

1 Overview

Cardiovascular health is a great test case for Australia's future well being. In recent decades, Australians have enjoyed greater life expectancy and a lower prevalence of some risk factors for heart, stroke and vascular disease. Australia and other developed countries have also made major advances in preventing heart, stroke and vascular disease and treating it once it occurs.

Despite this, heart, stroke and vascular disease is still the largest cause of premature death and death overall in Australia (and the world). Its health and economic burden exceeds that of any other disease. As well, Australia's very success in prevention and treatment poses new challenges to health care and the allocation of resources. Since age is the greatest risk factor for heart, stroke and vascular disease, advances in treatment and management are likely to shift the burden of the disease to higher age groups. This age-associated shift in disease focus, in combination with growing numbers of older Australians, is likely to add considerably to health care costs over the next several decades.

Because the actual number of patients with heart, stroke and vascular disease is expected to increase dramatically over the next few decades, the burden of heart failure and stroke in particular, but also heart attack, is likely to increase. This will require a stronger focus on preventing disability and enhancing quality of life in the ageing population, in addition to the emphasis on falls in mortality.

Certain groups in the population have significantly higher mortality from heart, stroke and vascular disease than other groups, particularly Indigenous Australians and those of lower socio-economic status. There is a clear need to reduce heart, stroke and vascular disease mortality in less advantaged groups.

It is now agreed that most of the premature deaths and much of the morbidity caused by heart, stroke and vascular disease are preventable. Furthermore, since heart, stroke and vascular disease shares risk factors with several other diseases and conditions, the health gains can be extended further. A number of major types of cancer (Australia's other main source of illness and premature death) share important and preventable risk factors with heart, stroke and vascular disease. These include tobacco smoking, physical inactivity, a diet high in fats and overweight. The latter three are also important in the prevention and management of the most common form of diabetes, another leading cause of mortality and morbidity in Australia. This suggests that prevention can occur on a broad front and bring even wider gains than those relating only to cardiovascular health.

1.1 Profile of heart, stroke and vascular disease

Heart, stroke and vascular disease comprises all diseases of the heart and blood vessels. The disease is also known as cardiovascular disease, or circulatory disease.¹ It includes coronary heart disease, stroke, heart failure and peripheral vascular disease, that are caused by a damaged blood supply to the heart, brain and legs. The main underlying cause of heart, stroke and vascular disease is a

1 Chapter IX (Diseases of the Circulatory System) of the WHO international classification of diseases (1998a) includes acute rheumatic fever, chronic rheumatic disease, hypertensive disease, ischaemic (coronary) heart disease, cerebrovascular disease and peripheral vascular disease.

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process known as atherosclerosis that clogs blood vessels. 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.

Extent of the problem²

Under the NHPA initiative, progress towards reducing the problem is measured by time trends of risk factor prevalence, morbidity and mortality.

Prevalence

Based on self reports during the 1995 National Health Survey, an estimated 2.8 million people aged 18 years and over (21 per cent of the Australian population in that age group) have had a recent and/or long-term cardiovascular condition (ABS 1997a).

The prevalence of heart, stroke and vascular disease conditions increases with age, from 4 per cent among 18 to 24 year olds to 61 per cent among those aged 75 years and over. The conditions are more prevalent among females (23 per cent) than males (19 per cent), explained partly by the higher prevalence of hypertension among females. The difference in rates between the two sexes is much smaller when age standardised.

Mortality

Heart, stroke and vascular disease is the leading cause of death among Australians, accounting for 53,990 deaths (26,550 males; 27,440 females), or 42 per cent of all deaths in 1996 (Figure 1.1). Although deaths from heart, stroke and vascular disease are a much smaller proportion of all deaths among males (39 per cent) than among females (45 per cent), males are more likely to die from heart, stroke and vascular disease prematurely. The male death rate is higher in most age groups, but the differential between the sexes declines with increasing age (Mathur & Gajanayake 1998).

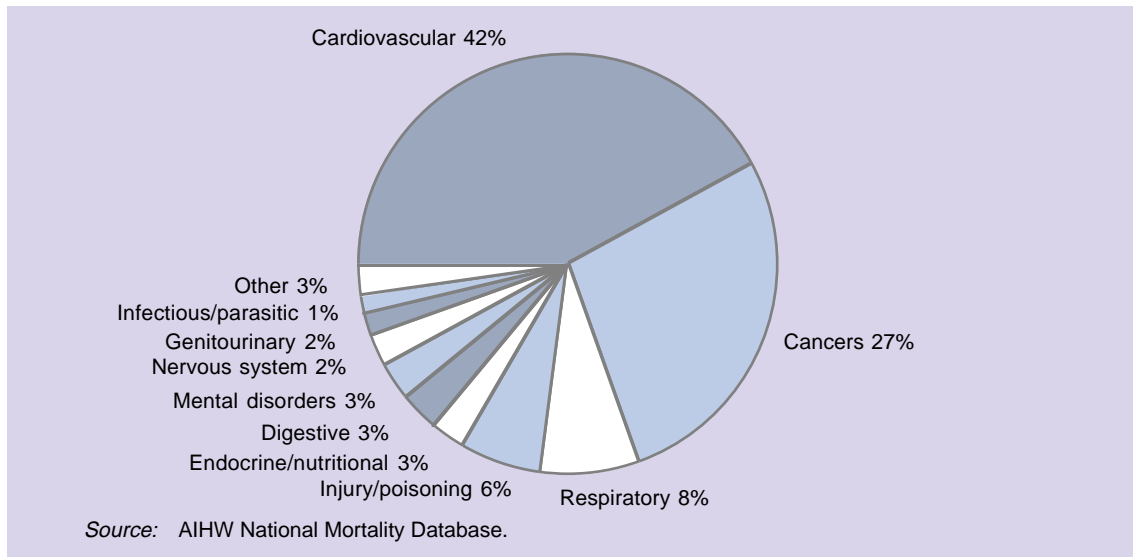
Indigenous people suffer higher heart, stroke and vascular disease death rates, at twice the rate of non-Indigenous Australians (Anderson et al 1996). Over the period 1994–1996, heart, stroke and vascular disease accounted for 28 per cent of all deaths of Indigenous persons, in comparison to 42 per cent in the total population. This is because Indigenous people tend to die much younger than other Australians, and the comparative age-specific rates were much higher in the Indigenous population (Mathur & Gajanayake 1998).

Certain other groups in the population also have higher heart, stroke and vascular disease death rates than the total Australian population. For example, people from lower socio-economic groups are more likely to die from heart, stroke and vascular disease than those from higher socio-economic groups. People born in Australia also have higher heart, stroke and vascular disease death rates than those born overseas.

² Unless otherwise indicated, data on epidemiology and risk factors in this chapter were provided by the AIHW.

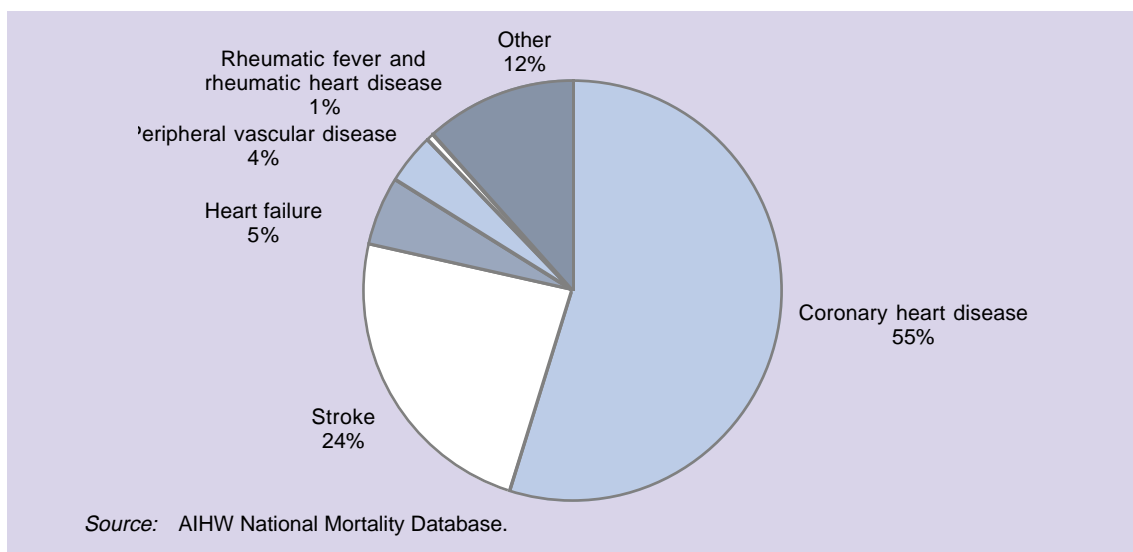
Profile of heart, stroke and vascular disease

Figure 1.1: Causes of death, Australia, 1996



Most cardiovascular deaths are caused by coronary heart disease and stroke (Figure 1.2). While coronary heart disease accounted for 55 per cent of all heart, stroke and vascular disease deaths in 1996, stroke was the underlying cause of death for 24 per cent of these deaths.

