey on Indigenous Australians living in remote areas, due to concerns about data quality.

Socioeconomic groups

The Australian Bureau of Statistics 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 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 least disadvantaged households and quintile 5 the most 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.

Australian Facts

Urban, rural and remote areas

Urban, rural and remote areas are identified in this report using the rural, remote and metropolitan areas (RRMA) classification, developed in 1994 by the Department of Primary Industries and Energy and the then Department of Human Services and Health.

The RRMA classification assigns each statistical local area in Australia into one of seven categories—two metropolitan, three rural and two 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.

This report examines data for the three larger areas (urban, rural and remote), as cell sizes are too small for accurate estimation in a more detailed classification.

Main data sources

1999-00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab), conducted by the International Diabetes Institute and partially funded by the Commonwealth Department of Health and Aged Care, is the most comprehensive study to date on the prevalence and impact of diabetes. The survey collected information on self-reported and measured diabetes and cardiovascular risk factors, features of the metabolic syndrome, health knowledge, attitudes, and health services utilisation and practices. The study collected information from approximately 10,000 adults aged 25 years and over throughout Australia (excluding the Australian Capital Territory).

1999 National Physical Activity Survey, funded by the Commonwealth Department of Health and Aged Care and the Australian Institute of Health and Welfare, was conducted to assess current patterns of physical activity and the impact of the Active Australia campaign. The survey collected information from a national sample of 3,841 people in November and December 1999. Comparisons are made with the 1997 Active Australia baseline physical activity survey.

1998 Disability, Ageing and Carers Survey, conducted by the Australian Bureau of Statistics, collected national information on the disability levels of Australians, their current and future 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.

1998 National Drug Strategy Household Survey was conducted between June and September 1998, with 10,030 Australians aged 14 years and older participating. This was the sixth survey in a series that commenced in 1985, but was the first to be managed by the Australian Institute of Health and Welfare. Respondents were asked about their knowledge of drugs, their attitudes towards drugs, their drug consumption histories and related behaviours.

1997 Active Australia Baseline Survey was funded by the Australian Sports Commission, the Commonwealth Department of Health and Aged Care, NSW Health, Queensland Health, Victorian Department of Health and Community Services, ACT Department of Health and Community Services, and the Queensland Office of Sport and Recreation. The survey was conducted to give a baseline assessment of physical activity patterns and knowledge of the benefits of physical activity among adult Australians. The survey collected information from a national sample of 4,821 people in November and December 1997.

1995 National Health Survey, conducted by the Australian Bureau of Statistics, was 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. It can be used with previous health surveys to monitor trends in health over time. The survey collected information from a sample of 57,600 people, over a 12-month period from January 1995 to January 1996.

1995 National Nutrition Survey, a joint project between the Australian Bureau of Statistics and the Commonwealth Department of Health and Aged Care, is 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 the 1995 National Health Survey, approximately 13,800 people from urban and rural areas of Australia. The National Nutrition Survey was conducted over a 12-month period from January 1995 to January 1996.

1983 National Dietary Survey of Adults was conducted as a component of the second Risk Factor Prevalence Survey, by the Commonwealth Department of Health in collaboration with the National Heart Foundation. The survey was designed to obtain national information on dietary intake to determine the food composition and nutrient intake of Australians aged 25–64. The survey collected information from a sample of 5,950 people living in the six State capital cities of Australia.

BEACH (Bettering the Evaluation And Care of Health), an ongoing national survey looking at the clinical activities of general practitioners, was conducted by the General Practice Statistics and Classification Unit (an Australian Institute of Health and Welfare 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.

Burden of Disease and Injury in Australia Study assessed the total 'burden' of disease/injury, by using a common metric developed by the Global Burden of Disease Study.

Drug Utilization Sub-Committee Database, held at the Commonwealth Department of Health and Aged Care, monitors the community (i.e. non-public hospital) use of prescription medicines in Australia. This database combines information on prescriptions subsidised by the Pharmaceutical Benefits Scheme (PBS) and the Repatriation Pharmaceutical Benefits Scheme with 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 each month dispensing information from a random sample of about 250 pharmacies throughout Australia. Information on drugs prescribed in public hospitals and on highly specialised drugs available for outpatients through public hospital pharmacies under section 100 of the National Health Act are not included in this database.

