Cardiovascular Health

Edited by Justin Healey
Cardiovascular Health is Volume 340 in the ‘Issues in Society’ series of educational resource books. The aim of this series is to offer current, diverse information about important issues in our world, from an Australian perspective.

**KEY ISSUES IN THIS TOPIC**
Cardiovascular disease (CVD) covers all diseases and conditions of the heart and blood vessels, including coronary heart disease, stroke, heart failure, and peripheral vascular disease. Cardiovascular diseases are the biggest cause of deaths worldwide. Although death rates for cardiovascular disease in Australia have declined considerably in recent decades, it continues to be the leading cause of premature death; the health and economic burden of CVD continues to exceed that of any other disease. Ninety per cent of Australians have at least one lifestyle-related risk factor for cardiovascular disease.

This book provides an overview of the prevalence and types of cardiovascular disease and offers risk reduction advice for the major modifiable risk factors – smoking, high blood pressure, high blood cholesterol, physical inactivity, overweight and obesity, diabetes and poor nutrition. How is your heart health?

The information on this topic is presented in two chapters: Cardiovascular disease: prevalence and causes; and Cardiovascular disease risk reduction.

**SOURCES OF INFORMATION**
Titles in the ‘Issues in Society’ series are individual resource books which provide an overview on a specific subject comprised of facts and opinions.

The information in this resource book is not from any single author, publication or organisation. The unique value of the ‘Issues in Society’ series lies in its diversity of content and perspectives.

The content comes from a wide variety of sources and includes:
- Newspaper reports and opinion pieces
- Website fact sheets
- Magazine and journal articles
- Statistics and surveys
- Government reports
- Literature from special interest groups

**CRITICAL EVALUATION**
As the information reproduced in this book is from a number of different sources, readers should always be aware of the origin of the text and whether or not the source is likely to be expressing a particular bias or agenda.

It is hoped that, as you read about the many aspects of the issues explored in this book, you will critically evaluate the information presented. In some cases, it is important that you decide whether you are being presented with facts or opinions. Does the writer give a biased or an unbiased report? If an opinion is being expressed, do you agree with the writer?

**EXPLORING ISSUES**
The ‘Exploring issues’ section at the back of this book features a range of ready-to-use worksheets relating to the articles and issues raised in this book. The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

**FURTHER RESEARCH**
This title offers a useful starting point for those who need convenient access to information about the issues involved. However, it is only a starting point. The ‘Web links’ section at the back of this book contains a list of useful websites which you can access for more reading on the topic.
CARDIOVASCULAR HEALTH

**Australian Institute of Health And Welfare** explains why cardiovascular disease is one of the biggest health problems requiring attention in Australia

### What is cardiovascular health?

Cardiovascular health relates to the health of the heart and blood vessels. It also relates to the health of organs that are critically dependent on a strong blood supply.

Maintenance of cardiovascular health and prevention of cardiovascular disease are the focus of the National Health Priority Area (NHPA) initiative in this particular priority area.

- Major cardiovascular diseases are:
  - Coronary heart disease
  - Stroke
  - Heart failure
  - Peripheral vascular disease.

The main underlying causal mechanism of cardiovascular disease is atherosclerosis, a process marked by abnormal build-ups of fat, cholesterol and other substances in the inner lining of the arteries. It is most serious when it affects the blood supply to the heart (causing angina or heart attack) or to the brain (causing a stroke).

### Why is cardiovascular health a National Health Priority Area?

Cardiovascular disease is the largest cause of premature death in Australia. Although death rates for cardiovascular disease have declined considerably in recent decades, it continues to be one of the biggest health problems requiring attention in Australia. Its health and economic burden continues to exceed that of any other disease.

Improved treatment and management of risk factors for cardiovascular disease may also result in the burden of death and disability to shift to older age groups.

**Cardiovascular disease is the largest cause of premature death in Australia.**

This age-associated shift in disease focus, in combination with growing number of older Australians, is likely to add considerably to health care costs over the next several decades. This will also require a stronger focus on the prevention of disability and enhancement of the quality of life in the ageing population, in addition to the continued emphasis on avoiding premature mortality.

In 2007, CVD was recorded as the primary cause of death for 46,623 Australians, accounting for just over a third of all deaths in that year. Half of these deaths (22,727) were due to coronary heart disease, and 8,623 to stroke. Over 78% of the CVD deaths were of people aged 75 years and over, and more than half were female (52.7%). (*Australia’s Health 2010* pages: 140-144, June 2010)

Based on the 2007-08 National
Health Survey (NHS), an estimated 3.4 million Australians (16.5% of the population) had one or more long-term diseases of the circulatory system that year. A higher proportion of females in the survey (17.6%) reported having CVD than males (15.3%) and the prevalence increased with age. (Australia’s Health 2010 pages: 141-144, June 2010)

It is estimated that 3.5 million Australians aged 16-85 years had a long-term chronic condition of CVD in 2007. As with the NHS, estimates are based on self-reported responses. Of those reporting CVD, 23.1% (corresponding to 800,000 people) reported also having a disability that led to a mild to profound restriction to core activities such as self-care, mobility and communication.

Compared with those without CVD, and after adjusting for age, those reporting a CVD condition were more likely to report that they had a disability, medium or high levels of psychological distress, fair or poor mental and physical health, depression or a schooling or employment restriction. (Australia’s Health 2010 pages: 142-144, June 2010)

The major, preventable risk factors for cardiovascular disease are:

➤ High blood pressure
➤ High blood cholesterol
➤ Insufficient physical activity
➤ Overweight and obesity
➤ Poor nutrition
➤ Diabetes.

It is estimated that 3.5 million Australians aged 16-85 years had a long-term chronic condition of cardiovascular disease in 2007.

Some of these risk factors are common to several other diseases and conditions, such as cancer and kidney disease, suggesting that successful prevention would assist in the reduction of other diseases besides cardiovascular disease.

From 1986 to 2006, the steady decline in CVD death rates has continued. In men, the age-standardised death rates for CVD decreased on average by 3.3% per year during 1987-1996 and 5.0% during 1997-2006. For women, the decline was 3.2% per year and 4.5% per year, respectively, over the two periods. (Cardiovascular Disease Mortality pages: 6-10, April 2010)

CVD is projected to account for 16% of the overall disease burden in Australia in 2010, with coronary heart disease and stroke contributing over four-fifths of this burden. Most of the CVD burden comes from premature death. For 2010, it is estimated that CVD will be responsible for 26% of total years of life lost due to premature mortality in Australia, second only to cancer (34%), and 7% of Australia’s total years lost due to disability. (Australia’s Health 2010 pages: 143-145, June 2010)

CVD is the most expensive disease group in Australia in terms of direct health-care expenditure. In 2004-05 it cost $5.94 billion – 11% of overall recurrent health system expenditure that could be allocated to various diseases. (Australia’s Health 2010 pages: 143-145, June 2010)
Despite major gains against CVD over the past 40 years it continues to have a major effect on the health of Australians in terms of prevalence, mortality, morbidity, burden of disease and expenditure. CVD remains Australia’s biggest killer, mostly because of the deaths it causes among older people. It is also the second largest contributor to the burden of disease in Australia, after cancer.

The term cardiovascular disease covers all diseases and conditions of the heart and blood vessels (see Box 4.3). Coronary heart disease, stroke, heart failure and peripheral vascular disease are the major contributors to the burden of CVD. Congenital heart and vascular diseases constitute one of the leading causes of death in the first year of life. Rheumatic fever and chronic rheumatic heart disease are a problem among Aboriginal and Torres Strait Islander people.

### BOX 4.3: DEFINITION OF CARDIOVASCULAR DISEASE

The definition of ‘cardiovascular disease’ differs between organisations and data collections. In this report, as in other material prepared by the Australian Institute of Health and Welfare (AIHW), the terms ‘cardiovascular disease’, ‘circulatory disease’ and ‘heart, stroke and vascular diseases’ are used interchangeably to convey the same meaning. They include all diseases in Chapter 9 (codes I00-I99) of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM).

It should be noted that the AIHW and the Australian Bureau of Statistics (ABS) use the term ‘heart, stroke and vascular diseases’ somewhat differently. For the ABS, the term represents a subgroup of ‘diseases of the circulatory system’ (ABS 2009a).

For the most common forms of CVD, the main underlying causal mechanism is plaque formation, a process marked by abnormal build-ups of fat, cholesterol and other substances in the inner lining of the arteries. Plaque is most serious when it leads to a reduced or blocked blood supply to the heart (causing angina or heart attack) or to the brain (causing a stroke).

The major preventable risk factors for CVD are tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition and diabetes. Atrial fibrillation, transient ischaemic attack and a high intake of alcohol also increase the risk of stroke.

This section provides a brief statistical profile of CVD as a whole, followed by sections on its main component diseases. Information is also presented on the use of health services. CVD in Indigenous Australians is discussed in Chapter 5 of Australia’s Health 2010.

### CARDIOVASCULAR DISEASE AS A WHOLE

In 2007, CVD was recorded as the primary cause of death for 46,623 Australians, accounting for just over a third of all deaths in that year. Half of these deaths (22,727) were due to coronary heart disease, and 8,623 to stroke. Over 78% of the CVD deaths were of people aged 75 years and over, and more than half were female (52.7%).

Over the past few decades Australia has achieved major gains in the fight against CVD, due to a combination of improvements in prevention, detection and clinical management. Death rates have fallen considerably from the peak levels seen in the late 1960s and early 1970s, when CVD was responsible for around 60,000 deaths annually, or roughly 55% of all deaths each year. The age-adjusted rate of death from CVD declined from 830.6 per 100,000 population in 1968 to 198.1 per 100,000 in 2007 – a 76% fall (Figure 4.2).

If the death rates for CVD had remained at their 1968 peak, the number of deaths due to these diseases in 2006 would have been around 4 times as high as the actual number. In 2006, 187,000 Australian lives would have been lost to CVD rather than the 45,670 actual deaths, representing a saving of over 140,000 lives in that year. By way of comparison, the total number of deaths from any cause in 2006 was 133,739 (AIHW 2009a).

Both males and females have benefited from the decline. However, age-adjusted death rates for CVD among males are still markedly higher than among females (in 2007, 232.1 per 100,000 compared with 168.2). The rates for males reached a higher peak (1,020.1 compared with 717.8 for females) and began to decline later (in the late 1960s compared with the early 1950s) (AIHW 2009b).

Based on the 2007-08 National Health Survey (NHS), an estimated 3.4 million Australians (16.5% of the population) had one or more long-term diseases of the circulatory system that year (ABS 2009a). A higher proportion of females in the survey (17.6%) reported having CVD than males (15.3%) and the prevalence increased with age (Figure 4.3). It should be noted that these estimates are based
on self-reporting by respondents, and do not include people in institutionalised care (such as hospitals and nursing homes). Therefore, some care should be taken in interpreting the figures in comparison with other surveys and over time.

Similar estimates of the prevalence of CVD (defined as a long-term condition of stroke, heart or circulatory condition) can be derived from the 2007 National Survey of Mental Health and Wellbeing (SMHWB) (ABS 2008). From this survey it is estimated that 3.5 million Australians aged 16–85 years had a long-term chronic condition of CVD that year. As with the NHS, estimates are based on self-reported responses. Of those reporting CVD, 23.1% (corresponding to 800,000 people) reported also having a disability that led to a mild to profound restriction to core activities such as self-care, mobility and communication. Compared with those without CVD, and after adjusting for age, those reporting a CVD condition were more likely to report that they had a disability, medium or high levels of psychological distress, fair or poor mental and physical health, depression or a schooling or employment restriction. All these differences were statistically significant (Figure 4.4).

Combining both the burden from the extent of its disability and from premature death, CVD is projected to account for 16% of the overall disease burden in Australia in 2010, with coronary heart disease and stroke contributing over four-fifths of this burden. Most of the CVD burden comes from premature death. For 2010, it is estimated that CVD will be responsible for 26% of total YLL in Australia, second only to cancer (34%), and 7% of Australia’s total YLD. The CVD burden increases markedly with age, particularly from 60 years onwards.

CVD is the most expensive disease group in Australia in terms of direct health-care expenditure. In 2004–05 it cost $5.94 billion – 11% of overall recurrent health system expenditure that could be allocated to various diseases (AIHW 2008a).

**CORONARY HEART DISEASE**

Coronary heart disease (CHD), also known as ischaemic heart disease, is the most common form of heart disease. There are two major clinical forms – heart attack (often known as acute myocardial infarction or AMI) and angina. A heart attack is a life-threatening event that occurs when a blood vessel supplying the heart itself is suddenly blocked completely, threatening to damage the heart muscle and its functions. The chief symptom is a severe and continuous chest pain. In the most serious cases the person can collapse and die if the artery blockage cannot be corrected. Angina is a chronic condition in which short episodes of chest pain can occur periodically when the heart has a temporary deficiency in its blood supply. These episodes of angina occur when one of the heart's arteries is already significantly narrowed by plaque and cannot meet an extra demand for blood flow, such as with exercise or strong emotion.

Estimates of the burden of disease for 2010 indicate that CHD will be the leading specific cause of disease burden overall (9%), ahead of anxiety and depression (7%) and Type 2 diabetes (6%). Over 80% of the CHD burden is due to premature death.

Based on the NHS, an estimated 684,800 Australians had a long-term condition of CHD in 2007-08 – 353,000 for angina and 449,000 for other ischaemic heart diseases or heart attack – note that a person may report more than one disease. The prevalence of CHD was nearly twice as high for males as for females, at 4.4% and 2.3% respectively. These differences remained after adjusting for differences in age structure.

The prevalence of CHD increases markedly with age. Based on self-reported information in the 2007-08 NHS, around 6.8% of Australians aged 55–64 years had long-term CHD but this increased to 19.9% among those aged 75 years and over.

While there are currently no reliable data on the incidence of CHD in Australia, a proxy measure which counts ‘major coronary events’ (acute myocardial infarctions (AMIs) or heart attacks) can be calculated from CHD deaths and non-fatal AMI hospitalisations (Jamrozik et al. 2001). It is estimated that both the rate of events and the proportion of people dying after a major coronary event have declined over the past decade.

![Figure 4.3: Proportion of the population reporting to a long-term CVD condition, by age group, 2007-08](chart)

**Figure 4.3: Proportion of the population reporting to a long-term CVD condition, by age group, 2007-08**

Per cent

<table>
<thead>
<tr>
<th>Age group</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>0</td>
</tr>
<tr>
<td>15-20</td>
<td>10</td>
</tr>
<tr>
<td>25-34</td>
<td>20</td>
</tr>
<tr>
<td>35-44</td>
<td>30</td>
</tr>
<tr>
<td>45-54</td>
<td>40</td>
</tr>
<tr>
<td>55-64</td>
<td>50</td>
</tr>
<tr>
<td>65-74</td>
<td>60</td>
</tr>
<tr>
<td>75 and over</td>
<td>70</td>
</tr>
</tbody>
</table>

Source: AIHW analysis via Remote Access Data Laboratory of the basic confidentialised unit record file of the ABS 2007-08 NHS.

![Figure 4.4: Self-reported disability and mental health status of people aged 16-85 years, with and without CVD, 2007](chart)

**Figure 4.4: Self-reported disability and mental health status of people aged 16-85 years, with and without CVD, 2007**

<table>
<thead>
<tr>
<th>Disability – profound/severe restriction</th>
<th>Age-standardised rate (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without any CVD</td>
<td>0</td>
</tr>
<tr>
<td>With past or present CVD</td>
<td>5</td>
</tr>
<tr>
<td>Disability – mild/moderate restriction</td>
<td>10</td>
</tr>
<tr>
<td>Lifetime depression</td>
<td>15</td>
</tr>
<tr>
<td>Fair/poor mental health</td>
<td>20</td>
</tr>
<tr>
<td>Medium/high psychological distress</td>
<td>25</td>
</tr>
<tr>
<td>Without any CVD</td>
<td>30</td>
</tr>
<tr>
<td>With past or present CVD</td>
<td>35</td>
</tr>
<tr>
<td>Disability – profound/severe restriction</td>
<td>40</td>
</tr>
<tr>
<td>Without any CVD</td>
<td>45</td>
</tr>
</tbody>
</table>

Notes:
1. Age-standardised to the 2001 ABS Australian standard population.
2. Missing data have been excluded.

Source: AIHW analysis via Remote Access Data Laboratory of the confidentialised unit record file of the ABS 2007 SMHWBR.
CHD is a major cause of disability in Australia as well as of death. In the 2003 Survey of Disability, Ageing and Carers (SDAC), 15% of respondents reported one or more disabling conditions associated with CHD, corresponding to about 301,500 Australians. Of these, almost half (49%) needed help or had difficulties with self-care, mobility or communication.