Figure 1.2: Deaths due to heart, stroke and vascular disease, Australia, 1996



Morbidity associated with heart, stroke and vascular disease is difficult to quantify fully. Hospital separations and visits to general practitioners are two major sources of information for determining the magnitude of heart, stroke and vascular disease morbidity.

Hospitalisation

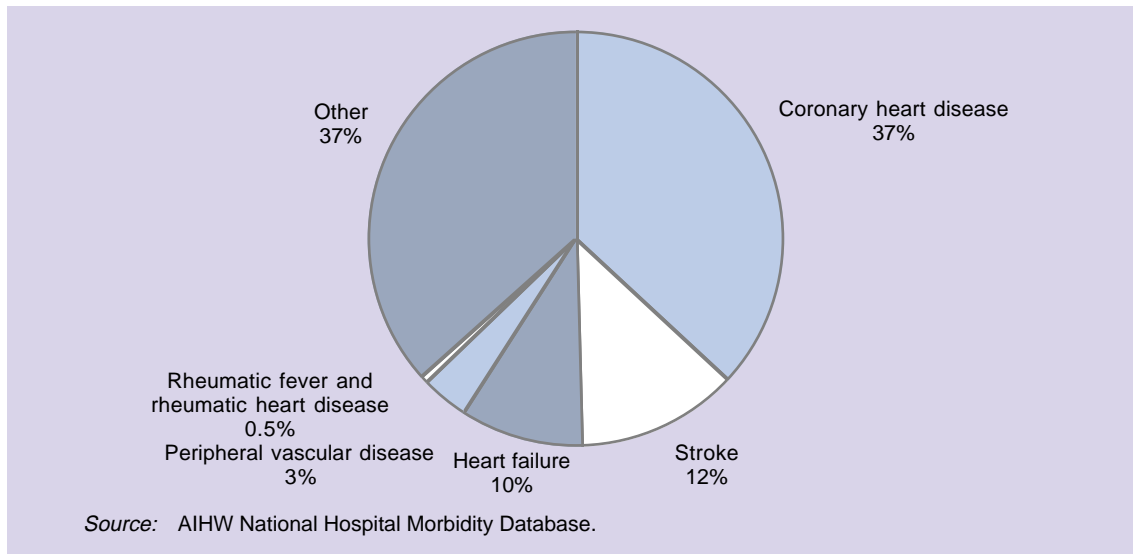
In 1996–97, over 421,000 hospital admissions were listed with heart, stroke and vascular disease as the principal diagnosis. This represents 8 per cent of all hospital separations, which is higher than the proportion for any other NHPA. Heart, stroke and vascular disease is also listed as an additional diagnosis in several other hospital separations. The average length of hospital stay for a

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principal diagnosis of heart, stroke and vascular disease is high — 5.9 days compared with an average of 4.2 days for all hospital stays in 1996–97.

The cardiovascular conditions that account for most hospital admissions are coronary heart disease, stroke and heart failure (Figure 1.3). However, these represent only 60 per cent of all separations with heart, stroke and vascular disease as a principal diagnosis.

Figure 1.3: Admissions to hospital for heart, stroke and vascular disease, Australia, 1996–97



Visits to general practitioners

In 1990–91, cardiovascular conditions were the second most frequently managed set of problems in general practice after respiratory conditions, accounting for 12.5 per cent of all problems managed (Bridges-Webb et al 1992). Approximately 14 per cent of cardiovascular problems managed were new problems.

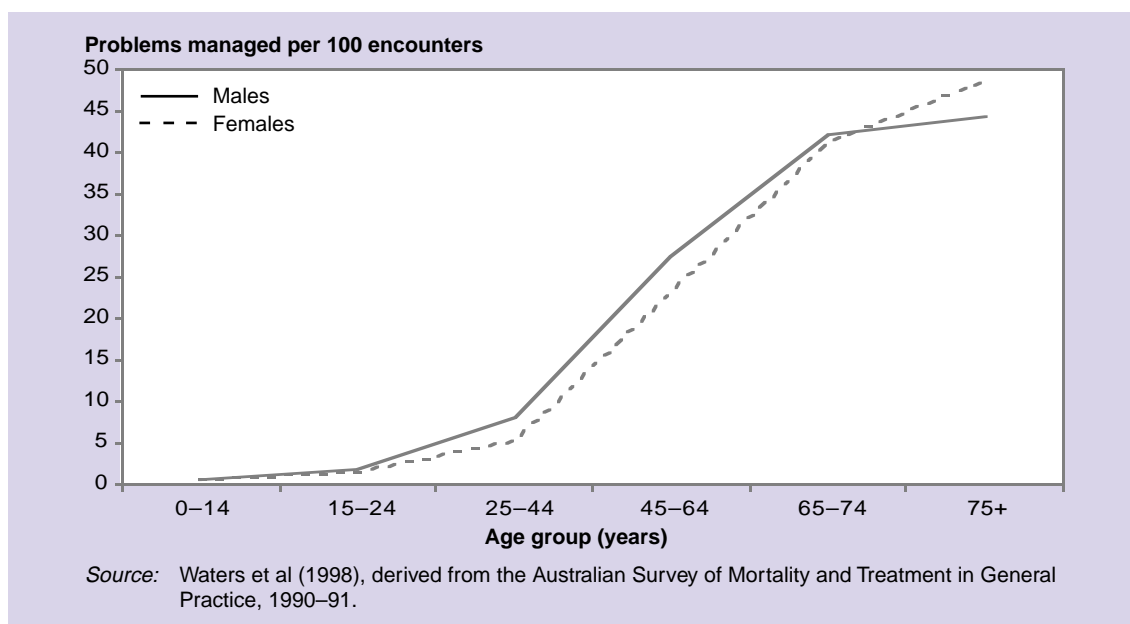
For both males and females, the average number of cardiovascular problems managed per 100 visits increases with age (Figure 1.4). In the younger age groups (< 25 years), there is little difference between males and females in the rate for problems managed. Between the ages of 25 and 74 years, males have higher rates of cardiovascular problems managed per 100 encounters than females. However, from age 75 years onwards, the rate of cardiovascular problems managed becomes higher for females than males.

Hypertension is the most common condition managed in general practice (Sayer et al 1994). In 1990–91, it accounted for 6.4 per cent of all problems managed. Only 5 per cent of all hypertension problems managed were new, reflecting the chronic nature of hypertension.

Other frequently managed cardiovascular conditions are heart failure, 'other and chronic coronary heart disease', angina and stroke. For each of these conditions, the average number of problems managed per 100 encounters increases with age, and males tend to have higher rates of problems than females.

Profile of heart, stroke and vascular disease

Figure 1.4: General practice consultations for heart, stroke and vascular disease, age-specific rates, 1990–91



Disability

The burden of heart, stroke and vascular disease is most evident in disability. About 2 per cent of Australian males and females are disabled by the disease (Mathers 1997). While all types of heart, stroke and vascular disease compromise a person's full functioning, stroke is one of the most prominent causes of disability.