National Cardiac Surgery Register, a joint project between the National Heart Foundation of Australia and the Australian Institute of Health and Welfare. This database contains information on the number of a range of heart surgery procedures and associated deaths. The data are supplied annually to the Australian Institute of Health and Welfare by cardiac surgery units around Australia.

National Coronary Angioplasty Register, a joint project between the National Heart Foundation of Australia and the Australian Institute of Health and Welfare. This database contains information on coronary angioplasty procedures, indications, associated complications, lesion location, success rates and adjunctive techniques such as stenting. The data are supplied annually to the Australian Institute of Health and Welfare by cardiac catheterisation units around Australia.

National Hospital Morbidity Database, held at the Australian Institute of Health and Welfare, contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital. The data items are supplied to the Australian Institute of Health and Welfare by the State and Territory health authorities. The database provides information on the number of hospitalisations for a particular condition or procedure. It is not possible to count patients individually. In this report, disease data relate to the principal diagnosis of hospitalisations while procedures data relate to principal and additional procedures.

National Mortality Database, held at the Australian Institute of Health and Welfare, 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 Australian Bureau of Statistics for coding of cause of death and compilation into aggregate statistics. On 1 January 1997 the Australian Bureau of Statistics introduced new automatic coding software, which identifies multiple causes of deaths within Australia. In this report, unless otherwise specified, death data relate only to the principal cause of death.

Risk Factor Prevalence Study, a series of surveys conducted by the National Heart Foundation in 1980, 1983 and 1989, was designed to obtain national information on biomedical and behavioural risk factors in Australia and to monitor trends over time. While the data are somewhat dated, it remains an important source of national data for biomedical risk factors. The study 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.

Table 1: Death rates for cardiovascular diseases and all causes of death by age, 1998

Disease	Sex	Age group							
		<25	25–34	35–44	45–54	55–64	65–74	75+	All ages[(a)]
		Rate per 100,000 population							
Coronary heart disease	Male	**	4.1	19.0	62.5	203.7	634.7	2,193.5	171.2
	Female	**	1.0*	4.3	13.9	60.7	262.4	1,703.0	93.2
Stroke	Male	0.2	1.4	4.2	10.2	38.4	157.8	872.0	56.3
	Female	0.4	1.1	4.2	8.6	23.0	114.2	996.1	50.8
Heart failure	Male	**	**	**	0.6	2.7	18.5	222.0	12.0
	Female	**	**	**	0.6	1.7	13.0	241.1	10.3
Peripheral vascular disease	Male	**	**	0.7*	2.0	9.6	53.7	189.8	13.5
	Female	**	**	0.3	0.7	5.2	19.9	120.0	6.8
Rheumatic fever and	Male	**	0.3	**	0.6	1.2	3.2	9.8	0.9
rheumatic heart disease	Female	**	0.3	0.6*	0.6*	1.7	6.0	15.9	1.4
All cardiovascular disease	*Male*	*1.8*	*9.1*	*29.4*	*88.7*	*287.1*	*964.7*	*3,879.1*	*284.6*
	Female	*1.5*	*5.1*	*12.9*	*30.6*	*109.8*	*483.8*	*3,511.3*	*188.0*
All causes of death	**Male**	**74.3**	**142.9**	**169.6**	**319.6**	**908.6**	**2,622.4**	**8,550.1**	**759.8**
	Female	**41.6**	**47.4**	**91.9**	**210.4**	**516.0**	**1,418.6**	**6,697.3**	**470.1**

* Rates should be interpreted with caution as the relative standard errors are between 25% and 50%.

** Rates are not presented as relative standard errors are greater than 50%.

(a) Age-standardised to the 1991 Australian population.

Source: AIHW National Mortality Database.