As with CVD overall, death rates from CHD have fallen rapidly since the late 1960s (Figure 4.5). In the latest decade with available data (1998-2007), the age-standardised CHD death rate fell by around 40% for both males and females. These declines are due to both a reduction in heart attacks and better survival after an event.

Despite these gains, CHD remains the largest single cause of death in Australia, accounting for 22,727 deaths (16.5% of all deaths) in 2007. This is mainly due to deaths among older people, with three-quarters of all CHD deaths occurring among those aged 75 years and over, and less than 5% occurring among those aged under 55 years. The male age-standardised CHD death rate in 2007 (126.3 per 100,000 population) was almost 75% higher than the female rate (72.5).

Australia’s CHD death rates compare favourably with those of countries such as the United Kingdom, the United States and New Zealand, but they are still almost 3 times as high as in Japan and 2.2 times as high as in France (OECD 2009).

CEREBROVASCULAR DISEASE

Cerebrovascular disease refers to any disorder of the blood vessels supplying the brain and its covering membranes. Most cases of cerebrovascular death are due to stroke. Stroke occurs when a blood vessel to the brain is suddenly blocked by a clot (an ischaemic stroke) or bleeds (a haemorrhagic stroke). This may result in part of the brain dying, leading to a loss of brain function or impairment in a range of activities including movement, thinking and communication, and it may also lead to death. Ischaemic strokes are more common, but haemorrhagic strokes have a higher fatality rate. There can also be temporary strokes (where symptoms disappear within 24 hours), known as transient ischaemic attacks.

This section uses the terms ‘cerebrovascular disease’ (ICD-10 codes I60-I69) and ‘stroke’ (ICD-10 codes I60-I64) in their strict meanings as explained above. However, sometimes others have used ‘stroke’ to mean the wider ‘cerebrovascular disease’, as shorthand. Thus, the figures presented here may not be comparable to those shown elsewhere.

Cerebrovascular disease is projected to be the sixth leading specific cause of disease burden overall in 2010 (4% of overall burden). Around 70% of the cerebrovascular disease burden comes from premature death.

An estimated 60,000 stroke events occur in Australia every year – one about every 10 minutes (NSF 2010). Most of these (70%) are first-ever strokes (AIHW 2004). Based on self-reported data from the 2003 SDAC, 346,700 Australians in 2003 had had a stroke at some time in their lives. This estimate includes residents in cared accommodation, such as hospitals, hostels and nursing homes, as well as in private dwellings.

The latest estimates of stroke prevalence can be derived from the 2007 SMHWB (ABS 2008). It should be noted when interpreting estimates based on this survey, however, that the scope is smaller than that of the SDAC, being restricted to people aged 16-85 years of age and only to residents of private dwellings. This survey indicates that an estimated 322,540 people aged 16-85 years in 2007 had had a stroke at some time. Of those who reported having had a stroke, 72% were aged 60-85 years and almost all the remainder were aged 40-59 years.

Stroke is a significant cause of disability. From the SDAC, about 282,600 persons had a disability in 2003 along with a history of stroke, representing 7% of all people with disability. In about half of these cases, the disability was mainly attributed to the stroke. Stroke survivors with disability were much more likely to have a profound core activity limitation than the average person with disability (AIHW: Senes 2006). This means that the person is unable...
to achieve, or always needs help with, communication, mobility or self-care.

Estimates from the 2007 SMHWB indicate that 42.5% of people who had had a stroke also had a disability resulting in a mild to profound core activity restriction. As with the SDAC, stroke survivors with a disability were much more likely to report a severe or profound core activity limitation (50.3%) than the average person with disability (29.1%).

Cerebrovascular disease accounted for 11,491 deaths (8.3% of all deaths) in 2007. Stroke (8,623 deaths) and its resulting disorders (2,398) accounted for 96% (11,021) of these deaths. Most of the deaths from cerebrovascular disease (83.9%) occurred among those aged 75 years or over. While a higher number of females died from cerebrovascular disease than males (6,975 compared with 4,516 in 2007), the age-standardised death rate was slightly higher among males (48.4 per 100,000 population compared with 47.6), reflecting the higher death rates for males in most age groups except the very oldest.

As with overall CVD and coronary heart disease, Australia’s mortality from cerebrovascular disease has been declining since the early 1970s (Figure 4.5). Age-standardised death rates for cerebrovascular disease fell by 34.2% (males) and 30.3% (females) over the period 1998–2007.

In 2004, cerebrovascular death rates in Australia were low compared with other OECD (Organisation for Economic Co-operation and Development) countries such as Hungary, Portugal, Italy and the United Kingdom, but they were 1.4 times as high as in Switzerland, which had the lowest rates overall, and slightly higher than the rate in the United States (OECD 2009).

HEART FAILURE AND CARDIOMYOPATHY

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

Cardiomyopathy refers to when the entire heart muscle or a large part of it is weakened due to various causes, which include viral infections and severe alcohol abuse. The heart can become enlarged, thickened or dilated. Symptoms include shortness of breath, fatigue, lethargy, palpitations and sometimes chest pains.

Based on 2007–08 NHS self-reports, 277,800 Australians (1.4% of the population) had heart failure or oedema (swelling, which can be a sign of heart failure when it occurs in the lower legs). Around 64% of those with the disease were females, with a prevalence of 1.7% compared with...
1.0% for males. The estimated prevalence of heart failure or oedema increased with age from 2.6% in people aged 55–64 years to 8.2% in those aged 75 years and over.

Heart failure and cardiomyopathy accounted for 4,055 deaths in 2007. However, due to the nature of these diseases, they are more likely to be listed as an associated cause of death rather than an underlying cause (see Section 2.6 of Australia’s Health 2010 for more information about underlying and associated causes of death). In 2007, heart failure or cardiomyopathy was the underlying or associated cause of death in 19,967 cases. Most of these deaths occur among people aged 75 years and over (80.9% where it was as an underlying cause and 83.5% where it was recorded as any cause of death in 2007).

More females than males die of heart failure and cardiomyopathy because they generally live longer than males. However, the age-standardised death rate from these diseases is higher for males than females (99.2 deaths per 100,000 population compared with 72.4 for females, based on combined underlying and associated cause of death). Heart failure occurs frequently as an associated cause when the underlying cause of death is kidney failure, coronary heart disease, diabetes or chronic lower respiratory disease.

In recent years there has been a major decline in mortality from heart failure and cardiomyopathy in Australia. Age-standardised death rates for heart failure as an underlying or associated cause of death fell by 26.0% between 1998 and 2007. The decline was similar for males and females. It is not clear whether this trend reflects a fall in the incidence of heart failure as a result of reduced incidence of coronary heart disease or improved care of people with coronary heart disease, or better management of people with heart failure resulting in reduced case-fatality.

### ACUTE RHEUMATIC FEVER AND CHRONIC RHEUMATIC HEART DISEASE

Both acute rheumatic fever and rheumatic heart disease are preventable causes of ill health and death. They are particularly a problem in the Indigenous Australian population of northern and central Australia. Acute rheumatic fever is a delayed complication of untreated throat infection with Group A Streptococcus bacteria, but may also follow streptococcal skin sores. The infection and illness occur mainly in children and young adults. Rheumatic heart disease is caused by the long-term damage done to the heart muscle or heart valves by acute rheumatic fever. Acute rheumatic fever is believed to be under-reported, partly because it is difficult to diagnose (AIHW: Field 2004).

In 2007, there were 255 deaths with acute rheumatic fever and rheumatic heart disease recorded as the underlying cause of death. They were mentioned as an associated cause of death on another 399 death certificates. The death rates for Indigenous Australian males and females from rheumatic heart disease are far higher than for other Australians.

### BOX 4.4: MAIN PROCEDURES USED FOR CORONARY HEART DISEASE

**Coronary angiography** (also known as coronary arteriography) gives a picture of the heart’s arteries, known as the coronary arteries, to find out if and where the coronary arteries are narrowed or blocked. A catheter is inserted into an artery, usually in the groin, then guided back to the heart, where a special dye is injected into the coronary arteries before X-rays are taken. The resulting X-ray images provide detailed information about the health of the heart and arteries. This is an important diagnostic test that medical professionals use to plan treatment options.

**Percutaneous coronary interventions** (PCIs) are used to restore adequate blood flow to blocked coronary arteries. There are two types of procedure used: (a) coronary angioplasty without stent; and (b) coronary stenting. In coronary angioplasty a small balloon is placed inside the coronary artery at the place of blockage, then it is opened out to clear the blockage. Coronary stenting is similar but involves stents (expandable mesh tubes) that are inserted into the affected part of the artery, expanded and then left there to keep it open.

**Coronary artery bypass grafting** (CABG) is a surgical procedure using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood flow to the heart muscle. The surgery involves taking a blood vessel from the patient’s leg, arm or inner chest and using it to attach to vessels on the outside of the heart in order to bypass a blocked artery.

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TABLE 4.5: MEDICINES FOR CARDIOVASCULAR CONDITIONS SUBSIDISED THROUGH THE PBS AND RPBS (a), 2007-08

<table>
<thead>
<tr>
<th>ATC Category</th>
<th>Number of Patients</th>
<th>Number of Prescriptions Dispensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antithrombotic medicines</td>
<td>1,096,571</td>
<td>7,191,285</td>
</tr>
<tr>
<td>Cardiac therapy medicines</td>
<td>569,958</td>
<td>3,531,732</td>
</tr>
<tr>
<td>Antihypertensive medicines</td>
<td>173,854</td>
<td>846,068</td>
</tr>
<tr>
<td>Diuretic medicines</td>
<td>695,839</td>
<td>2,479,389</td>
</tr>
<tr>
<td>Peripheral vasodilators</td>
<td>572</td>
<td>2,633</td>
</tr>
<tr>
<td>Beta-blocking agents</td>
<td>838,427</td>
<td>5,854,199</td>
</tr>
<tr>
<td>Calcium-channel blocking agents</td>
<td>883,733</td>
<td>7,657,120</td>
</tr>
<tr>
<td>Renin-angiotensin system agents</td>
<td>2,091,499</td>
<td>20,853,697</td>
</tr>
<tr>
<td>(ACE inhibitors)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum-lipid-reducing agents</td>
<td>2,310,334</td>
<td>21,853,719</td>
</tr>
<tr>
<td>Total</td>
<td>3,843,268(b)</td>
<td>70,269,842</td>
</tr>
</tbody>
</table>

ATC Anatomical Therapeutical Chemical classification.
(a) Excludes those prescriptions and patients with a missing or invalid pin number.
(b) The total is not the sum of each type of medication as patients may be on more than one medication.

Source: AIHW 2010.

USE OF HEALTH SERVICES

The treatment and care of people with CVD covers a variety of settings and types of care. This section presents data on the care provided by GPs, hospitalisations and the use of medicines. It should be noted that the type and level of treatment for CVD will depend on a number of factors, including the severity of the disease, patient preferences and their ability to access care, and the capacity of the health system to provide different levels of care.

Visits to general practitioners

GPs play an important role in identifying and managing people at risk of CVD, as well as in treating people living with CVD. CVD is a major reason for people going to see their GP. Based on a survey of 95,898 GP encounters, collected from 953 GPs in Australia in 2007-08, it was the third most common group of problems managed at GP-patient encounters, behind respiratory diseases and general or unspecified conditions (Britt et al. 2008a). CVD accounted for 11.6% of the problems managed by GPs in 2007-08. Within the CVD group of diseases, the most common problem managed was hypertension (high blood pressure), followed by cardiovascular check-up, coronary heart disease and atrial fibrillation/flutter.

Overall, GPs managed cardiovascular problems at a rate of 17.6 per 100 encounters with their patients in 2007-08. Hypertension (high blood pressure) was the problem most commonly managed overall by GPs in 2007-08, at a rate of 9.9 per 100 encounters. Lipid disorders (abnormal blood levels of cholesterol or related substances) were also a common problem managed by GPs (a rate of 3.4 per 100 encounters).

In 2007-08, the proportion of GP encounters where CVD was managed increased substantially with age, but with some levelling off for the oldest age group. Among females, 79% of encounters involving CVD care were for those aged 55 years or more. Males in the 25-64 year age groups had significantly higher rates of GP encounters for CVD problems than females. There was no significant difference in the other age groups (Table 4.4).

Between 1998-99 and 2007-08, there were significant increases in the management rate of hypertension (from 8.3 problems managed per 100 GP encounters to 9.9) and lipid disorders (from 2.5 to 3.7) (Britt et al. 2009).

Hospitalisations

CVD was the principal diagnosis for 475,200 hospitalisations (6.0% of all hospitalisations) in 2007-08. Of these, 34.0% were due to coronary heart disease, 10.4% to heart failure or cardiomyopathy, 7.4% to stroke, 3.1% to transient ischaemic attacks and 0.6% to acute rheumatic fever and chronic rheumatic heart disease. CVD was also recorded as an additional diagnosis in a further 796,500 hospitalisations in that year. The number and the rate of hospitalisations for CVD increase rapidly with age, with those aged 55 years and over accounting for 78% of hospitalisations. The rate of hospitalisations for CVD is higher for males than females at all ages. The age-standardised rate for males in 2007-08 (2,598 per 100,000 population) was 1.6 times that for females (1,651).
The rate of hospitalisations with CVD as the principal diagnosis has been slowly declining over the past decade. The age-standardised rate declined from 2,337 per 100,000 population in 1998-99 to 2,099 in 2007-08.

Despite this trend in hospitalisations, the number of hospital procedures to diagnose and treat people with CVD has continued to increase. Prominent among these are coronary angiography, percutaneous coronary interventions (PCIs) and coronary artery bypass grafting (CABG). (See Box 4.4 for a description of these procedures.)

Over the period 1996-97 to 2007-08, the rate of PCI procedures almost doubled from 81 to 155 per 100,000 population. In contrast, the rate of CABG procedures declined from 99 to 61 per 100,000 population (Figure 4.6). However, for the first time, the combined rate of these ‘revascularisation’ procedures declined over the period from 2005-06 to 2007-08.

Use of medicines

Most people with cardiovascular conditions need medicines to treat them – 61.9% of the people who reported a cardiovascular condition in the 2007-08 NHS also reported using medicines for it (ABS 2009a).

In 2007-08 there were over 70 million government-subsidised prescriptions for medicines used to prevent or treat CVD, dispensed to over 3.8 million patients. This is an increase of 8.2% in the number dispensed in 2004-05. It should be noted that these figures refer only to those CVD medicines subsidised through the Pharmaceutical Benefits Scheme (PBS) or the Repatriation Pharmaceutical Benefits Scheme (RPBS). Not all patients are eligible to receive a subsidy for all medicines through these schemes. In addition, medicines are available under other schemes (such as the $100 scheme for indigenous people in remote regions) and other arrangements (such as for admitted patients in hospital).

The most common government-subsidised prescriptions for CVD medicines in 2007-08 were for renin-angiotensin system agents (used to reduce high blood pressure) and lipid-reducing agents (commonly prescribed to control blood cholesterol levels) (Table 4.5). The number of prescriptions for lipid-reducing agents increased by 27.2% between 2004-05 and 2007-08, while prescriptions for antithrombotic medicines (used to prevent or dissolve blood clots) increased by 20.9% (AIHW 2010a).

The figures on prescriptions provided above reflect both the large numbers of Australians at risk of or with CVD and the chronic nature of the disease: once people start on these medicines, they usually need to use them for life. However, many people stop taking medicines – in an analysis of adherence to prescribed cardiovascular medicines, 10-25% had discontinued their medicines at 6 months from the start of therapy, rising to 21-47% at 24 months (AIHW: Senes & Penn 2007). The reasons for this may include cost, medicine side effects, treating conditions with no symptoms, patients not understanding their condition or the benefits of treatment, and the complexity of therapy.

Cardiovascular deaths fall, especially among older Australians

Death rates from cardiovascular disease (CVD) have fallen since 1987, with the greatest declines being among older people, according to a report released by the Australian Institute of Health and Welfare. The report, Cardiovascular disease mortality: trends at different ages, looks at trends in CVD deaths across different age and sex groups, and across the main individual diseases that make up cardiovascular disease.

It shows that death rates for CVD and each of its component diseases, including coronary heart disease (CHD), stroke, heart failure, rheumatic fever and rheumatic heart disease all fell between 1987 and 2006. The main contributors to CVD trends were substantial falls in stroke and CHD death rates. Declines in stroke and CHD death rates between 1987 and 2006 were greatest among people aged between 55 and 74 years. Over the most recent decade, there has been an accelerated decline in death rates among people aged 65 years and over.

However, the report found that the decline in coronary heart disease death rates has slowed among people aged 35-54. The decline in stroke death rates has also slowed among women aged 45-54 years.

“Even though death rates are declining, CVD is still a leading cause of death in Australia, and there is no room for complacency with these results,” said Anne Broadbent of the Institute’s Cardiovascular, Diabetes and Kidney Unit.