Stroke is the cause of nearly 25 per cent of all chronic disability in Australia. About one-third of people who have a stroke 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.

International comparisons

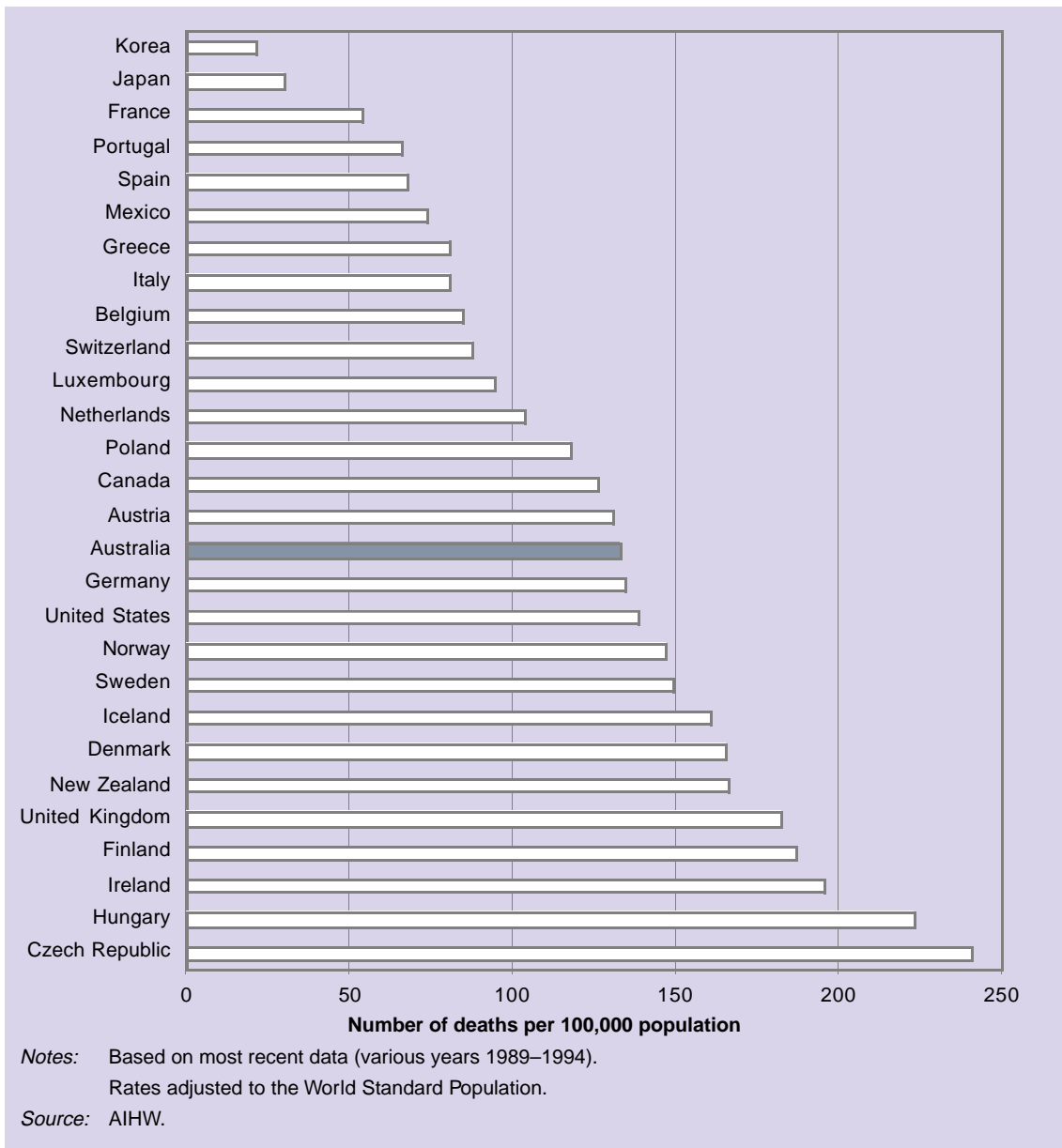
Although death rates from heart, stroke and vascular disease in Australia have more than halved since the 1950s, the rates remain high compared with other developed countries (de Looper & Bhatia 1998).

Among Organisation for Economic Cooperation and Development (OECD) countries, Australia ranks the ninth lowest out of 29 countries in age-standardised death rate for heart, stroke and vascular disease. In 1992, the rates were 61 per cent higher (males) than for Hong Kong and 65 per cent higher (females) than for France.

Australia's relative ranking is worse for coronary heart disease. In 1992, the death rate for coronary heart disease among Australians was more than five times that in Japan (Figures 1.5 and 1.6). This gap remains despite more than 50 per cent reduction in rates among both males and females over the past 40 years in Australia.

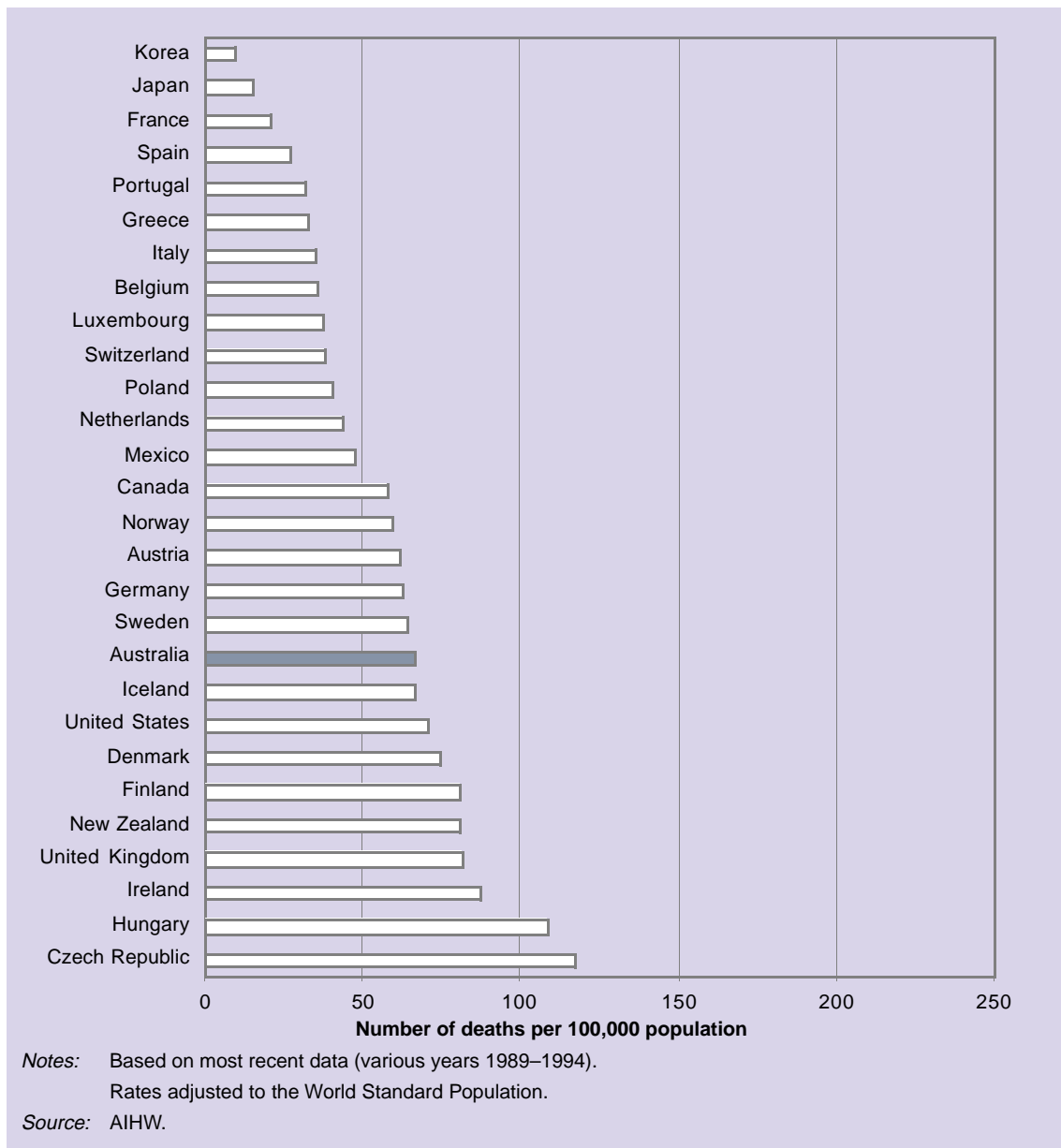
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Figure 1.5: Age-standardised male death rates for coronary heart disease in OECD countries, various years (1989–94)