Table 2: Hospitalisation rates for cardiovascular diseases by age, 1998–99

Disease	Sex	Age group									
		<5	5–14	15–24	25–34	35–44	45–54	55–64	65–74	75+	All ages[(a)]
		Rate per 100,000 population									
Coronary heart disease	Male	**	0.3	3.7	43.8	363.5	1,374.0	3,112.3	5,087.1	5,719.2	1,077.2
	Female	0.8	**	1.3	12.7	97.1	395.0	1,144.6	2,532.5	3,614.5	489.1
Stroke	Male	8.4	5.5	9.3	23.3	48.6	159.0	483.3	1,339.7	2,962.1	296.6
	Female	5.3	2.9	8.0	22.5	50.9	121.7	297.8	808.6	2,385.3	207.9
Heart failure	Male	5.3	0.8	3.4	6.7	21.6	69.9	285.3	965.0	2,916.2	235.5
	Female	5.5	0.8	2.5	4.4	13.3	39.5	145.0	562.5	2,443.7	159.5
Peripheral vascular disease	Male	**	0.4	4.1	6.5	11.9	35.8	159.2	573.9	917.6	100.6
	Female	**	**	2.4	5.6	10.2	17.2	58.0	180.5	360.0	37.5
Rheumatic fever and	Male	1.1	4.4	3.5	3.0	5.4	7.1	14.7	30.2	33.8	8.2
rheumatic heart disease	Female	1.6	7.1	3.7	4.8	7.6	15.8	37.4	44.9	36.1	13.3
All cardiovascular disease	**Male**	**89.9**	**87.7**	**170.5**	**421.1**	**1,082.7**	**2,721.7**	**5,929.7**	**11,228.9**	**17,225.6**	**2,613.8**
	Female	**65.9**	**70.8**	**152.6**	**426.9**	**873.2**	**1,633.4**	**3,247.2**	**6,658.7**	**12,642.9**	**1,694.3**

* Rates should be interpreted with caution as the relative standard errors are between 25% and 50%.

** Rates are not presented as relative standard errors are greater than 50%.

(a) Age-standardised to the 1991 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table 3: Cardiovascular disease risk factors by age, 1998 to 1999–00

Risk factor	Sex	Age group							
		18–24	25–34	35–44	45–54	55–64	65–74	75+	25+[a]
		Per cent							
Tobacco smoking[b]	Male	39.3	38.3	27.5	28.9	29.3	18.2	6.1	30.2[c]
	Female	36.5	33.9	28.7	19.1	14.2	9.4	6.3	24.0[c]
Diabetes[d]	Male	—	**	2.7	7.0	14.6	19.5	24.1	7.8
	Female	—	**	2.3	5.5	9.4	15.5	22.4	6.2
High blood cholesterol[d]	Male	—	31.0	54.2	60.7	61.8	54.1	49.2	49.9
	Female	—	30.1	39.8	54.7	71.6	74.0	65.2	49.7
High blood pressure[d]	Male	—	7.9	16.2	30.5	46.5	69.7	75.1	30.7
	Female	—	4.1	7.9	22.8	42.3	66.7	77.2	25.6
Overweight[d]	Male	—	60.2	65.5	72.5	74.0	73.7	64.3	67.3
	Female	—	35.8	45.6	58.1	67.2	70.7	56.4	51.7
		Age group							
		18–29		30–44		45–59		60–75	18–75
Sedentary or insufficient physical activity[e]	Persons	31.3		46.5		50.0		46.0	43.3

— Data unavailable.

** Rates are not presented as relative standard errors are greater than 50%.

(a) Age-standardised to the 1991 Australian population.

(b) Data from 1998.

(c) Data for ages 18 and over.

(d) Data from 1999–00.

(e) Data from 1999.

Sources: 1999–00 Australian Diabetes, Obesity and Lifestyle Study (AusDiab); 1999 National Physical Activity Survey; 1998 National Drug Strategy Household Survey.