“Over the last two decades, trends in the prevalence of risk factors for cardiovascular disease have varied, with some being favourable and others not so good,” she said.

“For example, there have been favourable trends with falling smoking rates and blood pressure levels, but little evidence of national change in blood cholesterol levels.

“There have also been unfavourable trends in physical inactivity, obesity and diabetes prevalence.

“On the other hand, improvements in medical care and treatment have contributed to the declines in death rates from CHD and stroke,” Ms Broadbent said.
The impact of cardiovascular disease

➤ In 2007-08, about 3.5 million Australians had a long-term cardiovascular disease.

➤ Nearly 50,000 deaths were attributed to CVD in Australia in 2008. It was responsible for more deaths than any other disease group – 34% of the total.

➤ CVD was the main cause for 475,000 hospitalisations in 2007-08 and played a secondary role in a further 797,000.

➤ CVD accounted for about 18% of the overall burden of disease in Australia in 2003, with coronary heart disease and stroke contributing over 80% of this burden.

➤ CVD remains the most expensive disease group in Australia, costing about $5.9 billion in 2004-05 with just over half of this money spent on patients admitted to hospital.

Trends

➤ The overall death rate for CVD has fallen by about 80% since the 1960s and continues to fall.

➤ Death rates for the major types of CVD, such as coronary heart disease, stroke, heart failure, rheumatic heart disease and peripheral vascular disease, have all fallen markedly in the past 20 years.

➤ There appears to be some recent slowing of the decline in the coronary heart disease death rates in younger age groups.

➤ CVD hospitalisation rates have declined slowly over the past decade.

Who does it affect most?

➤ On the whole lower socioeconomic groups, Aboriginal and Torres Strait Islander people and those living in the remote areas of Australia had the highest rates of hospitalisation and death resulting from CVD.

➤ CVD has its greatest impact on the elderly where hospitalisation and death rates are usually much higher than for others. The main exception to this is congenital heart disease where the impact is greatest on infants.

➤ For most cardiovascular conditions male death rates are clearly higher than female rates – in some cases twice as high.

➤ CVD is the cause of more female deaths than male deaths. This is because females usually live longer than males and the risk of a cardiovascular condition increases rapidly with age, particularly among the elderly.

Risk factors for cardiovascular disease – how much can we reduce them?

➤ The main risk factor for CVD is age.

➤ Many risk factors for CVD, such as sex, ethnicity and a family history of the disease, cannot be changed.

➤ Risk factors such as smoking, lack of exercise, being overweight, excessive alcohol use and a poor diet can all be changed and improving them can greatly reduce the impact of CVD.

Where are risk factors headed?

➤ Smoking rates in Australia have fallen by about 32% over the past two decades with about 17% of Australians now daily smokers. However, smoking remains the single most important cause of ill health and death in Australia.

➤ The prevalence of obesity rose by 6 percentage points between 1995 and 2007, with about 60% of adult Australians now being overweight or obese and about 70% not getting enough exercise.

➤ Alcohol use has remained stable in the past decade but around 10% of males and females over 14 years of age drink at risky levels.

What is happening with treatment?

➤ CVD patients are staying in hospital for shorter periods and the rate of deaths in hospital is declining.

➤ The rates for most procedures to diagnose and treat people with CVD have increased in the past decade.

➤ Prescription rates for medicines to control high blood pressure and blood cholesterol levels have also increased substantially in the past decade.
**Cardiovascular diseases (CVDs)**

*Increased government investment in national programmes aimed at CVD prevention and control is required, according to this fact sheet from the World Health Organization*

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**KEY FACTS**

- CVDs are the number one cause of death globally: more people die annually from CVDs than from any other cause.
- An estimated 17.3 million people died from CVDs in 2008, representing 30 per cent of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke.
- Low- and middle-income countries are disproportionately affected: over 80% of CVD deaths take place in low- and middle-income countries and occur almost equally in men and women.
- By 2030, almost 23.6 million people will die from CVDs, mainly from heart disease and stroke. These are projected to remain the single leading causes of death.

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More people die annually from cardiovascular diseases than from any other cause.

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**What are cardiovascular diseases?**

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and include:

- **Coronary heart disease** – disease of the blood vessels supplying the heart muscle.
- **Cerebrovascular disease** – disease of the blood vessels supplying the brain.
- **Peripheral arterial disease** – disease of blood vessels supplying the arms and legs.
- **Rheumatic heart disease** – damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria.
- **Congenital heart disease** – malformations of heart structure existing at birth.
- **Deep vein thrombosis and pulmonary embolism** – blood clots in the leg veins, which can dislodge and move to the heart and lungs.

Heart attacks and strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or brain. Strokes can also be caused by bleeding from a blood vessel in the brain or from blood clots.

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**What are the risk factors for cardiovascular disease?**

The most important behavioural risk factors of heart disease and stroke are unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol. Behavioural risk factors are responsible for about 80% of coronary heart disease and cerebrovascular disease.

The effects of unhealthy diet and physical inactivity may show up in individuals as raised blood pressure, raised blood glucose, raised blood lipids, and overweight and obesity; these are called ‘intermediate risk factors’ or metabolic risk factors. There are also a number of underlying determinants of CVDs, or ‘the causes of the causes’. These are a reflection of the major forces driving social, economic and cultural change – globalisation, urbanisation, and population ageing. Other determinants of CVDs include poverty, stress and hereditary factors.

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**What are common symptoms of cardiovascular diseases?**

**Symptoms of heart attacks and strokes**

Often, there are no symptoms of the underlying disease of the blood vessels. A heart attack or stroke may be the first warning of underlying disease.

Symptoms of a heart attack include:

- Pain or discomfort in the centre of the chest.
- Pain or discomfort in the arms, the left shoulder, elbows, jaw, or back.

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In addition the person may experience difficulty in breathing or shortness of breath; feeling sick or vomiting; feeling light-headed or faint; breaking into a cold sweat; and becoming pale. Women are more likely to have shortness of breath, nausea, vomiting, and back or jaw pain.

The most common symptom of a stroke is sudden weakness of the face, arm, or leg, most often on one side of the body. Other symptoms include sudden onset of: numbness of the face, arm, or leg, especially on one side of the body; confusion, difficulty speaking or understanding speech; difficulty seeing with one or both eyes; difficulty walking, dizziness, loss of balance or coordination; severe headache with no known cause; and fainting or unconsciousness.

People experiencing these symptoms should seek medical care immediately.

**What is rheumatic heart disease?**

Rheumatic heart disease is caused by damage to the heart valves and heart muscle from the inflammation and scarring caused by rheumatic fever. Rheumatic fever is caused by streptococcal bacteria, which usually begins as a sore throat or tonsillitis in children.

Rheumatic fever mostly affects children in developing countries, especially where poverty is widespread. Globally, almost 2 per cent of deaths from cardiovascular diseases is related to rheumatic heart disease, while 42 per cent of deaths from cardiovascular diseases is related to ischaemic heart disease, and 34 per cent to cerebrovascular disease.

**Symptoms of rheumatic heart disease**

- Symptoms of rheumatic heart disease include: shortness of breath, fatigue, irregular heartbeats, chest pain and fainting
- Symptoms of rheumatic fever include: fever, pain and swelling of the joints, nausea, stomach cramps and vomiting.

**Treatment**

- Early treatment of streptococcal sore throat can stop the development of rheumatic fever. Regular long-term penicillin treatment can prevent repeat attacks of rheumatic fever which give rise to rheumatic heart disease and can stop disease progression in people whose heart valves are already damaged by the disease.

Heart disease and stroke can be prevented through healthy diet, regular physical activity and avoiding tobacco smoke.

**Why are cardiovascular diseases a development issue in low- and middle-income countries?**

- Over 80 per cent of the world’s deaths from CVDs occur in low- and middle-income countries
- People in low- and middle-income countries are more exposed to risk factors leading to CVDs and other non-communicable diseases and are less exposed to prevention efforts than people in high-income countries
- People in low- and middle-income countries who suffer from CVDs and other non-communicable diseases have less access to effective and equitable health care services which respond to their needs (including early detection services)
- As a result, many people in low- and middle-income countries die younger from CVDs and other non-communicable diseases, often in their most productive years
- The poorest people in low- and middle-income countries are affected most. At household level, sufficient evidence is emerging to prove that CVDs and other non-communicable diseases contribute to poverty
- At macro-economic level, CVDs place a heavy burden on the economies of low- and middle-income countries. Heart disease, stroke and diabetes are estimated to reduce GDP between 1 and 5 per cent in low- and middle-income countries experiencing rapid economic growth, as many people die prematurely.

**How can the burden of cardiovascular diseases be reduced?**

Heart disease and stroke can be prevented through healthy diet, regular physical activity and avoiding tobacco smoke. Individuals can reduce their risk of CVDs by engaging in regular physical activity, avoiding tobacco use...
and second-hand tobacco smoke, choosing a diet rich in fruit and vegetables and avoiding foods that are high in fat, sugar and salt, and maintaining a healthy body weight.

Comprehensive and integrated action is the means to prevent and control CVDs

➤ Comprehensive action requires combining approaches that seek to reduce the risks throughout the entire population with strategies that target individuals at high risk or with established disease

➤ Examples of population-wide interventions that can be implemented to reduce CVDs include: comprehensive tobacco control policies; taxation to reduce the intake of foods that are high in fat, sugar and salt; building walking and cycle ways to increase physical activity; providing healthy school meals to children

➤ Integrated approaches focus on the main common risk factors for a range of chronic diseases such as CVD, diabetes and cancer: unhealthy diet, physically inactivity and tobacco use.

Survivors of a heart attack or stroke are at high risk of recurrences and at high risk of dying from them.

There are several treatment options available

➤ Effective and inexpensive medication is available to treat nearly all CVDs

➤ People at high risk can be identified using simple tools such as specific risk prediction charts. If people are identified early, inexpensive treatment is available to prevent many heart attacks and strokes

➤ Survivors of a heart attack or stroke are at high risk of recurrences and at high risk of dying from them.
What is heart failure?

Heart failure refers to the reduced ability of the heart to pump blood efficiently around the body. It is a poorly chosen term because it suggests the heart is about to stop or fail completely. This is not the case.

The term congestive heart failure is also used and refers to the typical symptoms that occur in heart failure from excess fluid accumulation in the body.

Heart failure affects approximately 4% of Australian adults aged over 45 years. Angina and heart failure can occur together because they are both often caused by coronary heart disease.

What causes heart failure?

The most common cause of heart failure is damage to the heart muscle, often due to coronary heart disease or long-term high blood pressure.

Other causes of heart failure include:

- Viral infection
- Alcohol damage
- Valve problems
- Heart abnormalities present at birth (congenital heart disease)
- Anaemia, and
- Drug side effects.

Heart failure affects approximately 4% of Australian adults aged over 45 years.

If the heart can no longer pump efficiently, it compensates by beating faster, eventually resulting in enlargement of the heart (hypertrophy) to cope with the extra workload. The body also tries to increase the volume of blood in the circulation by retaining water and it also gets the kidneys to retain salt (sodium). Because of the fluid retention, the heart muscle becomes stretched (dilated) and eventually loses its ability to contract efficiently, so the amount of blood pumped to the body is reduced.

How does the heart normally function as a pump?

The heart is a muscular organ, which pumps blood around the body. It is divided into four chambers, two thin-walled atria (receiving chambers) and two larger, thicker-walled ventricles (pumping chambers).

Blood that is low in oxygen returns from the body to the right side of the heart. It flows through the right atrium into the right ventricle, which pumps the blood into the lungs. Here oxygen is picked up before the blood flows back to the heart into the left atrium and then into the left ventricle, which pumps it to the body.

What are the symptoms of heart failure?

One of the most common symptoms is shortness of breath, which may be caused by fluid gathering in the lungs. Fluid can also gather in the ankles and legs, causing swelling. Some people feel weak and tired, and have a poor appetite. A dry cough can also indicate fluid on the lungs. Shortness of breath may be more obvious on physical exertion, such as climbing stairs. It can also occur when lying flat or several hours after lying down, causing you to wake up breathless or coughing. Sleeping well-supported with pillows may help relieve shortness of breath. The fluid retention that occurs with heart failure can cause unusual weight gain. Cyanosis (a blue tinge to the lips, nails or skin), dizziness and palpitations are other symptoms.

You may experience feelings of helplessness, depression, anger and loss of confidence because of changes in your lifestyle. These feelings are very real and it’s important to discuss them with your family, friends, your doctor, and if necessary, a counsellor.
What treatment can I expect?
The most commonly used medications are diuretics, angiotensin converting enzyme (ACE) inhibitors, digoxin and beta-blockers, and most people need treatment with two or more different types of drugs.
➤ Diuretics (‘water pills’) reduce the amount of fluid the heart has to push
➤ ACE inhibitors or angiotensin II receptor blockers relax blood vessels so that the heart doesn’t have to work as hard to push blood through
➤ Digoxin has many actions, including helping the heart work harder
➤ Beta-blockers relax blood vessels and/or slow the heart down, depending on the type used
➤ Vasodilators, such as hydralazine and isosorbide dinitrate, are sometimes used to relax blood vessels.

How do I look after myself?
Monitor your symptoms
➤ Weigh yourself daily. If your weight increases by more than 1.5 kg in 24 hours, especially if associated with other symptoms, contact your doctor. A rapid gain in weight may indicate a fluid build-up and an increase in your diuretic tablets may be needed
➤ See your doctor regularly for a review of your symptoms and medication.

Find a balance between rest and activity
Although rest may be a part of the initial treatment, staying active is very important. You will be the best judge of how much you can do. There are no strict rules about physical activity, however, regular walking within the limits of your comfort and symptoms is strongly encouraged. You should be able to carry out a normal conversation when you exercise. Do not work beyond this point. Try to accumulate 30 minutes of physical activity most days.
While exercise is beneficial when symptoms are mild, bed rest is necessary when symptoms are severe.

Watch your diet
➤ Reduce your salt intake because salt encourages the body to store fluid. Foods high in salt include salted nuts, dips, snacks, luncheon sausage, ham, corned beef, cheese, soy sauce, Marmite, Vegemite, canned or packaged soups, and some processed and canned foods. Use herbs, spices and other flavours to replace salt in cooking and avoid adding salt at the table

Heart failure can usually be adequately treated and controlled, allowing you to continue normal daily activities.
➤ Eat a wide variety of foods
➤ Eat foods low in fat (especially animal fats) to help keep your blood cholesterol down
➤ Eat plenty of fresh fruit and vegetables to provide extra potassium for the body to balance any potential loss of potassium caused by some types of diuretics (water tablets). However, check with your doctor first, as some medications used to treat heart failure actually increase potassium levels.

Stop smoking
If you are a smoker, quit. Smoking causes continuing damage to your lungs, heart and blood vessels. It’s never too late to give up and there is help available. Phone the Quitline on 131 848 or see your GP.

Drink in moderation
Alcohol is acceptable in small amounts. Limit your intake to no more than two standard drinks a day, unless otherwise stated by your doctor.

What about returning to normal activities?
Work
Heart failure can usually be adequately treated and controlled, allowing you to continue normal daily activities. You may need to adjust your working hours or drop off some strenuous activities if you tire more easily. If this is happening to you, discuss it with your doctor in case a change of medication is necessary, or with your employer to see if other work can be arranged.

Driving
Austroads, the association of Australian and New Zealand road transport and traffic authorities, publishes Assessing Fitness to Drive, the latest national guidelines and standards for assessing a person’s fitness to drive.
The aim of the guidelines is to assist health professionals in assessing the fitness to drive of any patient who holds a licence for a light motor vehicle including a car or motorcycle.
Austroads’ guideline for heart failure advises that you may drive if
asymptomatic (without obvious signs or symptoms of disease) on moderate exertion. However, if you have severe symptoms, consult your doctor. There are more stringent criteria for drivers of commercial vehicles.

The Cardiac Society of Australia and New Zealand has guidelines (2002) for doctors assessing the fitness of individuals with heart and vascular disease to drive. These state that people with heart failure or cardiomyopathy may be fit to drive if they don’t get short of breath on mild exertion and there are no other conditions, such as abnormal heart rhythms or poorly controlled anticoagulant therapy (e.g. warfarin), present which would preclude the person from driving.

**Sexual activity**

As with other activities, it should be within the limits of your symptoms. Sexual intercourse should be OK if you can climb two flights of stairs without stopping due to angina, dizziness or shortness of breath. Less strenuous positions, for example, side-by-side or having the healthier person on top, may be best.

**REFERENCES**


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WILL YOU RECOGNISE YOUR HEART ATTACK?

Understanding the warning signs of a heart attack can save your life according to this fact sheet from the National Heart Foundation of Australia.

The warning signs of heart attack can be varied and may not always be sudden or severe. You may have just one of these symptoms, or a combination of them. They can come on suddenly or develop over minutes and get progressively worse. Symptoms usually last for at least 10 minutes.