Profile of heart, stroke and vascular disease

Figure 1.6: Age-standardised female death rates for coronary heart disease in OECD countries, various years (1989–94)



Starting from a low base, Australia has also made significant improvement in reducing death rates for stroke. Nonetheless, death rates for stroke are higher in Australia than in Canada, the United States, Switzerland and France among the OECD countries. In particular, in Switzerland where access of stroke patients to dedicated stroke units is virtually universal, the stroke death rates have declined by more than two-thirds since 1950–1954 (Victorian Stroke Strategy Taskforce 1998; de Looper & Bhatia 1998).

Although international comparisons of death rates may be influenced by differences in coding practices between countries, these benchmarks clearly indicate that there is potential for further lowering the death rate for heart, stroke and vascular disease in Australia. In particular, reductions in Japan and Sweden suggest that much more of the mortality from heart, stroke and vascular disease in Australia is preventable.

Specific diseases

Profiles of various heart, stroke and vascular diseases and conditions based on incidence, prevalence, hospitalisation and mortality are given below.

Coronary heart disease

Coronary heart disease includes conditions such as heart attack³ and angina caused by blockages in the coronary arteries which supply blood to the heart muscle. It is the most common cause of sudden death.

In 1995–96, the incidence of coronary events in Australia, mainly heart attacks, was estimated at 421 per 100,000 among males aged 35–69 years, and 137 per 100,000 among females of the same age. Of these, about 65 per cent were non-fatal heart attacks (AIHW 1998a). Almost 156,000 hospital separations were on account of coronary heart disease, representing 3 per cent of all hospital separations in 1996–97.

In about 25 per cent of cases, the first clinical manifestation of coronary heart disease is fatal. This highlights the importance of effective prevention and early treatment. In 1996, coronary heart disease was the major cardiovascular cause of death, accounting for 23 per cent of all deaths.

Stroke

Stroke is the most important manifestation of cerebrovascular disease. A stroke occurs when an artery supplying blood to a part of the brain suddenly becomes blocked or bleeds. This causes a loss of function of part of the brain and impairment in any or all of a range of functions including movement of body parts, planning, communication and swallowing.

About 85 per cent of strokes are *ischaemic*, due mainly to atherosclerosis affecting arteries leading from the heart, or arteries in the neck or brain. Another cause is clots that travel from the heart, usually as a result of atrial fibrillation or heart attack. About 15 per cent of strokes are *haemorrhagic*, caused by bleeding within the brain or on its surface.

The prevalence of stroke in Australia per year is estimated at 40,000 events, about half of which occur in people aged over 75. For almost 52,000 hospital episodes in 1996–97, stroke was listed as the principal diagnosis, accounting for 1 per cent of all hospitalisations. It was the leading cardiovascular condition in terms of average length of stay in hospital in 1996–97 (10.5 days).

Nearly 25 per cent of those who suffer a stroke die as a consequence of the stroke within one month, and altogether one-third die within 12 months (Donnan et al 1997; Anderson et al 1993a; 1993b). Stroke accounted for almost 10 per cent of all deaths in Australia in 1996.

3 In this report, the term 'heart attack' is used rather than the medical term 'myocardial infarction'. A heart attack is the clinical event of sudden death or chest pain which signifies that one of the heart's arteries has suddenly become blocked by a blood clot. Myocardial infarction refers to the actual death of heart muscle that so often results from the blockage. However, the process of muscle death takes several hours to become irreversible. Before emergency clot-dissolving treatment (thrombolysis) became available, all heart attacks (coronary events) became myocardial infarction or sudden death but that is no longer so.

Death rates for stroke are continuing to decline, by 3.4 per cent per year among males and 3.8 per cent among females (based on trend analysis of 1985–1996 mortality data), although there is some suggestion that the decline in the death rate for stroke may be slowing (Jamrozik 1997).

Heart failure

The term heart failure is used when the heart cannot pump blood well enough to meet the body's normal needs. The causes of heart failure include heart attack, hypertension or a damaged heart valve. When it causes swelling of the ankles and lung congestion it is termed congestive heart failure. It is usually serious but can be successfully treated with drugs.

Reliable data on the prevalence of the condition in Australia are not available but there were almost 41,000 hospitalisations with heart failure as the principal diagnosis in 1996–97, representing 0.8 per cent of all hospital separations. Heart failure accounted for 2 per cent of all deaths in 1996.

Peripheral vascular disease

Peripheral vascular disease involves a reduced blood supply or impaired return of blood affecting the extremities. This ranges from asymptomatic disease, through pain on walking, to pain at rest and limb-threatening ischaemia that can lead to amputation.

In 1996–97, there were almost 14,000 hospitalisations with peripheral vascular disease as the principal diagnosis, representing 0.3 per cent of all hospital separations. Peripheral vascular disease is estimated to have caused almost 2 per cent of all deaths in 1996.

Abdominal aortic aneurysm

Abdominal aortic aneurysm is an abnormal ballooning out of the aorta (the main artery leading from the heart) below the renal arteries. This progresses gradually and usually asymptotically over many years.

The prevalence of potentially life-threatening abdominal aortic aneurysm is estimated at 0.8 per cent in males aged 65–79 years and less than 0.2 per cent in females (Nicholls et al 1992). The incidence of this condition appears to have risen over the last two decades (Norman et al 1991; Semmens et al 1998).

Acute rheumatic fever and rheumatic heart disease

Childhood and adolescent attacks of Group A streptococcal throat infections can lead to acute rheumatic fever. The damage this can do to heart valves and other parts of the heart is known as rheumatic heart disease, which may cause serious problems in the acute stage as well as later in life.

Rheumatic heart disease is now rare in Australia generally but its prevalence among Indigenous people living in remote regions of the country (especially the Top End of the Northern Territory) is high (10–24 per 1,000 in the Indigenous population compared to less than 1 per 1,000 in the general population). Similarly, annual incidence rates of acute rheumatic fever are estimated to range from 3 to 12 per 1,000 in the Indigenous population compared to less than 0.05 per 1,000 in the general Australian population.

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In 1996–97, there were almost 2,000 hospital separations with rheumatic heart disease as the principal diagnosis. Acute rheumatic fever and rheumatic heart disease caused around 0.3 per cent of all deaths in 1996.

Risk factors

Increasing age, male gender and a family history are risk factors for heart, stroke and vascular disease that cannot be modified. There is also a range of risk factors that can be modified or managed. The range includes tobacco smoking, high blood pressure, high blood cholesterol, physical inactivity, overweight and obesity, high alcohol consumption, diabetes and non-valvular atrial fibrillation.

It is important to recognise that these risk factors are strongly influenced by the circumstances in which people live and work (see Section 6.3).

Table 1.1 lists the major established risk factors for coronary heart disease and stroke.

Table 1.1: Risk factors for coronary heart disease and stroke

Risk factor	Coronary heart disease	Stroke
<i>Demographic and hereditary factors</i>		
Age	✓	✓
Sex	✓	—
Family history of disease	✓	✓
<i>Behavioural risk factors</i>		
Tobacco smoking	✓	✓
Physical inactivity	✓	✓
Poor nutrition	✓	✓
High consumption of alcohol	✓	✓
<i>Physiological risk factors</i>		
High blood pressure	✓	✓
Elevated blood lipids	✓	✓
Overweight and obesity	✓	✓
Diabetes mellitus	✓	✓
Non-valvular atrial fibrillation	—	✓
Transient ischaemic attack	—	✓

Note: ✓ substantial evidence of association between the risk factor and the disease;
— no known association.