Table 4: Death rates for cardiovascular diseases and all causes of death by States and Territories, 1996–98

Disease	Sex	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
					Rate per 100,000 population				
Coronary heart disease	Male	185.7	172.6	195.3	170.1	187.1	197.3	168.0	164.5
	Female	103.5	94.3	107.7	89.2	98.9	101.0	80.7	105.7
Stroke	Male	63.3	56.2	59.7	56.2	59.6	69.7	63.7	79.8
	Female	56.6	50.0	53.9	51.4	52.8	58.7	59.1	69.7
Heart failure	Male	13.8	14.9	9.3	10.9	14.0	17.1	18.0	22.2*
	Female	12.3	12.7	8.0	9.3	10.6	15.1	15.3	15.4*
Peripheral vascular disease	Male	15.2	12.1	14.3	13.6	15.3	18.8	16.1	18.4*
	Female	7.5	6.3	6.9	6.3	6.2	9.7	7.3	**
Rheumatic fever and	Male	1.1	1.2	1.6	1.4	1.4	**	**	6.0*
rheumatic heart disease	Female	1.6	1.6	1.6	2.2	1.9	2.3	1.2*	9.7*
All cardiovascular disease	*Male*	*314.1*	*291.1*	*308.4*	*282.0*	*311.0*	*343.4*	*292.2*	*330.5*
	Female	*207.8*	*191.4*	*201.8*	*179.7*	*196.1*	*220.2*	*187.5*	*254.4*
All causes of death	**Male**	**795.6**	**773.0**	**792.7**	**773.7**	**785.1**	**855.6**	**709.6**	**1,057.5**
	Female	**490.2**	**484.6**	**485.2**	**471.3**	**480.2**	**535.1**	**483.9**	**764.5**

* Rates should be interpreted with caution as the relative standard errors are between 25% and 50%.

** Rates are not presented as relative standard errors are greater than 50%.

Note: Age-standardised to the 1991 Australian population.

Source: AIHW National Mortality Database.

Table 5: Annual rates of change in cardiovascular disease death rates by States and Territories, 1987–98

Disease	Sex	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					Per cent					
Coronary heart disease	Male	–4.6	–4.1	–3.9	–4.3	–4.4	–4.2	–2.0	–2.7	–4.3
	Female	–4.2	–3.9	–3.8	–4.2	–4.3	–4.5	–4.1	–3.2	–4.1
Stroke	Male	–3.9	–3.2	–3.4	–3.0	–3.2	–2.2	–2.2	2.9	–3.4
	Female	–4.3	–3.5	–3.4	–2.3	–2.8	–3.4	—	2.3	–3.6
Heart failure	Male	–4.7	–3.7	–7.2	–3.0	–1.8	–3.3	2.2	—	–4.3
	Female	–4.7	–4.0	–6.3	–2.5	–2.6	–3.1	–4.1	—	–4.4
Peripheral vascular disease	Male	–2.6	–4.3	–3.0	–2.1	–2.2	–0.9	—	—	–2.9
	Female	–1.2	–1.5	—	–1.2	–2.7	1.6	—	—	–1.2
Rheumatic fever and	Male	–7.8	–4.7	–2.2	—	–2.4	—	—	—	–5.2
rheumatic heart disease	Female	–6.0	–4.8	–3.1	—	–4.5	—	—	—	–4.8
All cardiovascular disease	*Male*	*–4.1*	*–3.8*	*–3.8*	*–3.7*	*–3.9*	*–3.4*	*–2.4*	*–1.7*	*–3.9*
	Female	*–4.0*	*–3.7*	*–3.5*	*–3.3*	*–3.5*	*–3.9*	*–3.2*	*–1.8*	*–3.7*
All causes of death	**Male**	**–2.5**	**–2.4**	**–2.2**	**–1.8**	**–2.0**	**–2.0**	**–2.2**	**–2.4**	**–2.3**
	Female	**–2.2**	**–2.0**	**–1.8**	**–1.3**	**–1.5**	**–2.0**	**–1.6**	**–1.1**	**–1.9**

— Annual rates of change are not statistically significant.

Note: Annual rates of change are statistically significant at the 1% level.