Warning signs could include:

➤ Discomfort or pain in the centre of your chest – This can often feel like a heaviness, tightness or pressure. People who have had a heart attack have commonly described it as like an “elephant sitting on my chest”, “a belt that’s been tightened around my chest” or “bad indigestion”. The discomfort may spread to different parts of your upper body.

➤ Discomfort in these parts of your upper body:

- chest
- neck
- jaw
- back
- arm(s)
- shoulder(s)

You may have a choking feeling in your throat. Your arms may feel heavy or useless.

➤ You may also experience other signs and symptoms:
- Feel short of breath
- Feel nauseous
- Have a cold sweat
- Feel dizzy or light-headed.

Some people have also described feeling generally unwell or “not quite right”. If you feel any heart attack symptoms, refer to your action plan and get help fast – call Triple Zero (000)*.

* If calling Triple Zero (000) does not work on your mobile phone, try 112.

WARNING SIGNS OF HEART ATTACK – WHAT TO DO

1. Stop – Immediately stop what you are doing and rest
2. Talk – If you are with someone, tell them what you are feeling
3. Call Triple Zero (000)® now!

WHY IS A HEART ATTACK AN EMERGENCY?

With heart attack, every minute counts. Too many people lose their lives because they take too long to call Triple Zero (000).

Getting to hospital quickly can reduce the damage to your heart muscle and increase your chance of survival. In hospital, staff will give you treatments that help to reduce this damage.

Important notes

➤ Warning signs differ from person to person.
Heart attacks are not always sudden or severe. Many start slowly with only mild pain or discomfort. Some people do not get chest pain at all – only discomfort in other parts of their upper body.

➤ No two heart attacks are the same.
Someone who has already had heart attack may have different symptoms the second time.

➤ Knowing the warning signs of heart attack and acting quickly can reduce the damage to your heart muscle and increase your chance of survival.

Too many people lose their lives because they wait too long to call Triple Zero (000) for an ambulance.

* This information is for educational purposes only. It is not a substitute for individual health advice provided by your doctor or cardiologist (heart specialist).
**WHY CALL TRIPLE ZERO (000)?**

- The trained operator will decide if you need an ambulance
- You’ll receive treatment as soon as you phone
- You’ll receive advice on what to do while waiting for the ambulance to arrive.

Ambulance paramedics are trained to use special lifesaving equipment and to start early treatments for a heart attack inside the ambulance. An ambulance is the safest and fastest way to get you to hospital. Attempting to get to hospital quickly in a private vehicle can be dangerous for the occupants of your vehicle and other road users.

It is always better to go to call Triple Zero (000) and find out it’s not a heart attack than to wait until it is too late.

**WANT TO KNOW MORE?**

For more information about the warning signs of heart attack, visit [www.heartfoundation.org.au](http://www.heartfoundation.org.au) or call our Health Information Service on 1300 36 27 87.

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**Will you recognise your heart attack?**

1. **STOP** and rest now

2. **TALK** Tell someone how you feel
   - Are your symptoms severe or getting worse?
   - Have your symptoms lasted 10 minutes?

3. **CALL 000** Triple Zero
   - Ask for an ambulance.
   - Don’t hang up.
   - Wait for the operator’s instructions.

*If calling Triple Zero (000) does not work on your mobile phone, try 112.*

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**Be prepared**

- Know the warning signs of heart attack and what to do.
- Keep your action plan handy on your fridge.
- Make sure that you have ambulance cover.
- Tell your family and friends about the warning signs of heart attack and what to do – don’t keep this lifesaving message to yourself.
- Prevent a heart attack by taking steps to reduce your risk – talk to your doctor or visit [www.heartfoundation.org.au](http://www.heartfoundation.org.au)

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Heart explained

HEART FACTS FROM THE BETTER HEALTH CHANNEL

The heart is nestled between the two lungs in the centre of the chest, behind the breastbone. Its functions are to pump oxygenated blood around the body, and to deliver deoxygenated blood and waste products (carbon dioxide) to the lungs.

The heart is shaped a little like an upside-down pear, is about the size of a clenched fist, and weighs between 300 g and 450 g. At rest, the heart pumps about four to five litres of blood every minute.

The heart operates automatically, but responds to ‘information’ received from other parts of the body by changing its output accordingly. For example, hard-working muscles need more oxygen, so the heart (and lungs) picks up the pace to supply the body’s increased needs.

The four chambers of the heart

The heart is a double pump with four chambers, each separated by valves that only permit blood to flow in one direction. Basically, the right side of the heart pumps deoxygenated blood to the lungs, while the left side pumps oxygenated blood to the body.

The two sides of the heart are separated by a muscular wall called the septum. The right upper chamber (atrium) takes in deoxygenated blood from the body and squeezes it into the right lower chamber (ventricle). From there, the blood is taken by an artery to the lungs, where the carbon dioxide is replaced with oxygen.

Oxygenated blood enters the heart’s left upper chamber (atrium). It is then pumped into the lower left chamber (ventricle) and then into an artery (the aorta), where it starts its journey around the body again. Blood pressure refers to the amount of force the pumping blood exerts on arterial walls.

At rest, the heart pumps about four to five litres of blood every minute.

The heartbeat

Each atrium is connected to its ventricle by a one-way valve. The valve on the right side of the heart is called the tricuspid valve, while the valve on the left side is called the mitral valve. The familiar ‘lub-dub’ sound of the heartbeat is caused by the rhythmic closing of the heart valves as blood is pumped in and out of the chambers.

The heart rate is regulated by a special cluster of cells situated in the right atrium, called the sinus node. This prompts the atria to contract first; then an electrical impulse is sent to a second node (the atrioventricular node), which is found between the atria and their ventricles. After a brief delay, the ventricles contract. On average, the adult heart beats around 70-80 times every minute.

The heart’s blood vessels

The blood vessels of the heart include:

- **Vena cavae** – deoxygenated blood is delivered to the right atrium by two veins: one (superior vena cava) carries blood from the head and upper torso, while the other...
(inferior vena cava) carries blood from the lower body

- **Pulmonary arteries** – deoxygenated blood is pumped by the right ventricle into the pulmonary arteries that link to the lungs
- **Pulmonary veins** – the pulmonary veins return oxygenated blood from the lungs to the left atrium of the heart
- **Aorta** – the largest artery of the body that runs the length of the trunk. Oxygenated blood is pumped into the aorta from the left ventricle. The aorta subdivides into various branches that deliver blood to the upper body, trunk and lower body
- **Coronary arteries** – like any other organ or tissue, the heart needs oxygen. The coronary arteries that supply the heart are connected directly to the aorta, which ensures a rich supply of oxygenated blood
- **Coronary veins** – deoxygenated blood from heart muscle is ‘dumped’ by coronary veins directly into the right atrium.

**A range of disorders**

Some disorders of the heart include:

- **Heart murmur** – an audible vibration or humming heard through the stethoscope, caused by somewhat noisy blood flow within the heart. Faulty heart valves are a common cause, but usually the murmur does not indicate an abnormality
- **Heart valve disorders** – for example, a faulty mitral valve allows blood to move backwards from the ventricle into the atrium. This condition is called mitral regurgitation
- **Coronary heart disease** – fatty deposits or plaques build up inside one or more of the coronary arteries (atherosclerosis). This constant silting narrows the artery. Untreated, coronary heart disease can lead to angina or a heart attack
- **Angina** – if the coronary arteries are narrowed, part of the heart muscle may not receive enough blood and oxygen. This causes the sensations of chest tightness and pain that are typical of angina
- **Heart attack** – if a coronary artery is blocked, the heart is starved of oxygen and nutrients. Heart muscle cells (myocardial cells) are damaged, and may die without prompt treatment

**Things to remember**

- The functions of the heart are to pump oxygenated blood around the body, and to deliver deoxygenated blood and waste products (carbon dioxide) to the lungs
- The heart is a double pump consisting of four chambers, each separated by valves that only permit blood to flow in one direction
- Disorders of the heart include coronary heart disease, angina, heart attack, valve diseases and congenital disorders.

- **Congenital disorders** – the heart of a foetus may not develop properly.

**Symptoms of heart disease**

The symptoms of heart disease depend on the type of disorder, but may include:

- Chest pain
- Tightness in the chest
- Shortness of breath
- Irregular heartbeat
- Unusually fast or slow heartbeat
- Lightheadedness
- Fatigue.

**Where to get help**

- Your doctor
- Cardiologist.

This page has been produced in consultation with, and approved by the Heart Research Centre.

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Background

Which Hapsburg monarch put his entire court on a low-cholesterol diet? How many heroines in Jane Austen novels take herbs to lower blood pressure? If you said none, you’re right. Heart disease was largely unknown before the 20th century. Its beginnings as a mass killer lay in the industrial revolution in the 18th and 19th centuries. The wave of mechanisation that swept through Europe and North America brought two critical changes: a massive decline in heavy physical labour, and a widespread availability of processed food.

A sedentary lifestyle and a high-fat, highly-processed diet turned out to be two of the main causes of coronary heart disease, which soon propelled itself to the top of the list of major killers in the Western world and remains there today.

How the heart works

The heart is a double-sided muscular pump. The right side pumps into the lungs, where it’s oxygenated. The left side receives this oxygenated blood and pumps it around the rest of the body where the oxygen and other nutrients are used by the cells of the body’s tissues and organs. The deoxygenated blood then travels back via veins, to the right side of the heart again.

In this way, the body’s five or so litres of blood is continually being pumped through the body. Each side of the heart has two chambers – the ventricle (the main chamber, which does most of the pumping work), and the atrium (or auricle, a smaller chamber which pumps blood into the ventricle).

The heart is the hardest working organ in the body. It pumps about 70 times a minute, every minute of every day. That’s over 2000 billion beats in an average lifetime. To keep pumping at this rate, the heart itself needs a constant supply of oxygen. Supplying the muscles in the heart are three coronary arteries that encircle the heart and divide into a series of smaller arteries. As long as these arteries are healthy, they can keep the heart supplied with oxygen – even when the heart is pumping harder than normal, for example during sex or exercise. But if there is disease of these arteries, and not enough blood gets through them to the heart muscle, then the heart starts malfunctioning.

Coronary heart disease

Coronary heart disease is actually a disease of the arteries of the heart, rather than a disease of heart muscle itself. It is caused by a build-up of fatty deposits in the lining of the walls of arteries – a process known as atherosclerosis. These fatty deposits (called plaques) can thicken, calcify and narrow the arteries to the point where they constrict the flow of blood through them. Sometimes a blood clot can form at these plaques, abruptly stopping the flow through them (called coronary thrombosis, or coronary occlusion.) The end result is to deprive the heart tissue of oxygen, which can damage it, sometimes permanently. Hence the alternative name ‘ischaemic heart disease’ (ischaemia means lack of oxygen).

Atherosclerosis – and ischaemic heart disease/coronary artery disease – is especially common in people who have a family history of the disease, and/or who smoke, have hypertension (high blood pressure), are overweight, are diabetic, or have higher than normal levels of cholesterol in their blood. It is more common in men over the age of 45, though over the age of about 70, it’s equally common in both sexes.

Coronary heart disease causes one or more of the following conditions, alone or in combination:

➤ The chest pain known as angina
➤ Death of heart tissue (myocardial infarction or heart attack)
➤ Sudden stopping of the heart and collapse (cardiac arrest)
➤ Gradual failure of the pumping function of the heart (heart failure).

Atherosclerosis (heart disease and stroke together) accounts for 40 per cent of all deaths in Australia, making it the number one killer. Heart disease alone accounts for about 25 per cent of all deaths.

Angina

Angina is a pain, or feeling of discomfort, in the chest. It is usually felt in the centre of the chest, but may spread to the neck or arms (especially the left one) and sometimes the shoulders or back. It is often described as a feeling of...
‘tightness’ or ‘pressure’ and can range in severity from a mild ache to severe pain. The pain is caused by chemicals produced when the heart muscle has to function with inadequate oxygen.

Typically, the pain comes on during physical exertion and stops when the exertion ceases. This is because during exercise, the heart needs more oxygen and is more susceptible to the reduced volume of blood flowing through the diseased arteries. Sometimes though, angina can occur at rest. This usually indicates that coronary artery disease is more extensive than if it occurs only during exertion.

As well as pain there may be other symptoms – sweating, a feeling of anxiety or fear, a pallor (paleness), or irregular heart rhythms (palpitations) felt as ‘fluttering’ in the chest.

Someone with angina should see their doctor or go to hospital straight away if:

➤ They believe it is the first time they are suffering the condition
➤ They are on medication for angina, but the angina is getting more severe or frequent than normal
➤ The chest pain doesn’t go away with normal angina medications
➤ The chest pain comes on during resting
➤ The angina doesn’t get better with rest. In this case it may be progressing to myocardial infarction, or heart attack.

There are other causes of chest pain – heart burn caused by a backflow of acidic material in the oesophagus (known as reflux oesophagitis), for example. So in hospital, doctors will do an electrocardiograph (ECG) of the heart. This is a sensitive measurement of the heart’s electrical activity and it can tell whether the pain is angina and where the area of oxygen deprivation is.

If there is any doubt, there are other tests that can be done, usually when the person has recovered and is pain free. For example, the person can be put on an exercise machine and an ECG done to see how the heart performs during activity. This is known as a stress test.

Or a special X-ray may be taken after a catheter, inserted in the groin and threaded into the heart’s arteries, is injected with radioactive dye. The dye fills the arteries and reveals their outline as well as areas of narrowing or blockages. This is called coronary angiography.

**Treatment**

If the pain does turn out to have been angina, there is a range of treatment options available. Often taken as an aerosol spray or as a pill placed under the tongue, these may be taken for symptom relief during an episode of angina. They can also be taken on an ongoing basis to prevent angina.

The main classes of drugs for angina in common use are:

➤ **Nitrates.** These work by reducing the oxygen requirements of the heart muscle. They come in several forms: nitroglycerine tablets to be slipped under the tongue during (or in anticipation of) an attack, ointment to be absorbed through the skin, or long-acting tablets.

➤ **Beta-blocking drugs.** These slow the heart rate, decreasing blood pressure, and thereby reducing the oxygen demand of the heart.

➤ **Calcium-channel blocking drugs.** Heart muscles need calcium in order to contract. So blocking the channels (or gateways) through which calcium enters cells, effectively forces the heart to slow down and so reduces its need for oxygen.

There are also surgical treatments which are very effective, especially if the atherosclerosis is localised to just a few areas of the coronary arteries. Coronary bypass surgery involves a surgeon taking grafts from blood vessels in the legs or elsewhere, and joining them to either side of the affected artery areas – creating a bypass. In another technique known as coronary artery angioplasty, a tube containing an inflatable balloon is passed along the artery to the affected area. When the balloon is inflated, it widens the artery. Often, to keep the artery open, metal tubes called stents are then inserted.

These operations are usually done once the person has recovered from angina and is well enough to undergo the surgery. They will also need to modify their lifestyle; exercise, eat a low-fat diet, stop smoking, lose weight, control high blood pressure and lower blood cholesterol levels if they are too high.

**Heart attack**

A heart attack is the everyday term for myocardial infarction, which literally means ‘death of heart muscle because of inadequate oxygen’. The root cause is the same as that behind angina – atherosclerosis of the coronary arteries. In myocardial infarction, the chest pain doesn’t go away with rest, because the reduced or absent flow is severe enough to cause death of heart muscle.

A myocardial infarction may happen out of the blue, or it may occur in someone who has had angina for months or years with the problem getting more frequent or more severe. Just as with angina, a heart attack is often accompanied by sweating, pallor, and palpitations (abnormal heart rhythms felt in the chest). As well, there may be difficulty breathing and/or fainting or loss of consciousness.

In some cases, particularly in women, there may be no pain at all. Instead there may be other symptoms – sweating, dizziness, palpitations, nausea and difficulty breathing, for example. In a significant number of cases, there are no symptoms at all and the heart attack is only diagnosed much later when an ECG or other test reveals damage caused to the heart by a previous ‘silent’ heart attack.

Myocardial infarction is a medical emergency because of the serious effects it can have on the functioning of the heart. The death of heart muscle can disrupt the heart’s normal electrical activity and the heart may develop an arrhythmia – an abnormal rhythm. It is possible so much heart muscle may die that it can’t pump properly. In either case, the person can suddenly collapse and may die. This is called a cardiac arrest (see Cardiac arrest).

Even if the heart keeps working, it may not be working...
well and the symptoms of heart failure may develop (see Heart failure). So a heart attack is a medical emergency. Anyone who suspects they may be having one needs to go to hospital as soon as possible, preferably by ambulance. The sooner they get to hospital, the better their chances of recovery. In hospital they will usually be admitted into intensive care or a specialist cardiac unit. Tests such as blood tests, an ECG and special scans, can help measure the position and extent of the damage. They will be given pain relief, anti-angina medications, oxygen by mask, and drugs to stabilise any abnormal heart rhythms.