Tobacco smoking

There is a clear relationship between smoking and coronary heart disease (Prescott et al 1998), stroke (Robbins et al 1994), peripheral vascular disease (Krupski 1991) and abdominal aortic aneurysm (Lederle et al 1997). Passive smoking has also been associated with increased risk of heart disease (Kawachi et al 1997; Law & Hackshaw 1996; Lam & He 1997).

Because it can be prevented entirely in principle, and it approximately doubles the risk of dying of a heart attack, smoking is commonly regarded as the most important modifiable risk factor for heart, stroke and vascular disease.

Smoking cessation leads to a marked and rapid fall in the risk of heart, stroke and vascular disease (US Dept Health & Human Services 1990). The risk of a coronary event or stroke among former smokers has been reported to approach that of people who have never smoked within two to five years of cessation of smoking (Kawachi et al 1993; Negri et al 1994).

In Australia in 1995, an estimated 27 per cent of males and 20 per cent of females reported themselves as current smokers. Ex-smokers made up another 32 per cent of males and 23 per cent of females.

Physical inactivity

There is strong evidence that physical inactivity increases morbidity and mortality from coronary heart disease (especially heart attack and sudden death). The American Heart Association states that increasing levels of physical activity is as important in preventing coronary heart disease as lowering levels of cholesterol and blood pressure (Fletcher 1994). Evidence that physical activity plays a protective role against stroke is less clear, although such evidence is increasing (Stacco et al 1998; US Dept Health & Human Services 1996).

People who are physically inactive are almost twice as likely to die from coronary heart disease as those who are active (Berlin & Colditz 1990; Leon & Connett 1991). Physical inactivity also relates to other risk factors for heart, stroke and vascular disease, such as obesity, high blood pressure, total blood cholesterol and a poor cholesterol pattern (Blair 1997). There is evidence that an increase in physical activity over time is associated with a fall in levels of those risk factors (Young et al 1993).

The prevalence of physical inactivity is difficult to measure in population surveys. From various surveys, it is estimated that up to 50 per cent of Australians are physically inactive to a degree that carries a greater risk of heart, stroke and vascular disease.

High blood pressure

High blood pressure is a major risk factor for coronary heart disease, heart failure and stroke, with the risk increasing along with the level of blood pressure (Ashwell 1997; DSH 1994b; Whelton 1994; Kannel 1991).

Both systolic and diastolic blood pressures are predictors of heart, stroke and vascular disease at all ages (Kannel 1991), although systolic blood pressure is a stronger predictor of death due to coronary heart disease (Neaton & Wentworth 1992). When blood pressure is lowered by 4–6 mmHg over two to three years, it is estimated that the risk reduces by 14 per cent in patients with coronary heart disease and by 42 per cent in stroke patients (Collins et al 1990; Rose 1992).

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In Australia in 1995, 17 per cent of men and 15 per cent of women over 18 years of age had high blood pressure and/or were on treatment for the condition.

Non-valvular atrial fibrillation

Non-valvular atrial fibrillation occurs in about 10 per cent of those over the age of 75 years (Lake et al 1989), and increases stroke risk about five-fold (Wolf et al 1978). Among people with non-valvular atrial fibrillation, anticoagulation with warfarin reduces the relative risk of stroke by about 70 per cent and aspirin reduces the risk by about 30 per cent (Atrial Fibrillation Investigators 1994).

Nutrition

Poor nutrition can have many effects that contribute to heart, stroke and vascular disease. The types and proportions of fat and fibre as well as the level of dietary sodium, potassium and other components can variously have a wide range of effects. Among these are effects relating to blood cholesterol, blood pressure and perhaps heart rhythm. However, although the effects of dietary components are complex and inter-related, the most important single factor for heart, stroke and vascular disease appears to be the amount of saturated fat consumed. A population's level of saturated fat intake is the prime determinant of its level of blood cholesterol and, as shown below, high blood cholesterol is a key factor in heart, stroke and vascular disease, especially coronary heart disease.

Studies show a positive relationship between an individual's total blood cholesterol level and risk of coronary heart disease as well as death (Kannel & Gordon 1970; Pocock et al 1989).

Many studies have demonstrated the significance of blood cholesterol components as risk factors for heart, stroke and vascular disease. Evidence that raised low-density lipoprotein (LDL) cholesterol, the main component of blood cholesterol, is positively associated with coronary heart disease comes from epidemiology, animal research, clinical trials and genetic studies (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults 1994; Ashwell 1997). Conversely, a high concentration of high density lipoprotein (HDL), another key cholesterol component, appears to provide some protection against coronary heart disease (Pocock et al 1989). There is substantial evidence that lowering total and LDL cholesterol levels will reduce the incidence of coronary heart disease (LaRosa et al 1990; Muldoon et al 1990; Shepherd et al 1995).

There are no recent national data to provide information on the levels of blood lipids or triglycerides among Australians. However, according to National Heart Foundation Risk Factor Prevalence Survey data, the average levels of total blood cholesterol in the Australian population in 1989 were high and a major health concern. Of people aged 20–69 years, 47 per cent of men and 39 per cent of women had blood cholesterol levels above 5.5 mmol/L (Risk Factor Prevalence Study Management Committee 1990).

Overweight and obesity

Obesity is associated with increased morbidity and mortality (Pi-Sunyer 1993), particularly from heart, stroke and vascular disease (Eckel 1997). Even a modest degree of excess body fat has been associated with a higher risk of hypertension (Yong et al 1993; Huang et al 1998) and diabetes (Colditz et al 1990), both of which

contribute to heart, stroke and vascular disease. Abdominal obesity has been found to be a better predictor of cardiovascular morbidity and mortality than overall obesity (Prineas et al 1993).

Evidence that reducing weight reduces mortality from heart, stroke and vascular disease is inconclusive. However, there is evidence that losing weight reduces the incidence and severity of risk factors such as high blood pressure, high blood cholesterol and diabetes (Rissanen et al 1991; Pi-Sunyer 1993).

In 1995, according to the National Nutrition Survey (ABS & HEALTH 1998), almost 64 per cent of males and 49 per cent of females over 18 years of age were overweight. Over 18 per cent of Australians were estimated as being obese.

High consumption of alcohol

Evidence from prospective studies indicates that heavy alcohol consumption is associated with increased mortality and morbidity from coronary heart disease and stroke (Hanna et al 1992). Moderate to heavy drinkers have an increased risk of stroke compared to non-drinkers and light drinkers (Stampfer et al 1988).

It is well documented that increased consumption of alcohol, particularly binge drinking, is related to an increase in blood pressure (Wakabayashi et al 1994). Each increment of 10 g of alcohol drunk per day appears to increase systolic and diastolic blood pressure by 1–2 mmHg (Ashwell 1997). However, moderate intake of alcohol appears to have a protective effect against coronary heart disease (Rimm et al 1996).

In 1995, over 6 per cent of males and 4 per cent of females (aged over 15 years) reported drinking alcohol at levels dangerous to their health.

Diabetes

People with diabetes have two to five times increased risk of developing heart, stroke and vascular disease (Zimmet & Alberti 1997). It is the most common cause of death in people with diabetes. It is estimated that about 4 per cent of Australians have diabetes (Amos et al 1997).

Potential risk factors

In addition to the established risk factors described above, several other genetic, behavioural and physiological risk factors have been identified for heart, stroke and vascular disease. Under current investigation in particular are antioxidants and homocystine, which may eventually suggest further approaches to primary prevention.

Heart, stroke and vascular disease comorbidity

Comorbidity, which refers to the occurrence of more than one disorder at the same time, is commonly found among people with heart, stroke and vascular disease. An individual may have more than one cardiovascular condition, or may have a cardiovascular condition in combination with other diseases. While some comorbidity is of unrelated diseases, it often results from common sharing of risk factors. The issue of comorbidity of heart, stroke and vascular disease in relation to other NHPAs is discussed below.