Source: AIHW National Mortality Database.

Table 6: Cardiovascular disease risk factors by States and Territories, 1995[a]

Risk factor	Sex	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
					Per cent				
Diabetes type 2	Male	2.3	2.9	2.2	2.4	2.7	3.6	2.0	1.1
	Female	1.8	2.0	1.7	2.6	2.8	1.8	2.2	4.2
High blood pressure	Male	29.7	28.4	29.5	28.8	30.7	33.3	32.0	26.4
	Female	20.5	22.3	23.0	21.7	26.9	27.4	19.6	18.3
Overweight	Male	62.6	64.7	61.6	60.8	64.6	66.6	62.5*	52.0
	Female	46.9	49.7	44.4	47.2	49.7	54.2	51.5	46.5*
Physical inactivity	Male	34.8	34.9	34.5	30.6	35.0	33.9	23.3	42.9
	Female	37.7	32.8	34.9	29.2	35.0	36.1	28.1	35.5
Tobacco smoking[b]	Male	28.6	31.6	30.3	29.3	23.3	30.9	26.6	32.8
	Female	22.3	23.1	27.2	25.6	21.2	25.6	26.3	39.3

* Rates should be interpreted with caution as the relative standard errors are between 25% and 50%.

(a) Includes persons aged 18 years and over.

(b) Data from 1998 and includes persons 14+.

Note: Age-standardised to the 1991 Australian population.

Sources: 1998 National Drug Strategy Household survey; AIHW analysis of the 1995 National Health Survey (Australian Bureau of Statistics); AIHW analysis of the 1995 National Nutrition Survey (Australian Bureau of Statistics & Commonwealth Department of Health and Aged Care).

Table 7: Death rates for cardiovascular diseases and all causes of death by urban, rural and remote areas,[a] 1996–98

Disease	Sex	Urban	Rural	Remote
		Rate per 100,000 population		
Coronary heart disease	Male	178.1	193.4	195.2
	Female	98.5	103.3	102.6
Stroke	Male	59.5	62.0	54.6
	Female	53.7	54.1	51.3
Heart failure	Male	12.2	15.3	17.7
	Female	10.6	13.2	16.4
Peripheral vascular disease	Male	13.6	15.8	11.9
	Female	6.7	7.4	7.1
Rheumatic fever and	Male	1.2	1.4	3.5
rheumatic heart disease	Female	1.7	1.7	5.6
All cardiovascular disease	*Male*	*296.9*	*322.5*	*317.4*
	Female	*196.2*	*206.8*	*214.0*
All causes of death	**Male**	**770.4**	**824.6**	**903.3**
	Female	**481.4**	**498.2**	**579.8**

(a) Refers to 1994 Rural, Remote and Metropolitan (RRMA) classification.

Note: Age-standardised to the 1991 Australian population.

Source: AIHW National Mortality Database.

Table 8: Annual rates of change in cardiovascular disease death rates by urban, rural and remote areas,[(a)] 1987–98

Disease	Sex	Urban	Rural	Remote
		Per cent		
Coronary heart disease	Male	–4.5	–3.9	–3.7
	Female	–4.1	–4.1	–4.2
Stroke	Male	–3.5	–3.2	–4.0
	Female	–3.7	–3.4	–4.1
Heart failure	Male	–4.3	–4.4	–4.2
	Female	–4.5	–4.4	–4.7
Peripheral vascular disease	Male	–3.2	–2.3	–3.6
	Female	–1.4	–0.9	1.3
Rheumatic fever and	Male	–6.0	–4.4	—
rheumatic heart disease	Female	–5.3	–4.0	—
All cardiovascular disease	*Male*	*–4.0*	*–3.6*	*–3.7*
	Female	*–3.8*	*–3.7*	*–4.0*
All causes of death	**Male**	**–2.4**	**–2.1**	**–2.7**
	Female	**–1.9**	**–2.0**	**–2.3**

— Annual rates of change are not statistically significant.

(a) Refers to 1994 Rural, Remote and Metropolitan (RRMA) classification.