In some cases, special drugs that dissolve clots are given. These also increase the blood flow to the heart tissue, preventing further damage. Some hospitals offer emergency angioplasty, in which a catheter is threaded up into the blocked artery in the heart. A balloon attached to the catheter is opened, expanding the artery and then a stent – a wire mesh tube to keep the artery open – is inserted, which is designed to stay there permanently. Studies show that this procedure saves more lives than clot-dissolving drugs, as long as it’s done quickly – within two hours of a heart attack – and the hospital is well trained in the procedure. (One problem is in about a third of cases, the blood vessel becomes blocked again by scar tissue and the procedure needs to be redone. Newer stents – so called ‘drug-eluding stents’ – release drugs that help prevent the blockage from recurring.)

After a day or two, once the patient is stable and the pain has subsided, they will begin physical activity, health education and counselling programs. Most people are in hospital for about three to five days after a heart attack. The damaged part of the heart takes longer to heal – about six to eight weeks. Dead tissue isn’t replaced with normal heart tissue, but with scar tissue.

**Cardiac arrest**

In a cardiac arrest, the heart suddenly stops functioning altogether and the affected person collapses unconscious. If they are not resuscitated quickly, brain damage and death follow. However, if there is a bystander who is familiar with cardiopulmonary resuscitation (CPR), they can often be revived.

A cardiac arrest may be caused by a massive myocardial infarction that destroys so much heart muscle that the heart simply stops. It can also be caused by a disturbance of the electrical system within the heart which prevents the heart pumping blood normally. These disturbances are called arrhythmias. Within the heart muscle, there is a system of nerve pathways responsible for spreading electrical impulses through the heart in an orderly way so that it contracts rhythmically and efficiently. This electrical system can be disrupted by injury or disease.

In 90 per cent of cases, coronary artery disease is the cause, but other causes include drugs, electric shock, or pulmonary embolism (blood clots in the lungs). The most serious of the arrhythmias is ventricular fibrillation – a condition in which the muscles of the heart contracts in a rapid, unsynchronised way. The result is a ‘flutter’ rather than a true beat and the heart pumps little or no blood.

Someone who has had a cardiac arrest:

- Is unconscious
- Has no pulse (because the heart is not beating)
- Is not breathing (lack of blood to the brain damages its ‘breathing centre’)
- Looks pale or blue.

**As a general rule – if someone collapses unconscious, and doesn’t have a pulse, they have probably had a cardiac arrest.**

Immediate action is needed to save the life of a person who has had a cardiac arrest. If they are not resuscitated, brain damage begins after four minutes and death usually occurs after 12 minutes. An ambulance should be called by phoning 000 (in Australia). Resuscitation should be commenced using Cardiopulmonary Resuscitation (CPR) – a technique that involves mouth-to-mouth respiration and chest compression, with the aim of keeping the person alive until the ambulance arrives. The paramedics take over ventilation using more sophisticated ventilating devices.
They will use a device called a defibrillator to shock the heart in an attempt to re-establish the heart’s normal rhythm. They will also give the person intravenous drugs and fluids and transport them to hospital.

If someone has a cardiac arrest and is treated promptly by someone who is competent at CPR, and if an ambulance gets there promptly, survival rates can be as high as 70 per cent. Unfortunately because of general ignorance about CPR in the community, survival rates in practice are closer to between 10 per cent and 15 per cent. So there is currently an ongoing campaign by health authorities to teach people about CPR.

If the cardiac arrest is due to a massive myocardial infarction and death of heart muscle, rather than ventricular fibrillation (or another similar sort of arrhythmia) there is much less chance of successful resuscitation.

Sometimes a cardiac arrest takes place when a person is already in hospital. It is a common occurrence in someone who has had a heart attack, for example. In hospital, an arrest victim has a much better chance of survival because treatment is administered more promptly.

**Heart failure**

This is a condition where the heart, weakened by disease, fails to pump as well as it should. (The name is a little confusing, because the heart doesn’t fail outright and stop beating. That would be a cardiac arrest).

The most common cause of heart failure is death of heart muscle from coronary artery disease. It may result from a major heart attack, or a series of heart attacks. Or it may occur slowly and painlessly from coronary artery disease over a period of years. The heart muscle can also be weakened by a virus or by alcoholism. (A disease of heart muscle is known as a cardiomyopathy). As well, structural defects in the heart may be to blame – a faulty heart valve, or a hole in the chamber of the heart in an infant, for example. Some of these causes are reversible; that is, they can be treated and the heart function completely restored. But if the disease has caused heart muscle to die, then the disease is not reversible and the person will need ongoing treatment to relieve the symptoms.

A person with heart failure becomes tired and weak because their tissues are not receiving enough oxygenated blood. The reduced blood flow through the heart itself results in pooling upstream. The fluid from this pooled blood seeps into tissues, causing them to swell – a condition called oedema. If just the left side of the heart fails, the condition is known as left ventricular failure or LVF (the ventricular is the main chamber of the heart). If both sides fail the condition is called congestive cardiac failure (CCF). It is rare for the right side to fail on its own.

If the left side of the heart fails, there will be a pressure build up of blood in the veins of the lungs. This pressure build-up forces fluid into the airspaces of the lungs (pulmonary oedema) and the person experiences breathlessness, which is usually worse during physical exertion. Lying down can also cause the person to wake up breathless or coughing.

The right side of the heart normally pumps blood from the general circulation into the lungs. If the right side fails, blood pressure builds up in the general circulation and oedema tends to form around the ankles and legs and in the abdomen.

In the early stages, the heart may pump efficiently enough for a person to perform normal daily activities. The symptoms may only arise during physical exertion when the heart cannot cope with the extra pumping activity needed. But as heart failure worsens, the symptoms become more and more debilitating, until the person becomes bedridden and, in advanced cases, immobile. Fortunately the symptoms of heart failure can be well-controlled with drugs even when the condition is quite advanced.

**Treatment**

There are several different types of drugs that are often used in combination to treat heart failure.

➤ Drugs that reduce the fluid retention and oedema. These are called diuretics and they act by making the kidneys excrete more fluid and salt

➤ Drugs that dilate the blood vessels, reducing the work the heart has to do to pump blood through the arteries

➤ Drugs that help the heart contract more forcibly.

Doctors use one or more of these drugs in combinations. The dosages and the combination may need to be changed from time to time. The person may also need to take drugs for other conditions such as angina, which often coexists with heart failure. In advanced cases, when drug treatment is not working, a heart transplant (from a donor who had died of some other condition) may be an option. To prevent rejection of the new heart, the recipient will need to take medications to suppress the immune system and these can have serious side effects. A shortage of donor hearts means that recipients have to carefully selected. Nevertheless, a heart transplant can allow some patients to lead active, healthy lives once again. The average survival period after a heart transplant is between 10 and 20 years.

**Prevention**

There are certain steps that will significantly lessen your chances of getting ischaemic heart disease/coronary heart disease:

➤ Make sure your blood pressure is controlled

➤ Know your blood cholesterol level and if it is too high, take steps to reduce it

➤ Put yourself on a low-fat diet. Lose weight

➤ Stop smoking

➤ Exercise regularly

➤ If you have diabetes, make sure your blood sugars are as controlled as they can be

➤ If there is a family history of heart disease, discuss it with your doctor.
Why are risk factors included in the National Health Priority Areas initiative?

The effect of risk factors on health depends not only on their prevalence in the population but also on the relative amount they contribute to the level of ill health in the population. Australia’s most recent national study of the burden of illness and injury applied to 2003 and summarised the contribution of risk factors to the national burden for that year. Tobacco smoking was estimated to contribute the greatest burden (7.8% of the total health burden), followed by high blood pressure (7.6%) and overweight/obesity (7.5%). (Australia’s Health 2010 pages: 67-68, June 2010).

Most of the total burden of disease and injury in Australia in 2003 was attributed to chronic conditions, the leading contributors being cancers (19%) and cardiovascular diseases (18%). Determinants that contribute to the development of one or more chronic diseases include lifestyle behaviours such as tobacco smoking, physical inactivity, alcohol consumption, illicit drug use and unsafe sex; physiological conditions such as excess body weight, high blood pressure and high blood cholesterol; and social and environmental factors such as occupational exposures, intimate partner violence and air pollution. Some of these associations are presented in Table 3.1. (Australia’s Health 2010 pages: 67-68, June 2010).

Risk factors contribute to over 30% of Australia’s total burden of death, disease and disability.

Focus National Health Priority Area risk factors?

The initial focus, under the NHPA initiative, is on lifestyle and behavioural risk factors such as tobacco smoking, physical activity, and diet and nutrition. Emphasis is also placed on monitoring excess body weight, high blood pressure, high blood cholesterol.

Tobacco smoking

Risk factors contribute to over 30% of Australia’s total burden of death, disease and disability. Tobacco smoking is the single most preventable cause of ill health and death in Australia. However, Australia’s level of smoking continues to fall and is among the lowest for OECD countries, with a daily smoking rate of about 1 in 6 adults in 2007. (Australia’s Health 2010 pages: 61-63, June 2010)

Cigarettes and other tobacco products contain carcinogens (cancer-causing agents), nicotine (an addictive
agent) and numerous other poisonous substances. People who use tobacco have an increased risk of developing coronary heart disease, stroke, heart failure, peripheral vascular disease, lung cancer, cervical cancer and osteoporosis. These risks increase with the number of cigarettes smoked daily, with the number of years of smoking, and especially when the habit is started at an early age.

Tobacco smoke affects not only the individual user, but also others who may be exposed to it. Environmental tobacco smoke has been shown to be associated particularly with the exacerbation of childhood respiratory diseases such as asthma.

**Physical inactivity**

Physical inactivity, defined as people undertaking ‘insufficient’ physical activity to achieve measurable health outcomes, is a strong risk factor for a range of NHPA diseases and conditions. It can also contribute to other risk factors such as increases in blood pressure, blood cholesterol levels and overweight and obesity.

There is strong evidence that a lack of regular physical activity is associated with an increased risk of mortality and morbidity from heart and vascular diseases, particularly coronary heart disease. There is also some association between physical inactivity and an increase in risk of some types of stroke, heart failure and peripheral vascular disease. Insufficient physical activity increases the risk of Type 2 diabetes, osteoarthritis, osteoporosis and some cancers; in particularly, an increased risk for post-menopausal breast cancer and colorectal cancer.

Physical activity has a beneficial effect on improving various aspects of health including cardiovascular disease, musculoskeletal health and diabetes. Physical activity may also assist in the reduction in symptoms of depression and reduce the risks of developing some cancers, such as prostate cancer.

Physical inactivity has been ranked second only to tobacco smoking, in terms of the burden of disease and injury from risk factors in Australia.

**Poor diet and nutrition**

Diet and nutrition play a major role in health and disease. In recent decades much evidence has shown that dietary patterns can contribute to the risk of various diseases and their immediate risk factors.

Poor diets often result from over-consumption of food in general, or diets high in energy-rich components such as fat. A poor diet may also be low in dietary fibres or complex carbohydrates, and deficient in certain vitamins and minerals.

In developed nations, the problem is more closely associated with excess consumption rather than nutritional deficits that are experienced in developing nations.

Poor diet plays a key role in the development and progression of NHPA diseases such as coronary heart disease, stroke, Type 2 diabetes and some forms of cancers such as colorectal cancer and post-menopausal breast cancer. It may also increase the risk of prostate cancer, although this link is less clear. Poor diet and nutrition also contributes to a variety of other health risk factors such as high blood pressure, excess weight and high blood cholesterol.

**Excess body weight**

Excess body weight, a term used to refer to both overweight and obesity, is a condition that occurs due to excess body fat resulting from an energy imbalance, where energy consumption (nutritional patterns) exceeds energy expenditure over a considerable period of time.

Excess body weight has been clearly linked with increased risk of mortality and morbidity from heart and vascular diseases, such as coronary heart disease, stroke, heart failure and peripheral vascular disease. There is also substantial evidence for a causal relationship between excess body weight and increased risk for a number of NHPA diseases such as Type 2 diabetes, gestational diabetes and some cancers such as colorectal cancer, prostate cancer and post-menopausal breast cancer.

Excess body weight is also
associated with a range of other NHPA risk factors, such as high blood pressure, impaired glucose tolerance and high blood cholesterol. The risk of developing more than one NHPA disease or condition also increases with increasing levels of excess weight. Overweight was estimated to account for 4.3% of the total burden of disease in Australia in 1996.

High blood pressure

High blood pressure (hypertension) is a condition that is defined by the WHO as when either the systolic blood pressure is 140 mmHg or more; or diastolic blood pressure is 90 mmHg or more. The term ‘blood pressure’ refers to the forces exerted by blood on the walls of the arteries and is measured as systolic pressure over diastolic pressure. Systolic blood pressure reflects the maximum pressure in the arteries when the heart muscle contracts to pump blood. Diastolic blood pressure reflects the minimum pressure in the arteries when the heart muscle relaxes.

High blood pressure is a major risk factor for a range of cardiovascular diseases. The risk of disease increases as the level of blood pressure increases. It can be controlled via changes in nutrition, weight, physical activity and medication. The burden of disease in Australia that can be attributed to high blood pressure was estimated to be more than 5% of the total burden in DALY terms among Australians in 1996.

Increased risk to two major forms of cardiovascular disease, coronary heart disease and stroke, as well as other serious complications are directly associated with high blood pressure. It can increase the risk of these two cardiovascular diseases by two to four times. High blood pressure is also associated with an increased risk of heart failure and peripheral vascular disease.

High blood cholesterol is a major risk factor for coronary heart disease, the single greatest cause of death and disability in Australia.

High blood cholesterol

High blood cholesterol (hypercholesterolemia) means there is too much cholesterol (a fat-like substance) in the blood. This leads to the build up of cholesterol, on the walls of the arteries of the heart and other parts of the body, in a process called atherosclerosis, resulting in the arteries becoming clogged and having decreased or inhibited blood flow.

High blood cholesterol is a major risk factor for coronary heart disease, the single greatest cause of death and disability in Australia. It is also associated with an increased risk of ischaemic stroke, heart failure and peripheral vascular disease. For most people, a diet high in saturated fat is the main factor that raises blood cholesterol levels. High blood cholesterol accounted for almost 3% of the total burden of disease of Australians in 1996.

The set of indicators for risk factors covers the major underlying risk factors which commonly contribute to the NHPA diseases and conditions. This includes tobacco smoking, insufficient physical activity, excess body weight, high blood pressure, high blood cholesterol and diet and nutrition.
REGULAR CHECK-UPS

One of the most important things you can do is talk to your doctor about your risk of heart disease. Often there are no symptoms of heart disease. That is why it is so important when you next visit your doctor to have your risk factors measured – whether or not you think anything is wrong with you.

Be honest and provide your doctor with as much information about your lifestyle and family history as possible. If you’re not sure what questions to ask your doctor, see the list of questions below for an idea of where to start.

QUESTIONS YOU CAN ASK YOUR DOCTOR

Family history
➤ Does my family history put me at increased risk of heart disease?

Blood pressure
➤ What should my blood pressure be?
➤ How often should I have my blood pressure checked?
➤ How can I lower my blood pressure?

Blood cholesterol
➤ What is blood cholesterol?
➤ Am I due for a blood cholesterol test?
➤ What do my blood cholesterol numbers mean?
➤ What should my blood cholesterol goal be?
➤ What can I do to reduce my total blood cholesterol level?

Lifestyle
➤ What lifestyle changes can I make to help manage my blood pressure or blood cholesterol levels?
➤ What should I be eating to reduce my risk factors?
➤ What types of physical activity can I do?
➤ How much physical activity should I be doing?
➤ What can I do to achieve or maintain a healthy weight?
➤ What can I do to stop smoking?

Medicines
➤ Will I need to take medicines to manage my blood pressure or blood cholesterol levels?
➤ If yes, what medicines do I need and what do they do?
➤ Are there any side effects I need to be aware of?
➤ For how long do I need to take medicine?
➤ How should I take my medicines (e.g. once a day with food, or twice a day 30 minutes before meals)?
➤ Can you give me a Consumer Medicine Information leaflet for my medicine?

Tests
➤ Why do I need this test?
➤ How is it done?
➤ Will it hurt?
➤ What are the benefits and risks of the test?
➤ When will I get the results?
➤ Will I need to stay in hospital?

Referrals
Do I need to see another health professional, such as a dietician, physical activity professional or cardiologist?
This booklet information explains a new way that your doctor can measure your heart and stroke risk score. When your doctor tells you what your risk score is, you can record it on a copy of this page to help you to remember it. This booklet also gives you tips and outlines simple steps that you can take to reduce your risk factors and improve your health.