Cardiovascular health and other National Health Priority Areas

Cardiovascular health shares a number of risk factors with other NHPAs, particularly diabetes. Having one disease or condition can predispose to another. The NHPA conditions have many common roots in lifestyle, social factors and the environment, eg the contribution of obesity to both cardiovascular problems and diabetes. Reducing the levels of these factors requires similar interventions and will bring benefits across all the NHPAs, although the effectiveness of the interventions may vary for each condition.

The overlap between the various NHPAs has implications for their control, especially in determining whether health care is helping to create a smaller burden of disease. Substitute morbidity and mortality following successful intervention for a condition or disease may offset the benefits to the population as a whole. The rising trends in cancer incidence, in juxtaposition to declining cardiovascular mortality, is an example of such an overlap between NHPA diseases and conditions.

In terms of overall NHPA goals, collaboration between various strategies, particularly in the area of prevention, is likely to prove cost-effective.

Diabetes

Heart disease is common among people with diabetes. During the 1995 National Health Survey, about 15 per cent of those with diabetes reported having heart disease, at almost six times the rate noted among people without diabetes. In 1996–97, almost one in six hospital separations with coronary heart disease as any listed diagnosis also had diabetes recorded as an associated diagnosis. Heart disease appears earlier in life and is more often fatal among those with diabetes.

Diabetes is also an important cause of stroke, and people with diabetes may have a worse prognosis after stroke. Diabetes may accentuate the role of elevated blood pressure in stroke.

The incidence and prevalence of peripheral vascular disease in those with diabetes increase with the duration of the peripheral vascular disease. Mortality is increased among patients with peripheral vascular disease and diabetes, in particular if foot ulcerations, infection or gangrene occur.

Not only do heart, stroke and vascular disease and diabetes share common risk factors, but diabetes is an independent risk factor for heart, stroke and vascular disease. However, there is limited information on whether the presence of heart, stroke and vascular disease promotes diabetes in some way.

High blood pressure, high cholesterol and obesity are often present along with diabetes. As well as all being independent cardiovascular risk factors, when they are in combination with glucose intolerance (a feature of diabetes) and other risk factors such as physical inactivity and smoking, these factors present a greater risk for heart, stroke and vascular disease. Evidence is accumulating that high cholesterol and glucose intolerance, which often occur together, may have a common aetiological factor.

Despite these similarities, trends in cardiovascular mortality and diabetes incidence and mortality are moving in opposite directions. While the ageing of the population following reductions in cardiovascular mortality may have contributed to these contrasting trends, the role of other factors also needs to be clearly understood if common risk factor prevention strategies are to be considered.

Cancer control

Cancer mortality is also decreasing in Australia, reflecting changes in patterns of exposure to risk factors, changes in treatment and early detection techniques, and the use of medical services.

However, the incidence of cancer is on the rise in Australia. While some of this increase is attributable to population growth and increased rate of detection of some cancers, ageing of the population (following sustained reduced mortality from heart, stroke and vascular disease) over the past several years may have led to a substantial substitute effect.

The co-presence of both heart, stroke and vascular disease and cancer is not uncommon. However, there is no known common cause. The two groups of diseases also share several risk factors. The contribution of smoking to both diseases is well documented; obesity, heavy alcohol use and other risk factors may also contribute to both groups.

Injury prevention and control

The impact of external injuries upon cardiovascular outcomes is rarely quantified. Injuries may initiate incipient diseases or problems, including those that predispose to heart, stroke and vascular disease. They may also force lifestyle changes that alter the cardiovascular health of the individual.

The presence of heart, stroke and vascular disease may affect recovery from an accident but there are limited statistics available to support this.

Mental health

Psychosocial disorders are one of the most difficult problems for physicians caring for those with chronic conditions such as heart, stroke and vascular disease.

Emotional problems following stroke have been reported for several decades. Post-stroke depressive disorders are common, often severe and lengthy if untreated. Depression is also a common problem associated with heart disease. Studies indicate that 10 to 20 per cent of patients with heart attack, heart failure and other forms of chronic heart disease have depressive symptoms. Almost 5 per cent may suffer from major depression.

Marmot et al (1998) and others have recently suggested physical and chemical mechanisms by which social and emotional factors cause coronary heart disease. Further evidence is required to support these suggestions.

1.2 Trends in mortality and prevalence

Mortality

There has been a substantial decline in heart, stroke and vascular disease mortality in Australia over recent decades (Figures 1.7 and 1.8). This trend in death rates continues among both males and females, and more rapidly than for non-cardiovascular mortality.

Figure 1.7: Trends in heart, stroke and vascular disease mortality among males, Australia, 1950–1996

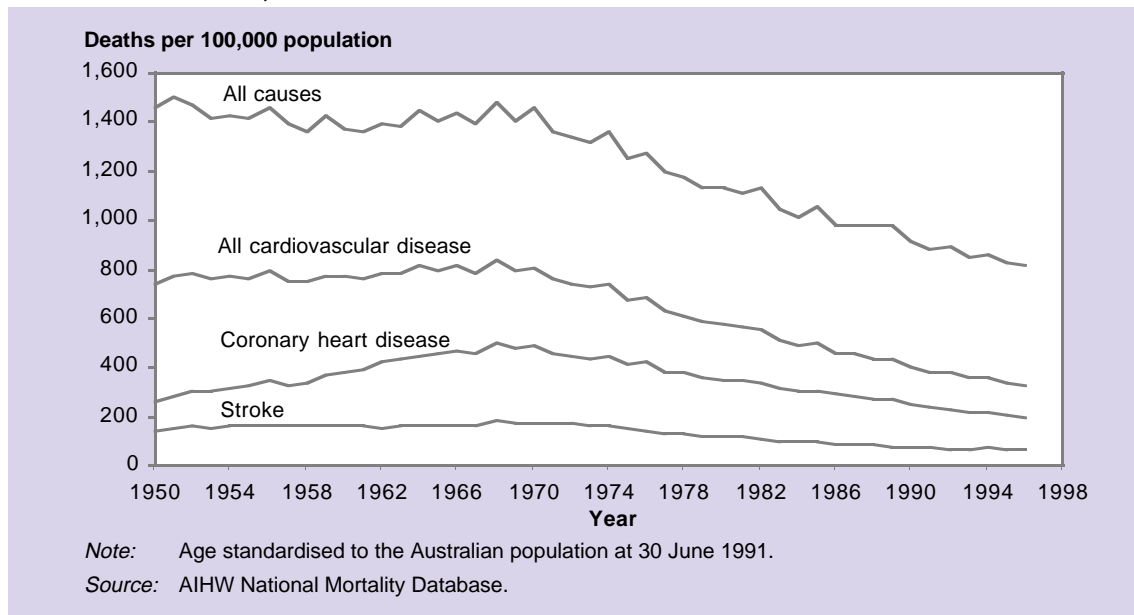
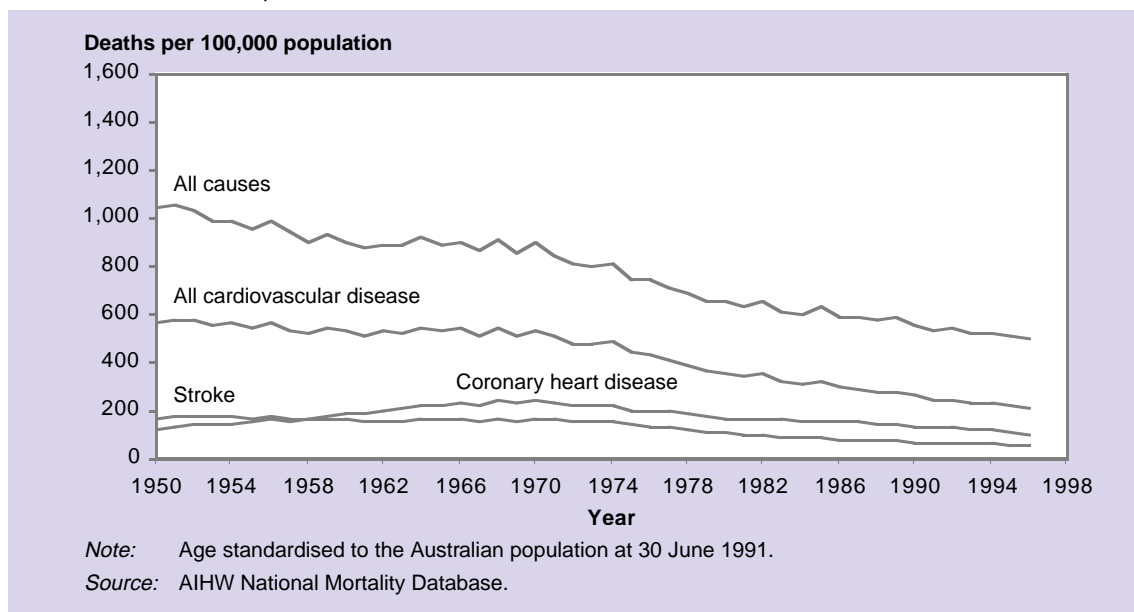