Note: Annual rates of change are statistically significant at 1% level.

Source: AIHW National Mortality Database.

Table 9: Cardiovascular disease risk factors for urban, rural and remote areas,[a] 1995

Risk factor	Sex	Urban	Rural	Remote
		Per cent		
Diabetes type 2[b]	Male	1.9	2.0	1.5
	Female	1.6	1.4	1.4
High blood pressure	Male	29.5	29.5	29.8
	Female	22.1	22.3	22.5
Overweight	Male	62.5	64.6	65.4
	Female	47.1	46.0	53.2
Physical inactivity	Male	32.8	30.9	39.2
	Female	34.2	32.2	33.8
Tobacco smoking[c]	Male	28.5	33.3	33.1
	Female	23.0	28.5	38.0

(a) Refers to 1994 Rural, Remote and Metropolitan (RRMA) classification. Includes persons aged 18 years and over.

(b) Also includes data from people aged less than 18 years.

(c) Data from 1998 and includes persons aged 14+.

Note: Age-standardised to the 1991 Australian population.

Sources: 1998 National Drug Srategy Household Survey; AIHW analysis of the 1995 National Health Survey (Australian Bureau of Statistics); AIHW analysis of the 1995 National Nutrition Survey (Australian Bureau of Statistics & Commonwealth Department of Health and Aged Care).

Table 10: Age-standardised death rates for cardiovascular diseases by quintiles of socioeconomic disadvantage, 1997

Disease	Sex	Quintiles (least to most disadvantaged) 1	2	3	4	5
		Rate per 100,000 population				
Coronary heart disease	Male	153.4	172.8	191.7	191.6	198.6
	Female	87.0	94.4	103.8	108.3	111.2
Stroke	Male	52.5	57.7	61.8	58.1	63.8
	Female	52.0	52.0	52.8	53.2	53.9
Heart failure	Male	12.1	11.1	15.8	12.1	14.3
	Female	9.3	10.5	13.2	11.8	11.9
Peripheral vascular disease	Male	10.9	14.9	15.2	16.3	17.0
	Female	6.1	6.9	6.9	7.9	7.3
Rheumatic fever and	Male	1.0	1.6	1.3	1.5	1.6
rheumatic heart disease	Female	1.9	1.5	1.8	2.2	2.1
All cardiovascular disease	*Male*	*261.3*	*287.2*	*320.9*	*314.9*	*332.0*
	Female	*178.0*	*189.0*	*205.0*	*209.4*	*215.2*
All causes of death	**Male**	**676.2**	**750.3**	**824.5**	**805.5**	**868.9**
	Female	**449.8**	**472.6**	**502.4**	**502.9**	**533.9**

Note: Age-standardised to the 1991 Australian population.

Source: AIHW National Mortality Database.

Table 11: Total health system costs of diseases of the circulatory system by health sector and disease type, 1993–94