Every hour, five Australians die from heart, stroke and blood vessel disease* (together known as ‘cardiovascular disease’ or ‘CVD’). CVD is also a major cause of disability. The good news is, most CVD is preventable. You can take steps to help to reduce your risk of CVD.

The first step is to **know your risk**.

### WHAT IS MY ‘RISK’?

The first step is to find out your heart and stroke risk score, which is your chance, as an individual, of getting CVD. When you know your risk score, you can look at how you can reduce your risk by tackling your risk factors (things that can increase your chance of getting CVD).

It can be difficult to know whether or not you are at risk of CVD, because often you can’t feel any symptoms. If you are 45 years old or over,** seeing your doctor is part of the first step.

### HOW HAS MEASURING HEART AND STROKE RISK CHANGED?

In the past, CVD risk was measured and treated by looking at one risk factor, such as blood pressure or cholesterol, at a time.

We now know that your individual combination of risk factors is more important. Risk factors work together to increase or decrease your overall chance of getting CVD.

The new method of measuring your risk gives you an overall picture of your personal risk level, to help you and your doctor to identify the most important steps that you should take to reduce your risk and improve your health.

### HOW IS MY HEART AND STROKE RISK MEASURED?

Your doctor will test and record a range of your risk factors, including:

- Blood pressure
- Age
- Cholesterol
- Sex
- Whether or not you smoke.

He or she will also look at other important factors that can increase your risk, such as whether or not you have:

- Diabetes
- Chronic kidney disease
- An irregular heart beat
- A family history of CVD or high cholesterol.

Your doctor will then use a ‘risk calculator’ to work out your overall heart and stroke risk score.

### WHAT DOES MY HEART AND STROKE RISK SCORE MEAN?

Your risk score shows your chance of getting CVD within five years.

- **High risk**
  - More than 15% (nearly 1 in 7 will get CVD within the next five years)
- **Moderate risk**
  - 10-15% (1 in 10 will get CVD within the next five years)
- **Low risk**
  - Less than 10% (1 in 20 will get CVD within the next five years)

### WHAT HAPPENS NEXT?

Your doctor will look at your risk score and your individual risk factors to work out what steps you should take to reduce your risk.

If you are at **low risk**, ask your doctor to measure your risk again in two years and maintain a healthy lifestyle.

If you are at **moderate risk**, ask your doctor to measure your risk twice a year, and follow the tips for reducing your risk of CVD in this booklet and your doctor’s advice.

If you are at **high risk**, ask your doctor for advice and follow it.

### HOW CAN I REDUCE MY RISK FACTORS?

1. Stop smoking and avoid second-hand smoke
2. Be active every day. Aim for at least...
30 minutes of moderate-intensity physical activity, such as brisk walking, on most, if not all, days

3. Avoid adding salt to food. Choose ‘no added salt’, ‘low-salt’ or ‘salt-reduced’ foods where possible

4. Eat a variety of foods, including vegetables, wholegrains, lean meats, oily fish, fruit, low fat dairy and vegetable/seed oils. Remember to also eat nuts, seeds and legumes

5. Take your medicines as prescribed by your doctor

6. Visit your doctor regularly

7. Look for resources that may help you to reduce your risk.

Start with these websites for lots of helpful information:
➤➤ www.diabetesaustralia.com.au
➤➤ www.heartfoundation.org.au
➤➤ www.kidney.org.au
➤➤ www.strokefoundation.com.au

(These are the health charities that form the National Vascular Disease Prevention Alliance).

WHAT IS CVD?
CVD is heart, stroke and blood vessel disease.

CVD includes:
➤ Coronary heart disease leading to heart attack and angina
➤ Stroke
➤ Transient ischaemic attacks (mini strokes)
➤ Heart failure
➤ Peripheral arterial disease (diseases of blood vessels in the legs)
➤ Blood clotting problems.

CVD happens when the blood vessels that transport oxygen to different parts of your body gradually narrow. Blood vessels become narrow when fatty material builds up on their walls.

This can reduce your blood flow. If a blood clot forms in your narrowed blood vessel and completely blocks the blood supply to important parts of your body, such as your brain or heart, a stroke or heart attack will happen.

WHAT RISK FACTORS FOR CVD CAN I CONTROL?
Risk factors that you can control to reduce your chance of getting CVD include:
➤ Smoking
➤ Making poor food choices
➤ Being overweight or obese
➤ Not getting enough physical activity
➤ Diabetes
➤ High blood pressure
➤ High cholesterol
➤ Chronic kidney disease.

Kidney disease and diabetes are closely related to CVD and increase your risk of getting CVD.

AN EXAMPLE OF CVD RISK MEASUREMENT
David is a 49-year-old male.
He has smoked a packet of cigarettes every day for the past 20 years.
He has more than five pots/middies of full strength beer at least three times a week.
He has high blood pressure, often measured at 160 mmHg/100 mmHg.
He does not have diabetes.
He has a total cholesterol reading of 6 mmol/L.
He weighs 70 kg.
His father died of stroke at 70 years of age.
His 85-year-old mother is still alive, but has high blood pressure and diabetes.
David’s doctor considers these risk factors, as well as whether or not David has any conditions, such as chronic kidney disease, that already put him at high risk of CVD, before calculating his risk.

Using a risk calculator, the doctor works out that David’s heart and stroke risk score is 16%

WHAT DOES THIS MEAN?
David has a high risk (more than 15%) of experiencing a CVD event, such as heart attack, in the next five years. Therefore, he needs to act now to lower his risk.

With help from Quitline, David stops smoking. David’s doctor prescribes him blood pressure medicine, which David takes every day. David starts exercising and cuts his salt intake and the amount of take-away food he eats.
In six months, the doctor calculates David’s personal risk score again and it is 10-15%. As a result of his actions, David has successfully reduced his risk of CVD. The doctor also suggests that David should limit the amount of beer he drinks to help to further lower his risk.

FOR MORE INFORMATION
➤ Diabetes Australia
www.diabetesaustralia.com.au
➤ Kidney Health Australia
www.kidney.org.au
➤ National Heart Foundation of Australia
www.heartfoundation.org.au
➤ National Stroke Foundation
www.strokefoundation.com.au

ENDNOTES
** 35 years for Aboriginal and Torres Strait Islander peoples.

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Coronary heart disease occurs when your coronary arteries (the arteries that supply blood and oxygen to your heart muscle) become clogged with fatty material called ‘plaque’ or ‘atheroma’. Plaque slowly builds up on the inner wall of the arteries, causing them to become narrow. This process is called ‘atherosclerosis’. It can start when you are young and be well advanced by middle age.

If your arteries become too narrow, the blood supply to your heart muscle is reduced. This may lead to symptoms such as angina. If a blood clot forms in the narrowed artery and completely blocks the blood supply to part of your heart, it can cause a heart attack.

Heart disease is the leading single cause of death in Australia, with over 23,600 Australian lives lost to the disease in 2008.

RISKS YOU CAN CHANGE AND RISKS THAT YOU CAN’T

There is no single cause for coronary heart disease, but there are ‘risk factors’ that increase your chance of developing it. There are ‘modifiable’ risk factors (ones that you can change) and ‘non-modifiable’ risk factors (ones that you can’t change).

Modifiable risk factors include:

➤ Smoking
➤ High total blood cholesterol
➤ High blood pressure
➤ Diabetes
➤ Being physically inactive
➤ Being overweight
➤ Depression, social isolation and a lack of quality social support.

Risk factors that you can’t change include increasing age, being male and having a family history of heart disease. Aboriginal and Torres Strait Islander people are also at increased risk of coronary heart disease.

The good news is that you can reduce your overall risk of developing coronary heart disease by leading a healthy lifestyle and taking medicines as prescribed by your doctor.

SMOKING

As well as causing cancer, smoking affects the arteries that supply blood to your heart and other parts of your body. It reduces the amount of oxygen in your blood and damages your artery walls. Smoking increases your risk of heart attack, stroke and peripheral arterial disease (that can lead to gangrene and limb amputation).

Smoking makes your blood ‘stickier’, causing blood cells to clump together. This slows blood flow through your arteries and makes blockages more common. Blockages may cause heart attack and stroke.

It also makes your artery walls sticky, causing them to become clogged with fatty material called ‘plaque’ or ‘atheroma’. Smokers often have cold hands or feet as a result of clogged arteries, which may also lead to serious problems such as gangrene. If the clogged artery is your coronary artery, it can cause angina. If a blood clot forms in the narrowed coronary artery and completely blocks the blood supply to a part of your heart, it can cause a heart attack.

HIGH TOTAL BLOOD CHOLESTEROL

Cholesterol is a fatty substance produced naturally by your body. You can also get cholesterol from some foods. It is used for many different things in your body, but is a problem when there’s too much of it in your blood.

A high total blood cholesterol level causes fatty material to gradually build up in coronary arteries, making it harder for blood to flow through. It is mainly caused by eating foods high in saturated and trans fats.

Your total blood cholesterol level includes two types of blood cholesterol.

➤ Low density lipoprotein (LDL) is also known as ‘bad’ cholesterol because it can add to the build up of plaque in your arteries and increase your risk of getting coronary heart disease (CHD).

➤ High density lipoprotein (HDL) is also known as ‘good’ cholesterol because it helps to protect you against CHD.

Most of the total cholesterol in your blood is made up of LDL cholesterol. Only a small part is made up of HDL cholesterol.
It’s best to aim for a low LDL cholesterol level and a higher HDL cholesterol level.

HIGH BLOOD PRESSURE

Blood pressure is the pressure of the blood in your arteries (the blood vessels that carry oxygen and nutrients to the body) as it is pumped around the body by the heart. Blood pressure depends on two main things: the amount of blood pumped by the heart and how easily the blood can flow through the arteries.

Your blood pressure will go up and down throughout the day, depending on the time of day and what you are doing. However, high blood pressure is a condition where your blood pressure is consistently high.

Your family history, eating patterns, alcohol intake, weight and level of physical activity have a strong influence on blood pressure. In some people, medicines, including the oral contraceptive pill, contraceptive ‘depot’ injections, steroids (cortisone-like medicines) and arthritis medicines, can also raise blood pressure.

High blood pressure can overload the heart and coronary arteries and speed up the artery-clogging process. This can lead to problems such as heart attack and stroke.

High blood pressure can also affect arteries to other parts of the body, such as the eyes, kidneys and legs.

If high blood pressure is not treated, the heart may weaken because of the constant extra demand. This may cause ‘heart failure’, a serious condition with symptoms such as tiredness, shortness of breath and swelling of the feet and ankles.

DIABETES

Diabetes increases the risk of heart attack, angina and stroke. People with coronary heart disease frequently have Type 2 diabetes. People with diabetes and coronary heart disease are at higher risk of heart attack and stroke.

The reported increase in diabetes in Australia is thought to be associated with more people being physically inactive, having unfavourable eating habits and being overweight.

There are two main types of diabetes:
- **Type 1** previously known as insulin dependent or juvenile onset diabetes
- **Type 2** previously known as non-insulin dependent or mature onset diabetes.

If you have diabetes, it is important that you manage your condition by being physically active, enjoying healthy eating and maintaining a healthy weight.

If you have diabetes, it is important that you manage your condition by being physically active, enjoying healthy eating and maintaining a healthy weight.

If you have Type 2 diabetes, you may need to take medicines to help you to maintain normal blood glucose levels, as well as make these lifestyle changes.

It is also important to stop smoking, reduce your total blood cholesterol level, control your blood pressure and regularly see your doctor for diabetes reviews.

BEING OVERWEIGHT

Being overweight increases your risk of a number of health problems, including:
- Coronary heart disease
- Diabetes
- High blood pressure
- High blood cholesterol
- Gall bladder disease
- Joint problems, such as gout, arthritis and joint pain
- Sleep problems, such as sleep apnoea
- Certain types of cancer.

Carrying extra weight around your middle (being ‘apple-shaped’) is more of a health risk, so it is especially important for you to lose weight if this is the case.

To achieve a healthy body weight, balance the energy (kilojoules) coming into your body through food and drinks with the energy (kilojoules) being used up by your body through regular physical activity.

BEING PHYSICALLY ACTIVE

Physical activity is an important part of looking after your health and reducing your risk of coronary heart disease.

Regular physical activity will:
- Improve your long-term health
- Reduce your risk of heart attack
- Give you more energy
- Help you to manage your weight
- Help you to achieve a healthier total blood cholesterol level
- Lower your blood pressure
- Make your bones and muscles stronger
- Make you feel more confident, happy and relaxed
- Help you to sleep better.
If you have had a heart attack, regular physical activity will help you to recover more quickly. If you have diabetes, it will also help you to control your blood glucose levels.

Physical activity doesn’t have to be strenuous – moderate-intensity physical activity, such as brisk walking, is great for your health. We recommend that you do at least 30 minutes of moderate intensity physical activity on most, if not all, days of the week. You can do this in smaller bouts, such as three 10-minute walks, if it is easier.

**DEPRESSION**

Studies have shown that some people who have depression, are socially isolated, or do not have quality social support are at greater risk of developing coronary heart disease.

Depression can be treated with medical and non-medical therapies. If you think that you have depression, talking to your health professional is the best first step.

For more information on depression, visit www.beyondblue.org.au

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Moderate-intensity physical activity, such as brisk walking, is great for your health.

**FAMILY HISTORY**

A person’s family history of disease or genes can increase their tendency to develop:

- High blood pressure
- High blood cholesterol
- Diabetes
- A particular body shape.

Whereas having a family history of coronary heart disease is a risk factor for developing it, fortunately it does not mean that you will develop it.

However, if you do have a family history of coronary heart disease, it is important to reduce or remove your other risk factors. For example, limit the amount of saturated and trans fats you eat, be smoke-free and lead an active, healthy lifestyle.

**GENDER AND AGE**

Generally, men have a higher risk than women of developing coronary heart disease in middle age. The risk rises as they get older.

However, the risk of developing coronary heart disease is an important issue for women, especially as they get older. It is not clear why women tend to get coronary heart disease at a later age than men, although it is likely that hormonal changes after menopause, combined with changes in their risk factors, play a role.

Despite your gender and age, you can reduce your risk of developing coronary heart disease if you follow a healthy lifestyle and take medicines as prescribed by your doctor.

**THINGS TO REMEMBER**

- There is no single thing that causes coronary heart disease, but several risk factors that contribute to it.
- You can reduce your risk of developing coronary heart disease by reducing or removing the modifiable risk factors, such as smoking, high total blood cholesterol, high blood pressure, being physically inactive, being overweight, diabetes, depression and social isolation.
- Take any medicines as prescribed by your doctor.

This page has been produced in consultation with, and approved by, the Heart Foundation.

For the latest updates and more information, visit www.betterhealth.vic.gov.au
Heart disease is rarely caused by just one thing. It most often results from an accumulation of risk factors. It is important that you know these factors and work to avoid or improve on any ones that are relevant to you.

An assessment of your risk of heart disease is best done by your doctor who can advise you on ways to reduce your risk factors.

Ways to reduce your risk of heart disease

➤ Keep your blood lipid levels low (cholesterol and triglycerides)
➤ Maintain a healthy weight
➤ If you have diabetes, ensure it’s controlled
➤ Have your blood pressure checked regularly
➤ Be physically active
➤ Don’t smoke.

Keeping blood cholesterol and triglycerides low

Blood cholesterol and triglycerides are best measured as part of an overall assessment of your risk of heart disease. They can be measured by a simple blood test, which can be arranged by your doctor. Depending on your other risk factors (such as a family history of high cholesterol, or other existing conditions such as diabetes), your doctor may aim to get your total blood cholesterol level to about 4.0 mmol/L. Ask for further advice from your doctor.

To help keep cholesterol low, remember the following key points.

➤ Eat less fat, especially saturated animal fat
➤ Achieve and maintain a healthy body weight
➤ Keep active.

How do I eat less saturated fat?

➤ Use small amounts of margarine and monounsaturated and polyunsaturated oils (e.g. canola, olive, sunflower and safflower) instead of butter and other animal fats (such as dripping)
➤ Cut fat off meat
➤ Remove skin from chicken
➤ Grill meat instead of frying
➤ Choose lower fat cheeses (such as Edam, mozzarella or cottage cheese)
➤ Use low-fat milk (less than 2 per cent fat)

Avoid deep-fried, take-away foods
Minimise your intake of cakes, biscuits, pastries and chocolate. Have them only occasionally
While most saturated fats have an animal source, some vegetable oils, such as palm oil and coconut oil (and coconut milk and cream), do contain high levels of saturated fat, and should also be avoided.

How do I maintain a healthy weight?

➤ Avoid foods high in fat: choose lean meats, cut the skin off chicken, choose low-fat dairy products and eat fish regularly. All fats, saturated or not, contain high levels of energy
➤ Eat smaller portions
➤ Reduce sugar and alcohol intake
➤ Be physically active: choose activities that you enjoy and can keep up
If you are already overweight, you need to lose some weight. But it is important to do it slowly and properly. Avoid diets that promise rapid weight loss. Don’t starve yourself or miss meals. Seek the advice of your doctor or a dietitian.