Figure 1.8: Trends in heart, stroke and vascular disease mortality among females, Australia, 1950–1996



Between 1985 and 1996:

- Heart, stroke and vascular disease death rates declined with an annual average of 3.7 per cent for males and 3.6 per cent for females. The corresponding rates of decline for all causes of death were 2.2 and 1.9 per cent, respectively.
- Coronary heart disease death rates declined 4.0 per cent per year among males and 3.6 per cent per year among females during that period. Deaths from heart attacks, the major contributor to coronary heart disease mortality, declined at an annual rate of 5.5 per cent among males and 4.7 per cent among females.
- Mortality from stroke declined 3.4 per cent per year among males and 3.8 per cent per year among females, and the decline occurred in all age groups.
- The rate of decline in death rates was faster in the younger age groups. For example, coronary heart disease death rate declined annually by 5.6 per cent for males and 6.2 per cent for females in the age group 25–74 years. The corresponding figures for stroke were 5.1 and 6.0 per cent respectively.

Disease prevalence

A comparison of the 1989–90 and 1995 National Health Surveys reveals an increase in the prevalence of heart, stroke and vascular disease conditions, from 174 per 1,000 adults (persons aged 18 years and over) to 209 per 1,000 adults. Hypertension was estimated to have increased by 17 per cent between the two periods; heart disease in comparison increased by about 5 per cent. The largest increase in reported prevalence was noted for ‘other circulatory diseases’ (which includes aortic aneurysm and peripheral vascular disease) which appears to have increased from 22 per 1,000 adults to 52 per 1,000 adults, an increase of 136 per cent (ABS 1997a).⁴

Several different factors may have contributed to this increase in the reported prevalence. While some of the increase is due to the ageing of the population, the increase may also be a reflection of heightened public awareness and improved medical diagnosis related to heart, stroke and vascular disease conditions (ABS 1997a). Even after removing the effect of the ageing of the population — by age and sex standardising the data — the prevalence rate increased from 180 per 1,000 adults to 209 per 1,000 adults between the two periods.

It is estimated that, compared with other groups of diseases, eliminating heart, stroke and vascular disease in Australia would result in the greatest gain in disability-free life expectancy. It would add five healthy years to the average life expectancy at birth for males and 2.7 healthy years for females (Mathers 1997). For individual diseases, eliminating coronary heart disease would achieve the greatest gain in healthy life expectancy at birth — an average of 2.4 years for males and 1.1 years for females. Similarly, eliminating stroke would lead to an additional 0.7 healthy years on average for males and 0.6 healthy years on average for females.

4 Care should be taken in interpreting trends as changes in survey methods may affect comparability between the surveys.

1.3 Issues in heart, stroke and vascular disease

Increasing burden

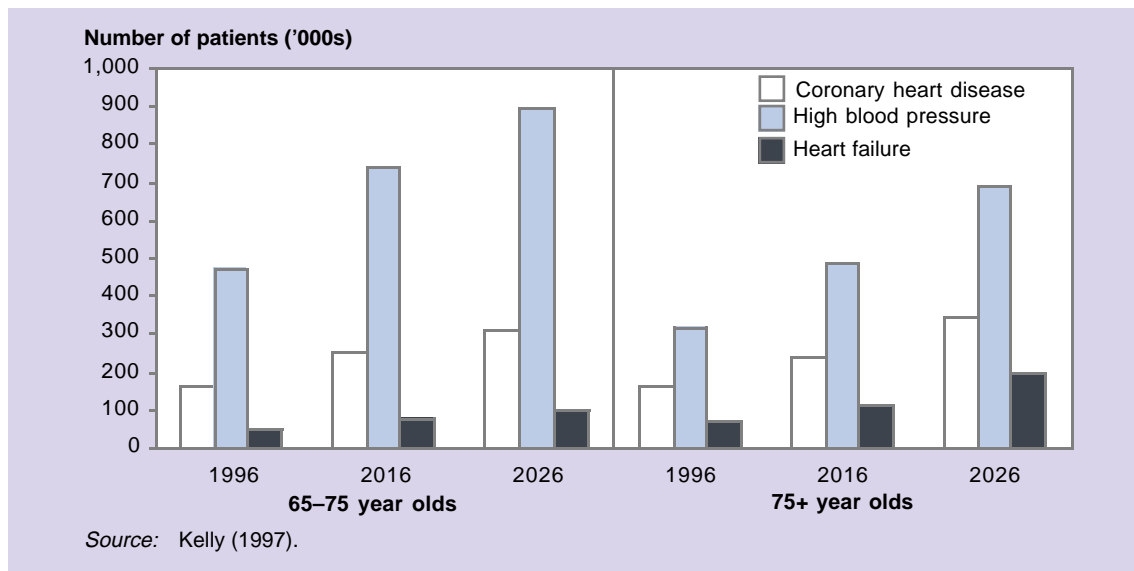
Despite the downward trends in death rates, the burden of heart, stroke and vascular disease appears to be rising. The increase is mainly because the population is ageing, but also partly because of declines in heart, stroke and vascular disease death rates among younger age groups. This has important health care and resource implications.

Coronary heart disease, stroke, hypertension and heart failure are common conditions among older people. It is expected that their treatment with drugs and other medical interventions will place increasing demand on the health care system over the next several decades. At the same time, more emphasis will be needed on preventing and reducing disability and improving quality of life in this age group.

More than 2.2 million Australians in 1993–94 were aged 65 years or more. They were 12 per cent of the population, but accounted for about two-thirds of the cardiovascular health care costs. Over 50 per cent of these people were reported to have some form of heart, stroke and vascular disease.

Figure 1.9 shows projected numbers of older persons with certain cardiovascular conditions in Australia over the next 30 years, with an approximate two-fold increase in prevalence expected (Kelly 1997).

Figure 1.9: Projected numbers of older patients with certain heart, stroke and vascular conditions, Australia



Similarly for stroke, it is expected that between 1996 and 2016 there will be a 69 per cent increase in new cases and a 45 per cent increase in the total cost of stroke (NHMRC 1997a).

Population groups at higher risk

Certain groups in the population have significantly higher risk of heart, stroke and vascular disease mortality than others (discussed in more detail in Chapter 6).

- Indigenous Australians die from heart, stroke and vascular disease at twice the rate of the non-Indigenous population. Among Indigenous adults of working age, the ratio is six to nine times higher for males and females respectively, with the greatest difference occurring in the younger age groups. Although heart, stroke and vascular disease death rates are declining among Indigenous females (5.2 per cent annually between 1991 and 1996), there has been no decline among Indigenous males over the same period (Mathur & Gajanayake 1998).
- People of lower socio-economic status are more likely to die from heart, stroke and vascular disease than are those from higher socio-economic levels. This difference existed throughout the 1970s and 1980s, and has persisted into the 1990s (Bennett 1996; Mathers 1994).
- Males in rural and remote areas are more likely to die from heart, stroke and vascular disease than those living in urban areas. For females, heart, stroke and vascular disease death rates show less difference across urban, rural and remote areas (Mathur & Gajanayake 1998; Strong et al 1998).
- Males are twice as likely to die from coronary heart disease than females, with males aged under 65 experiencing three to five times higher death rates than females. Age-standardised death rates for coronary heart disease among older females approach that of older males. For stroke, the difference between males and females is not as marked (Mathur & Gajanayake 1998).