ICD-9 chapter	Hospital inpatients					Drugs					
	Public hospitals[a]	Private hospitals	Non-inpatients	Nursing homes	Medical services[b]	Prescription	Over-the-counter	Allied health	Research	Other[c]	**Total costs[d]**
						$ million					
Coronary heart disease	*412.5*	*144.0*	*17.7*	*72.5*	*87.9*	*97.6*	*7.7*	*5.5*	*10.7*	*38.1*	***894.4***
Heart attack	114.1	10.8	0.5	25.3	3.2	0.8	0.2	0.1	2.0	7.2	**164.1**
Other	298.5	133.2	17.3	47.3	84.8	96.8	7.5	5.4	8.7	31.0	**730.3**
Diseases of arteries, arterioles, capillaries	*130.8*	*33.9*	*15.5*	*36.5*	*21.8*	*5.8*	*4.8*	*2.1*	*6.6*	*11.3*	***269.0***
Atherosclerosis	30.4	5.8	6.8	8.1	1.7	0.3	1.4	0.1	2.7	2.5	**59.6**
Aortic aneurysm	36.0	6.3	3.8	2.9	5.0	1.1	0.9	0.2	1.4	2.5	**60.2**
Other peripheral vascular disease	64.4	21.8	4.9	25.5	15.1	4.4	2.6	1.8	2.5	6.3	**149.3**
Diseases of pulmonary circulation	*18.6*	*2.9*	*0.7*	*5.3*	*2.6*	*1.7*	*0.3*	*0.2*	*1.0*	*1.4*	***34.6***
Diseases of veins, lymphatics, other	*87.4*	*57.7*	*11.7*	*32.1*	*45.9*	*17.4*	*5.9*	*2.2*	*2.6*	*11.7*	***274.7***
Phlebitis & thrombophlebitis	3.4	0.9	2.9	1.7	9.6	3.7	2.0	0.7	0.3	1.1	**26.2**
Varicose veins of leg	30.2	27.4	1.2	3.9	6.8	1.5	0.4	0.6	0.7	3.2	**76.0**
Haemorrhoids	19.6	20.9	1.8	4.2	17.3	9.6	1.3	0.7	0.8	3.4	**79.3**
Other	34.2	8.5	5.9	22.3	12.2	2.7	2.3	0.3	0.9	4.0	**93.2**
High blood pressure[e]	*18.7*	*4.3*	*31.8*	*6.7*	*216.6*	*409.6*	*66.5*	*20.1*	*21.8*	*34.9*	***831.0***
Rheumatic heart disease	*13.9*	*3.8*	*1.1*	*0.5*	*1.8*	*0.8*	*0.7*	*0.2*	*0.2*	*1.0*	***24.0***
Stroke	*235.2*	*34.2*	*13.7*	*265.4*	*31.5*	*10.3*	*2.7*	*4.8*	*5.9*	*27.0*	***630.5***

(continued)

Table 11 (continued): Total health system costs of diseases of the circulatory system by health sector and disease type, 1993–94

ICD-9 chapter	Hospital inpatients					Drugs					
	Public hospitals[a]	Private hospitals	Non-inpatients	Nursing homes	Medical services[b]	Prescription	Over-the-counter	Allied health	Research	Other[c]	**Total costs[d]**
						$ million					
Other forms of heart disease	*255.5*	*55.7*	*41.5*	*167.1*	*92.9*	*55.4*	*25.7*	*4.7*	*11.0*	*31.5*	*740.9*
Cardiac dysrhythmias	82.5	13.5	18.3	28.7	35.8	20.0	10.9	0.7	3.7	9.5	223.6
Heart failure	118.4	21.3	17.8	134.8	46.8	32.7	12.2	3.9	5.4	17.5	410.9
Non-rheumatic valvular disease	31.3	16.9	3.6	1.6	6.6	1.6	1.7	—	0.5	2.9	66.8
Cardiomyopathy and other heart diseases	23.3	4.1	1.7	2.0	3.6	1.0	0.9	0.1	1.4	1.6	39.6
Prevention and screening	*0.0*	*0.0*	*8.5*	—	*1.4*	*0.1*	*0.8*	—	*0.2*	*0.5*	*11.6*
Unspecified treatment and aftercare	*3.4*	*1.0*	*1.1*	*0.6*	*1.1*	*0.7*	*0.1*	—	*0.1*	*0.4*	*8.6*
Total	**1,176.0**	**337.5**	**143.2**	**586.9**	**503.4**	**599.4**	**115.3**	**39.7**	**60.1**	**157.9**	**3,719.4**

— Data not available.

(a) Public acute, public psychiatric and repatriation hospitals.