General rules of healthy eating

➤ Make vegetables a major part of at least one meal each day and eat fruit frequently. Recommendations are for five serves of vegetables and two serves of fruit daily
➤ Choose wholegrain breads instead of white varieties more often
➤ Eat more cereals (rice, pasta and other grains) and legumes (dried peas and beans)
➤ Use only small amounts of very lean meats and poultry without skin
➤ Choose low-fat dairy products (milk, yoghurt and cheese)
➤ Try to eat fish at least twice a week (tinned or fresh), but make sure it isn’t fried
➤ Avoid high fat and/or high sugar bakery products, fast foods, desserts, soft drinks and confectionery
➤ Use small amounts of margarine or olive oil instead of butter
➤ Use monounsaturated or polyunsaturated oils for cooking (e.g. olive, canola, sunflower and safflower)
➤ Grill, boil, steam, bake or microwave rather than fry
➤ Reduce your salt intake
➤ Look for the Heart Foundation Tick for healthy food choices
➤ Drink plenty of water.

**Why is it important to control diabetes?**

People with diabetes have a greater chance of developing heart disease than those who don’t have diabetes. Diabetes can affect the vessels that supply blood to the heart. Working with your doctor to develop a plan to control your diabetes is the first step in safeguarding your heart.

Many of the lifestyle changes suggested for keeping your heart healthy, such as a good diet and regular exercise, are also important in controlling diabetes. Sometimes medication is needed. Ask your doctor.

**Why should I be physically active?**

Active people have fewer heart attacks and have a better chance of recovery than inactive people. They also:

➤ Feel good, are less tired, more relaxed and are better able to cope with stress
➤ Can do more with less effort
➤ Have better heart function and possibly lower blood pressure, and
➤ Can control their weight and lower their blood cholesterol levels.

Aim to accumulate 30 minutes of physical activity most days of the week. You don’t have to join a gym or pound the pavements all day long. Regular brisk walking for half an hour can do the job just as well. Find a variety of activities you enjoy. Look for opportunities to put activity in your day, such as taking the stairs instead of the lift or parking your car a little further away. Every bit helps. Two or three sessions that add up to half an hour are OK if you can’t do it all at once.

**Why is blood pressure important?**

High blood pressure can enlarge and weaken the heart. It also damages the blood vessels. If they become narrow or blocked, it may result in a heart attack or stroke. Have your blood pressure checked regularly.

Your doctor can tell you how often is advisable: your blood pressure needs to be checked more often if you are older, taking any medication (including the contraceptive pill), if you are overweight, or if you have diabetes or a family history of heart disease.

**How does smoking affect my heart?**

If you smoke, your chances of a heart attack are two or three times more than a non-smoker, and you have a higher risk of stroke and many other diseases. Lifetime smokers have a one in two chance of dying from smoking and shorten their lives by an average of 14 years. Smoking also adversely affects the health of others around you.

**Is it worth stopping smoking?**

YES. Always. Whatever your age, whatever your health. If you stop smoking, the risks mentioned above soon become much less.

**How do I stop?**

➤ Set a quit day and go for it
➤ Ring the Quitline for free advice and support (131 848)
➤ Do something different at times when you usually smoke
➤ Get your friends to support you
➤ Avoid smokers and places where a lot of people smoke
➤ Be more physically active
➤ Try chewing gum or nibbling on raw fruits or vegetables
➤ Promise yourself a treat with the money you save
➤ Don’t be put off by one failure: try again and again if necessary
➤ Talk to your doctor or pharmacist about nicotine replacement or other prescription medicines to help with cravings
➤ Enrol for a stop smoking programme: talk to your doctor.

**Should we be stressed about stress?**

The exact relationship between stress and heart disease is unclear. However, for our general health and wellbeing, it is advisable to understand what things stress us unduly, and to find ways of dealing with them.

**Here are some helpful ways of reducing stress**

➤ Identify the cause
➤ Be more physically active
➤ Relax physically and mentally
➤ Maintain healthy eating habits
➤ Establish regular sleep patterns.

Cardiovascular exercise is an important component of any balanced exercise routine. The following recommendations from Fitness Australia help to inform cardiovascular exercise prescriptions for general health.

**GENERAL RECOMMENDATIONS**

➤ To achieve health benefits, healthy adults should complete a minimum of 150 minutes of moderate intensity cardiovascular exercise or 75 minutes of vigorous cardiovascular exercise per week.

➤ Greater activity levels are associated with further health benefits.

➤ Cardiovascular exercise can be accumulated in short bouts of 10 minutes to obtain health benefits.

➤ In order to meet the recommended weekly cardiovascular exercise volume, content can consist of a mixture of both vigorous and moderate intensity.

➤ One minute of vigorous intensity exercise is approximately equivalent to 2 minutes of moderate intensity exercise.

➤ The recommended exercise levels outlined above are additional to routine low intensity activities of daily living or activities lasting less than 10 minutes in duration.

Monitoring cardiovascular exercise intensity helps to ensure the exercise is both safe and effective.

**Practical example**

Mixing sessions across a week: A person could reach the recommended weekly cardiovascular exercise through 2 x 30 minute brisk walks per week in addition to 3 x 15 minute vigorous jogs.

Mixing intensities in a single session: A 30 minute interval session consisting of 1 minute of vigorous intensity cardiovascular exercise (e.g. jogging) followed by 2 minutes of moderate intensity recoveries (e.g. brisk walking) would contribute 10 minutes of vigorous and 20 minutes of moderate intensity cardiovascular exercise to the weekly total.

**INTENSITY**

Monitoring cardiovascular exercise intensity helps to ensure the exercise is both safe and effective. It is a critical component of program design. Exercise Professionals can use the following methods to successfully gauge and monitor cardiovascular exercise intensity.

**When using the rate of perceived exertion (RPE):**

➤ Moderate intensity can be considered between 11 and 13 or ‘fairly light’ to ‘somewhat hard’.

➤ Vigorous intensity can be considered between 14 and 16 or an exercise intensity that would subjectively be perceived as ‘hard’.

**Practical example**

An individual that is beginning a cardiovascular exercise program may begin at an intensity of 11-13 on the RPE scale. As fitness improves they may then incorporate some vigorous intensity exercise by training at an intensity of 14-16 on the RPE scale.

**HEART RATE**

Calculation of a suitable exercise heart rate range can be obtained through reference to the heart rate reserve (HRR – see practical example below).

➤ Moderate intensity can be considered to be between 40-60% HRR.

➤ Vigorous intensity is between 60-85% HRR.

**Practical example**

HRR = HR max – HR resting

e.g. For a 40 year old: 180 minus 60 = 120 (HRR)

Exercise HR Range = (HRR x training range %) + HR resting
e.g. 120 x 40-60% + 60 = 108-132 bpm (Exercise HR Range)

An individual that is new to cardiovascular exercise can begin at a moderate intensity of 40-60% HRR and as fitness improves may gradually progress to some vigorous intensity exercise at 60-85% HRR.

**TALK TEST**

➤ The talk test involves exercising at the highest intensity that is possible while still maintaining a comfortable
conversation. This intensity is considered to be the upper level of moderate intensity

➤ Once the individuals breathing patterns become elevated to the point where a conversation cannot be comfortably maintained, the intensity is considered vigorous.

**Practical example**

If while exercising, an individual cannot talk comfortably due to excessive ventilation, they are above the talk test intensity and therefore exercising at a vigorous intensity.

If an individual has not been physically active for some time, they might begin with 15 minutes of moderate intensity cardiovascular exercise three times per week.

**USING MULTIPLE MARKERS OF INTENSITY**

➤ Given that there are both advantages and disadvantages to the various methods of monitoring intensity, it can be advantageous to use multiple methods.

**Practical example**

Using multiple markers of intensity: A person wanting to undertake cardiovascular exercise at a moderate intensity could simultaneously aim for a HR of 40-60% HRR and an intensity at which they can comfortably maintain a conversation.

During an interval training session a healthy fit individual may exercise for 2 minutes at an RPE of 15 followed by 2 minutes at an RPE of 11. Alternatively an individual could exercise for 2 minutes at an intensity of 85% HRR followed by moderate intensity exercise until the HR drops back to 60% of HRR.

**MODE**

➤ The mode of activity for cardiovascular exercise needs to be large muscle mass, rhythmic activities such as walking, jogging, swimming, rowing and cycling.

➤ Activities of daily living that are longer than 10 minutes in duration and of sufficient intensity to raise heart rate and ventilation to moderate levels can be used towards the weekly cardiovascular exercise target (e.g. manual labor, lawn mowing, walking to work).

**PROGRESSION**

➤ Anything is better than nothing and in those individuals who are extremely deconditioned health benefits can be realised with small increases in cardiovascular exercise.

➤ If an individual has been inactive for some time, they will need to start slowly and build up to recommended cardiovascular exercise levels over time.

**Practical example**

If an individual has not been physically active for some time, they might begin with 15 minutes of moderate intensity cardiovascular exercise three times per week. As fitness improves they may progress over a number of weeks to performing 15 minutes of cardiovascular exercise five times per week. They may then progressively increase duration to 30 minutes for each session.

**REFERENCES**


Eating for a healthy heart

Just a few simple small changes to your diet can make a big difference to your heart and general health, says myDr

For many years, the traditional Australian diet has been too high in meat and animal fat and lacking in vegetables, fruits, fish, legumes and grains. This has made us very vulnerable to heart and blood vessel disease, not to mention a whole range of other diseases.

You can make a huge difference to your heart and to your general health just by making a few simple changes in your way of eating.

Start gradually, and see how many of these changes you can incorporate into your daily diet.

➤ Make vegetables a major part of at least one meal each day and eat fruit frequently – the recommended intake is five serves of vegetables and two serves of fruit daily

➤ Choose wholegrain breads instead of white varieties more often

➤ Eat more cereals (rice, pasta and other grains) and legumes (dried peas and beans). Try flavouring these with small amounts of lean meat, rather than basing the whole meal around meat. Like meat, legumes are a good source of iron and protein

➤ Use only very small amounts of very lean meats, and eat poultry without skin

➤ Choose low-fat dairy products (milk, yoghurt and cheese)

➤ Eat fish (fresh or canned and not fried) two to three times a week

➤ Make high-fat and/or high-sugar bakery products, fast foods, desserts, soft drinks (including fruit juice drinks) and confectionery occasional treats rather than everyday food

➤ Use monounsaturated or polyunsaturated oils (e.g. olive, canola, sunflower and safflower) for cooking

➤ Use small amounts of margarine spreads or olive oil instead of butter

➤ Grill, boil, steam, bake or microwave rather than fry

➤ Reduce your salt intake

➤ Look for the Heart Foundation Tick for healthy food choices

➤ Drink no more than two standard drinks of alcohol a day

➤ Drink plenty of water

➤ Rediscover the joy of cooking wholesome meals at home, and teach your kids!
The facts about cholesterol levels

CSIRO is researching ways to reduce cholesterol levels, the risk of heart disease and other conditions that are food-related and can be addressed by modifying diet.

Cholesterol

CSIRO is carrying out research in a number of dietary areas to develop strategies for reducing cholesterol levels, the risk of heart disease and other conditions that are food-related and correctable through modification of diet.

High levels of cholesterol are a risk factor for coronary artery disease (heart attacks and angina).

What is it?

Cholesterol is an essential type of fat that is carried in the blood.

All cells in the body need cholesterol for internal and external membranes.

It is also needed to produce some hormones and for other functions.

The body generally makes all the cholesterol it needs.

Some dietary cholesterol is normally excreted via the liver, however eating too much saturated fat leads to excess cholesterol in the blood stream.

Why is high cholesterol a problem?

High levels of cholesterol in the blood stream are a risk factor for coronary artery disease (heart attacks and angina).

If your cholesterol level is 6.5 mmol/L or greater your risk of heart disease is about four times greater than that of a person with a cholesterol level of 4 mmol/L.

Not all people with high cholesterol levels get heart disease.

About 30 per cent of the community will die of heart disease and most of these will be over 65 years old.

Heart disease usually takes 60-70 years to develop, but if you discover your cholesterol level is high you should see your doctor within the next 2-3 months, not necessarily tomorrow.

Other risk factors for heart disease include smoking, high blood pressure and obesity.

Cholesterol – the good and the bad

Cholesterol is carried in the blood stream in particles called lipoproteins.

These are named according to how big they are:

➤ The very large particles are called Very Low Density Lipoproteins (VLDL)
➤ The intermediate size ones are called Low Density Lipoprotein (LDL) and these particles cause heart disease
➤ The smallest particles are called High Density Lipoproteins (HDL) and these particles actually protect against heart disease.

What to do if your cholesterol level is high

The most effective way to lower your cholesterol is to reduce the amount of animal fat in your diet by various means.

You could:

➤ Reduce cheese intake and/or substitute low fat varieties
➤ Choose reduced fat milks
➤ Use polyunsaturated or monounsaturated margarine or oils instead of butter
➤ Choose lean cuts of meat and remove all visible fat
➤ Eat skinless chicken, fish or beans
➤ Beware of pies, pasties, fish and chips and commercial cakes (hidden fat)
➤ Make cakes at home with polyunsaturated fat, cook chips with polyunsaturated or monounsaturated oil
➤ Lose weight if overweight.
If you make a number of changes to your diet you can expect your cholesterol to fall by 10 per cent.

About 15 per cent of people will see no change and another 15 per cent will see changes of 20-30 per cent.

**How high is high?**

If your cholesterol is between 5.5 and 6.5 your risk of heart disease is only increased by a small amount.

Don’t panic but make a few moderate changes to your diet.

However if you already have heart disease, or one of your parents developed heart disease at an early age, (less than 55 years of age) then you need to make bigger changes.

If your cholesterol is higher than 6.5 then you need to make more changes.

If despite changes to your diet your cholesterol level remains above 6.5 you may need medication, especially if you have the other risk factors mentioned or you have a family history of heart disease see your doctor.

**What about triglycerides?**

Triglycerides are a stored energy source.

Most of the triglyceride is found in the very large particles, the VLDL.

Under some circumstances high blood triglyceride can be a risk factor.

If your cholesterol is high (greater than 6.5) and your HDL cholesterol is low (less than 0.9) then triglycerides can increase the risk of heart disease if they are greater than 1.7.

Triglyceride levels greater than 10 can cause inflammation of the pancreas which is a very serious condition.

**How can I lower my triglyceride?**

Reduce your intake of animal or hard vegetable fats, lose weight and reduce alcohol intake.

Alcohol is very powerful at elevating triglyceride.

See your family doctor if it remains elevated as you may require medication.

Find out more about CSIRO’s work in *Diet & Nutrition* on their website, [www.csiro.au](http://www.csiro.au)

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**FAST FACTS**

➤ High cholesterol is a risk factor for coronary artery disease (heart attacks and angina)

➤ Not all people with high cholesterol levels get heart disease

➤ High triglycerides can also increase the risk of heart disease

➤ The most effective way to lower cholesterol is to reduce animal fats in the diet

➤ If you have a family history of heart disease you may need to make bigger changes

➤ If you are concerned about your cholesterol or triglyceride levels see your doctor.
High blood pressure (often referred to as hypertension; see Box 3.11) is a major risk factor for coronary heart disease, stroke, heart failure and chronic kidney disease. Studies have shown that the lower the blood pressure, the lower the risk of cardiovascular disease, chronic kidney disease and death (NHFA 2009b). When high blood pressure is controlled, the risk is reduced, but not necessarily to the levels of unaffected people (WHO-ISH 1999).

Worldwide, high blood pressure has been found to be responsible for more deaths and disease than any other biomedical risk factor (Lopez et al. 2006). In Australia, nearly 8% of the burden of disease in 2003 was attributed to high blood pressure. It ranked as a close second to tobacco use on this score, with coronary heart disease and stroke accounting for 93% of the burden of high blood pressure. Four-fifths of the burden of high blood pressure related to premature death and the remainder to disability.

Major causes of high blood pressure include diet (particularly a high salt intake), obesity, excessive alcohol consumption and insufficient physical activity. Attention to health determinants such as body weight, physical activity and nutrition plays an important role in maintaining healthy blood pressure.

Despite the definition of high blood pressure in Box 3.11, blood pressure is a continuum with no threshold level of risk as it rises. Starting from quite low levels, as blood pressure increases so does the risk of stroke, heart attack and heart failure. This means that, for people’s usual, day-to-day blood pressure, the lower the better. This is true with rare exceptions.

**Prevalence**

The 1999-2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) measured people’s blood pressure. The results indicated that 30% of Australians aged 25 years and over (3.7 million) had high systolic or diastolic blood pressure or were on medication for high blood pressure – 32% of males and 27% of females. The proportion of people with high blood pressure increased markedly with age (Figure 3.13).