Heart, stroke and vascular disease labour force

Comprehensive information on the labour force related to heart, stroke and vascular disease in Australia is unavailable. However, some information on the number of medical practitioners in cardiovascular and related specialities can be extracted from the Medical Labour Force Survey (AIHW 1997a). Medicare data also contain information regarding services provided in relation to cardiovascular conditions.

In 1995, there were an estimated 471 cardiologists, 84 cardiothoracic surgeons, 106 neurosurgeons and 122 vascular surgeons registered and practising in these respective fields as their main specialty. In addition, there were an estimated 71 general practitioners mainly practising in cardiology (AIHW 1997a).

Medicare data, which do not cover services to private patients in public hospitals or outpatient services by public hospitals, indicate that 473 cardiologists provided 1.7 million services in 1994–95, representing an average of 949 in-hospital and 2,646 out-of-hospital services per cardiologist. An estimated 90 cardiothoracic surgeons provided 63,000 services, amounting to an average of 408 in-hospital and 289 out-of-hospital services per practitioner. An estimated 94 neurosurgeons provided 93,000 services, amounting to 305 in-hospital and 684 out-of-hospital services per practitioner. An estimated 119 practitioners performed 198,000 vascular procedures, representing 404 in-hospital and 1,258 out-of-hospital procedures per practitioner (Table 1.2) (AIHW 1996).

Overview

Table 1.2: Heart, stroke and vascular disease related Medicare providers and services, 1994–95

Specialty	Number of practitioners	Number of services ('000s)	Average number of services per practitioner	
			In hospital	Out of hospital
Cardiology	473	1,700	949	2,646
Cardiothoracic surgery	90	63	408	289
Neurosurgery	94	93	305	684
Vascular surgery	119	198	404	1,258

Source: Department of Health and Aged Care (unpublished data).

Substantial changes have occurred in medical education and training over the last decade, and it is likely that further changes will reflect the changing nature of heart, stroke and vascular disease and its management. A major impact of advances in medical technology and interventions is likely to be a reduction in the need for and duration of hospital stay for many clinical conditions. The rapidly changing nature of hospital practice, and increasing use of outpatient or community-based treatment programs, may also have an impact on the cardiovascular health labour force.

Health system costs of heart, stroke and vascular disease

Direct health care costs for heart, stroke and vascular disease were estimated at \$3,719 million in 1993–94 (Mathers & Penm, in press). These include costs for inpatient and outpatient hospital services, nursing homes, medical services, pharmaceuticals, allied health services, research, other institutional items and administration, but do not include costs of ambulance services, community health services or medical aids and appliances. Indirect costs, such as those associated with lost production due to sickness and premature death, and intangible costs such as those due to pain, suffering, anxiety and bereavement, are also not accounted for.

In comparison with other major disease groups, heart, stroke and vascular disease ranked first in terms of direct costs, together with diseases of the digestive system (12 per cent). Other major disease groups accounting substantial proportions of health costs were: musculoskeletal conditions (10 per cent); mental disorders (8 per cent); injury and poisoning (8 per cent); respiratory diseases (8 per cent); cancers (6 per cent); and diseases of the genito-urinary tract (5 per cent).

Hospital expenditure for inpatients accounted for 41 per cent of the health care costs of heart, stroke and vascular disease. Pharmaceutical costs accounted for a further 20 per cent, while expenditure on nursing homes and medical services each accounted for approximately 15 per cent. Investment in prevention and screening activities amounted to only 0.3 per cent of the total cost of heart, stroke and vascular disease.

Coronary heart disease was the major contributor to the costs of health care for heart, stroke and vascular disease in 1993–94, accounting for 25 per cent (\$894 million) of the total. Approximately one-fifth (\$168 million) of the cost of coronary heart disease was attributable to acute heart attacks. Other major

Issues in heart, stroke and vascular disease

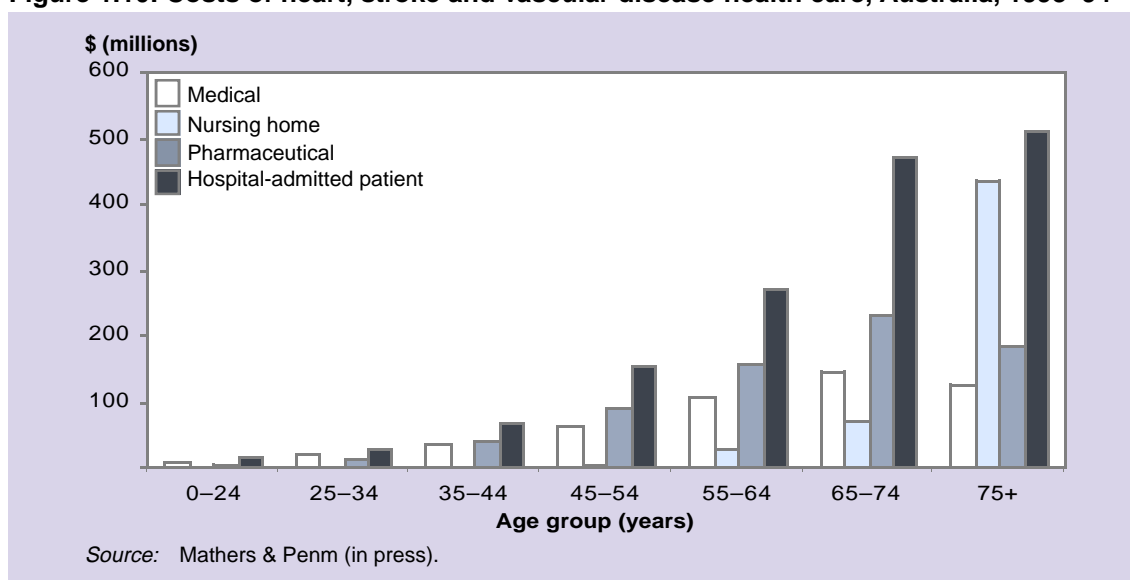
contributors to the health care costs of heart, stroke and vascular disease in 1993–94 were: hypertension (22 per cent); stroke (17 per cent); and ‘other forms of heart disease’ (20 per cent), particularly heart failure (11 per cent).

In terms of specific sectors of expenditure for heart, stroke and vascular disease, coronary heart disease was the major contributor to hospital inpatient costs. Stroke dominated nursing home costs, while hypertension was the major contributor to medical, pharmaceutical, allied health professional and outpatient costs.

Overall, the health care costs of heart, stroke and vascular disease were similar for both sexes. The largest relative differences were for nursing home costs (higher for females) and hospital inpatient costs (higher for males).

The health care costs of heart, stroke and vascular disease increased with age for both sexes, with 65 per cent of the total spent on those aged over 64 years (Figure 1.10). The rise was particularly marked for hospital expenditure for admitted patients after age 64, and nursing homes after age 74.

Figure 1.10: Costs of heart, stroke and vascular disease health care, Australia, 1993–94



It is clear that heart, stroke and vascular disease places a heavy burden on society in terms of illness, disability and economic cost, despite the great improvements in death rates in recent decades. With an ageing population, the impact of heart, stroke and vascular disease is expected to remain a major concern. And yet much of this disease is preventable. Far too many Australians remain at higher risk of heart, stroke and vascular disease through tobacco smoking, physical inactivity, high blood pressure, high blood cholesterol and overweight. Effective treatment and continuing care of people with heart, stroke and vascular disease is also important in reducing case fatality rates and the recurrence of events such as heart attack and stroke.

Prevention and management of heart, stroke and vascular disease are discussed in detail in Chapters 3 and 4, and the potential for the most effective use of these strategies to further improve the cardiovascular health of Australians is discussed in Chapter 5. National indicators have been set for risk factor levels and for heart, stroke and vascular disease, and these are summarised in Chapter 2.