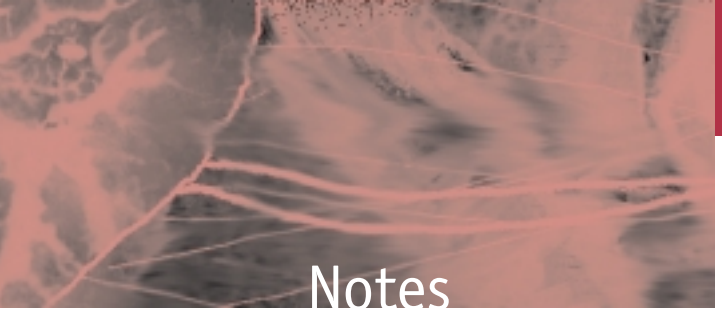
(b) Medical services for private patients in hospitals are included under Public hospitals and Private hospitals; medical services include services by general practitioners and specialists as well as pathology tests, screening and other diagnostic services.

(c) Includes other institutional, non-institutional and administration expenditure.

(d) Excludes expenditure for public health services, community health services, ambulances, medical aids and appliances.

(e) High blood pressure includes all persons with high blood pressure and those receiving treatment for high blood pressure.

Source: Mathers C & Penm R 1999, Health system costs of cardiovascular diseases and diabetes in Australia 1993–94, AIHW Cat. No. HWE 11, Canberra: AIHW.



Notes

1. The term 'cardiovascular disease' is used in this report to refer to heart, stroke and vascular diseases.
2. In keeping with the readable style of this publication references are not provided in the text. A list of references appears at the end of this section.
3. The recommendations expressed in this section are those of the National Heart Foundation of Australia and do not necessarily reflect the views of the Australian Institute of Health and Welfare.
4. This includes diseases of the circulatory system (ICD-9 codes 390–459) and circulatory-system-related congenital anomalies (ICD-9 codes 745–747).
5. Excludes Indigenous Australians living in remote areas.
6. Data based on ICD-10-AM codes G45, G46 and I00–I99.
7. Data based on ICD-9 codes 390–459.
8. Includes data from only Western Australia, South Australia and the Northern Territory.
9. Data based on ICD-10-AM codes I20–I25.
10. Data based on ICD-9 codes 410–414.
11. Includes data from only Western Australia, South Australia and the Northern Territory.
12. Data based on ICD-10-AM codes G45, G46 and I60–I69.
13. Data based on ICD-9 codes 430–438.
14. Includes data from only Western Australia, South Australia and the Northern Territory.
15 Data based on ICD-10-AM code I50.
16. Data based on ICD-9 code 428.
17. Includes data from only Western Australia, South Australia and the Northern Territory.
18. The Northern Territory has been excluded from this analysis due to the small number of deaths occurring there.
19. Data based on ICD-10-AM codes I71–I74.
20. Data based on ICD-9 codes 441–444.
21 Includes data from only Western Australia, South Australia and the Northern Territory.
22. The Northern Territory has been excluded from this analysis due to the small number of deaths occurring there.
23. Data based on ICD-10-AM codes I00–I02 and I05–I09.
24. Data based on ICD-9 codes 390–398.
25. Includes data from only Western Australia, South Australia and the Northern Territory.
26. Excludes Indigenous Australians living in remote areas.
27. Excludes Indigenous Australians living in remote areas.
28. Data based on ICD-10-AM codes E10–E14.
29. Data based on ICD-9 code 250.
30. Includes data from only Western Australia, South Australia and the Northern Territory.
31. This includes diseases of the circulatory system (ICD-9 codes 390–459) and circulatory-system-related congenital anomalies (ICD-9 codes 745–747).
32. Data based on ICD-10-AM codes and includes data for only Western Australia, South Australia and the Northern Territory.
33. Refers only to principal procedures.
34. Includes data from only Western Australia, South Australia and the Northern Territory.

Heart, Stroke and Vascular Diseases

Australian Facts 2001 presents the latest facts and figures on cardiovascular disease and its impact on the Australian community. It is the second report in a biennial series by the National Centre for Monitoring Cardiovascular Disease.

Published by the Australian Institute of Health and Welfare, the National Heart Foundation of Australia and the National Stroke Foundation, this is a comprehensive source of information covering patterns of cardiovascular health and illness among Australians, their associated risk factors, treatment and management of cardiovascular disease, and health care costs.

This valuable compilation will be relevant to the broader community as well as policy makers, health professionals and researchers interested in cardiovascular health.