Figure 3.13 also shows the proportion of people who were classified as having ‘high-normal’ blood pressure, which is defined as systolic blood pressure of 120-139 mmHg and/or diastolic blood pressure of 80-89 mmHg (NHFA 2009b). People in this category therefore have blood pressure levels that are in between what is classified as normal and high – in other words, they are on the border of having high blood pressure.

Lifestyle modification such as regular physical activity and quitting smoking is advised for people with blood pressure levels in this category (NHFA 2008). The AusDiab found that, although a smaller proportion of people aged 25-54 years had clinical hypertension compared with those aged 55 years and over, around 40% of people in each of these age groups were...
classified as having high-normal blood pressure (Figure 3.13). This places them at risk of clinical hypertension in the future if lifestyle modification is not pursued or if it is ineffective in controlling their blood pressure.

Over the past decade much effort has been put into more aggressively treating people with high blood pressure.

Figure 3.13 also shows that a large proportion of Australians with high blood pressure were not receiving medication to lower their blood pressure. In 1999-2000, about half of those with high blood pressure aged 55 years and above were not receiving medication.

Although fewer people in the younger age groups had high blood pressure, a greater proportion of those who did were not receiving any medication for it. Over the past decade, however, much effort has been put into more aggressively treating people with high blood pressure. Hence, it is likely that these figures underestimate the current proportion of people on blood pressure lowering medicines.

More recent Pharmaceutical Benefit Scheme (PBS) data show that during the 2007-08 financial year, almost 3 million people in Australia filled prescriptions for medicines with a blood pressure lowering effect. The actual number of users of these medicines is likely to be higher as this figure includes only people receiving medicines subsidised under the PBS. It is important to note that a number of these medicines, while very commonly used to lower blood pressure, can also be used for other conditions.

**Trends**

Between 1995 and 1999-2000 the prevalence of measured high blood pressure among Australians aged 25 years and over remained about the same – 31% in 1995 and 30% in 1999-2000. However, looking at just the urban population aged 25-64 years – the population for which longer term trends are available – the prevalence of high blood pressure decreased appreciably over the final two decades of the 20th century for both males and females (Figure 3.14).
WHAT IS A STROKE?

A stroke is not a heart attack. A stroke occurs when the supply of blood to the brain is suddenly disrupted. Blood is carried to the brain by blood vessels called arteries. Blood may stop moving through an artery because the artery is blocked by a clot or plaque, or because the artery breaks or bursts.

When blood is stopped, the brain cannot get the oxygen it needs, brain cells in the area die and the brain can become permanently damaged.

What are the risk factors for stroke?

Stroke risk is influenced by many factors. Some factors such as age, gender and a family history of stroke, cannot be controlled.

However, there are a number of others that you can control to help reduce your chances of having a stroke.

➤ High blood pressure
➤ High cholesterol
➤ Being overweight
➤ Excessive alcohol
➤ Smoking
➤ Poor diet and inactivity
➤ Diabetes
➤ Atrial fibrillation.

These include:

➤ High blood pressure
➤ High cholesterol
➤ Being overweight
➤ Excessive alcohol
➤ Smoking
➤ Poor diet and inactivity
➤ Diabetes
➤ Atrial fibrillation.

The more risk factors you have, the higher your chances of having a stroke. Individuals with the highest risk of stroke include those with multiple risk factors and those who have already suffered a transient ischaemic attack (TIA), stroke or heart attack.

When your blood pressure is consistently equal to or over 140/90. This is known as ‘hypertension’.

Why does high blood pressure matter?

High blood pressure can have many harmful effects which can eventually lead to stroke; for example:

➤ High blood pressure puts unnecessary stress on blood vessel walls, causing the blood vessel to thicken and break down, eventually leading to a stroke

Doctors sometimes call high blood pressure the ‘silent killer’ because sufferers can have high blood pressure and show no warning signs. If untreated, high blood pressure will increase the risk of stroke, heart attack and kidney failure.

When your blood pressure is:

- Normal: 120/80 or lower
- Normal to High: 120/80 to 140/90
- High to Very High: 140/90 or higher

High blood pressure can speed up common forms of heart disease that can lead to stroke

High blood pressure can increase pressure on the walls of blood vessels taking blood to the brain and weaken them, leading to a bleed in the brain known as a haemorrhagic stroke

High blood pressure can also cause blood clots or plaque (cholesterol and other fat like substances) to break off artery walls and block a brain artery causing a stroke

High blood pressure can cause a haemorrhagic stroke in people who were born with irregular formation of the vessel walls in the brain.

Blood pressure varies throughout the day and if the reading is high, your doctor may measure your blood pressure on a number of occasions. You may be asked to monitor your blood pressure at home. There are a number of different blood pressure devices you may use to do this. Talk to your doctor about what is best for you.

Blood pressure is a measurement of the force your blood puts on blood vessel walls as it travels through your body. High blood pressure is the most important risk factor for stroke. Your blood pressure is expressed with two numbers; for example 120/80.

Blood pressure varies throughout the day and if the reading is high,
Changing your lifestyle to lower your blood pressure and risk of stroke

You don’t have to rely on medication alone to control your blood pressure. There are a number of lifestyle changes you can make to help lower your blood pressure and risk of stroke.

Some people with mild hypertension are able to control their blood pressure simply by making healthy lifestyle changes. Lifestyle changes not only lower blood pressure, they can increase the effectiveness of blood pressure medication and reduce risk of stroke, heart attack and diabetes.

A few simple things to remember that will help keep your blood pressure down:

➤ Drop the salt! and cut down on take-away foods and don’t add salt at the table or when cooking

➤ Healthy eating – enjoy a variety foods especially plant based foods including fresh fruit and vegetables, legumes and wholegrain breads and cereals

➤ Get active and try to exercise regularly, at least 30 minutes of moderate exercise on most days of the week is recommended*

➤ Limit your alcohol intake. A moderate amount of alcohol can lower your risk of stroke but more alcohol may be harmful to your health. Stay within recommended limits for drinking alcohol

➤ Be smoke-free and quit smoking. Call Quit on 131 848

➤ Know your blood pressure numbers; remember the lower your blood pressure, the lower your risk of stroke. One of the most important things you can do is to have your blood pressure checked regularly and confirmed by your doctor.

Blood pressure medications

If you have high blood pressure, or your overall risk of stroke is high because you have multiple stroke risk factors, your doctor may prescribe medications to lower your blood pressure. There are many blood pressure medications and your doctor may need to increase the dose or use these medications in combination to reduce your blood pressure.

Some people will require a number of different ways to lower their blood pressure (medication and lifestyle changes). However, medication does not cure high blood pressure, it can only help control it. Most people who are treated will need to keep taking medication over a lifetime.

If you have already had a stroke or a transient ischaemic attack (TIA), the use of the blood pressure lowering drug perindopril in combination with indapamide has been shown to reduce the chance of a further stroke. This is also true for stroke survivors who have ‘normal’ blood pressure.

StrokeLine

The National Stroke Foundation’s StrokeLine provides information about stroke prevention, recovery and support. Our qualified health professionals are here for you when you need comprehensive information and help.

Remember, stroke is largely preventable, so contact us today to discover the changes you can make to reduce your risk of stroke.

Call our toll free service on 1800 787 653 (open business hours EST across Australia, a message service is available outside these hours). If you leave a message, a health professional will return your call the next working day.

It is important to take your blood pressure medication as prescribed. Do not make decisions about stopping your medication without talking to your doctor.

How can you help?

Stroke is responsible for 1 in 10 deaths in Australia. We need to raise urgently needed funds to continue our work in a number of areas to reduce the incidence and burden of stroke in Australia. Please show your support and donate today. Visit www.strokefoundation.com.au or call 1300 194 196.

* Note some types of exercises should be avoided by people with high blood pressure – please ask your doctor about what is best for you.

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Note: All information was correct at the time of printing, August 2009.
CARDIOVASCULAR DISEASES

Cardiovascular disease (CVD) is the umbrella term for a variety of disease processes related to the functioning of the heart and the circulatory system. CVD is the leading cause of death in Australia, causing about 38% of all deaths in 2002, and long-term disability for 1.1 million people.10

There are a number of modifiable or avoidable risk factors for developing CVD. These are smoking, having elevated blood fat levels (cholesterol and triglycerides), having high blood pressure, being overweight, being physically inactive, poor nutrition, and drinking at harmful levels. Individuals with diabetes mellitus are also at higher risk of developing cardiovascular disease. There is also recognition that socioeconomic factors and psychosocial factors, such as depression and social isolation, influence the development of CVD. To a large extent, therefore, CVD is preventable. Disease trends in Australia show that CVD impacts most heavily on population groups which suffer socioeconomic disadvantage, including Australia’s Aboriginal people and Torres Strait Islanders.10,11

Cigarette smoking contributes to cardiovascular disease in a number of ways. Toxic products from cigarette smoke circulate in the bloodstream, interfering with the efficient working of the endothelium (the inner cellular layer of the arterial wall), and causing the development of atherosclerotic lesions (collections of cholesterol, fat and other matter) in the arterial walls. These collections narrow the arteries, gradually impairing blood flow, and making the arteries harder, less elastic, and more liable to rupture. The first signs of atherosclerosis, plaque (fatty streaks) deposited within the inner layers of the arteries, may start developing as early as in teenage years and the 20s. Smoking also has a direct effect on platelets (blood cells involved in the clotting process), leading to increased activation and stickiness. This in turn causes an increased risk of thrombosis, or development of blood clots.5

Smoking a cigarette also temporarily increases heart rate and blood pressure, which raises the body’s demand for oxygen, but at the same time deprives the body of oxygen through the effects of carbon monoxide, one of the main components of cigarette smoke. The resulting imbalance in oxygen supply and demand promotes the complications of atherosclerosis. These include ischaemia (lack of oxygen due to poor blood supply), with resultant angina pectoris (chest pain or tightness) or myocardial dysfunction (poor heart muscle function).5,12

Nicotine and carbon monoxide in tobacco smoke are most strongly implicated in the processes leading to development of cardiovascular disease but other chemicals may also be involved.5 There is now strong evidence that exposure to second hand cigarette smoke is also a cause of heart disease in non-smokers.

3.2.1 Coronary heart disease

Coronary heart disease (CHD), also known as ischaemic heart disease, is the most common form of cardiovascular disease, and the most common cause of sudden death in Australia.10 It occurs when the arteries around the heart become narrowed due to atherosclerosis. This reduces the blood flow, forcing the heart to work harder to compensate, and can lead to angina. If the damaged artery splits, a blood clot may form, blocking the artery completely. This in turn can lead to acute myocardial infarction (heart attack), which is the death of vital heart muscle due to oxygen starvation. More than 80% of heart attacks occur outside the hospital environment, and in about half of all cases, a heart attack is fatal.10

Smoking is a cause of coronary heart disease,5 increasing the risk of disease incidence by between two- and four-fold, the risk increasing with heaviness of smoking.13 Even light smoking significantly increases the risk of dying from coronary heart disease, the steepest increase in risk occurring in smokers of up to four cigarettes a day.14

Smokers who have CHD are more likely to die of the disease than non-smokers with the disease. The mortality rate for CHD among heavy smokers is up to three times higher than that of non-smokers.13
The heaviest burden of excess death due to tobacco-caused CHD is felt in early middle age. In Australia in 2004-05, 40% of all deaths due to CHD occurring in males between the ages of 35 and 39 were due to smoking. Among women aged 40-44, smoking caused about 34% of all deaths due to CHD. In women who smoke and use the contraceptive pill there is a synergistic interaction, resulting in a particularly elevated risk of coronary heart disease.

In Australia in 2004-05, about 37% of all deaths due to PVD in males aged over 35 were attributable to smoking, and 30% of all PVD deaths in women aged over 35 were caused by smoking. The greatest impact occurred in women aged 40-44, among whom 35% of all stroke deaths were due to tobacco. Research has shown that the risk of having a stroke decreases steadily after quitting smoking, ex-smokers having the same risk as never smokers after 5-15 years, depending on the study.

### 3.2.3 Atherosclerotic peripheral vascular disease
Atherosclerotic peripheral vascular disease (PVD), also known as peripheral artery disease, occurs when blockages within the blood vessels prevent proper blood circulation. PVD most commonly occurs in the legs and feet, but it can also develop in the arms and hands. This may result in severe pain (claudication), especially when exercising. PVD can lead to death of part of the limb. Amputation may be necessary for relief of pain, and to prevent the development of gangrene. Given that the disease process is the same, it is not uncommon for individuals with PVD to die from stroke or heart attack.

Smoking is a cause of peripheral vascular disease. The likelihood of developing PVD increases with amount smoked and duration of exposure to tobacco smoke. In Australia in 2004-05, about 37% of all deaths due to PVD in males aged over 35 were attributable to smoking, and 30% of all PVD deaths in women aged over 35 were caused by smoking.

### 3.2.4 Abdominal aortic aneurysm
Abdominal aortic aneurysm is a weakening of the wall of the aorta (the major artery carrying oxygenated blood from the heart to the body) in the region below the diaphragm. The weakening occurs as a result of atherosclerotic lesions developing in the aortic wall. The wall may eventually stretch and then leak or burst. Abdominal aortic aneurysm is frequently fatal.
Smoking is a cause of abdominal aortic aneurysm, the risk rising with increased exposure to tobacco smoke. Smoking is one of the few currently modifiable risk factors for this disease. Stopping smoking approximately halves the risk of abdominal aortic aneurysm compared to continuing smokers, but even after quitting, former smokers still retain around twice the risk of developing abdominal aortic aneurysm than never smokers.5

3.2.5 Sudden cardiac death

Sudden cardiac death describes death occurring due to sudden, unexpected loss of heart function in an individual who may have no previous history of heart trouble. Cardiac dysrhythmias (irregular muscular contractions of the heart, also referred to as cardiac arrhythmias) are the usual cause of sudden cardiac death. Smokers have a two- to three-fold greater risk of suffering sudden cardiac death than non-smokers, the risk increasing with increased exposure to cigarette smoke.5,13 In Australia it is estimated that smoking causes between 30-40% of all deaths due to cardiac dysrhythmias in men aged between 35-59, and about one third of all deaths due to cardiac dysrhythmias in women aged between 35-44.7

3.2.6 Congestive heart failure

Congestive heart failure (CHF) occurs when the heart becomes less able to pump blood through the body effectively. The heart may become enlarged or thicken, and fluid may collect in the lungs (causing shortness of breath) or in other parts of the body (causing swelling or weight gain). CHF usually occurs in individuals with a history of heart problems such as high blood pressure or coronary heart disease.5 As well as contributing to the disease processes that primarily lead to CHF, smoking is also an independent risk factor for CHF.5 CHF sufferers experience high levels of disability and have a reduced life expectancy.5 In Australia, it is estimated that smoking causes between 30-40% of all deaths due to CHF in men aged between 35-59, and about one third of all deaths due to CHF in women aged between 35-44.7

REFERENCES


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Issues in Society | Volume 340

Cardiovascular Health
Recent research by the Heart Foundation of Australia has concluded that there are strong links between depression, social isolation, the lack of quality social support and coronary heart disease (CHD), similar to the more conventional risk factors such as smoking, high cholesterol, and high blood pressure.

**WHAT IS MEANT BY DEPRESSION, SOCIAL ISOLATION AND QUALITY SOCIAL SUPPORT?**

A person may be depressed if, for more than two weeks they have felt sad, down or miserable, lost interest in things that they would normally enjoy, and experienced three or more symptoms across the following areas:

- **Physical** – tired all the time, can’t sleep.
- **Behaviours** – not going out, not getting things done at work, relying on alcohol and sedatives.
- **Thoughts** – thinking that “nothing good ever happens to me”, “I’m worthless”.
- **Feelings** – guilty, unhappy, disappointed, no confidence.

Social isolation is when a person feels lonely. It is a well-established fact that the degree to which a person feels part of social relationships that provide friendship, love and meaning, as well as a sense of belonging, is a major influence on their mental and physical health.

A person who does not have quality social support is someone who doesn’t have a variety of contacts with people who are available for practical and emotional support, such as someone to confide in, help out during tough times, or to just go out with.

**FACTS ABOUT MENTAL HEALTH AND CHD**

- Depression, social isolation and lack of social support are significant risk factors for CHD
- Within the first 12 months after a heart attack psychological factors such as depression can treble the risk of having another heart attack independent of other factors
- About 800,000 Australian adults and 100,000 children and young people suffer depression each year
- Depression affects on average one in five people in Australia at some point in their lifetime
- Depression is common but can be easily identified and treated
- For more information, see [www.beyondblue.org.au](http://www.beyondblue.org.au) and [www.heartfoundation.com.au](http://www.heartfoundation.com.au)
- Talk to your GP.

For counselling services call Lifeline on 1300 13 11 14. For further information go to [www.mhca.org.au](http://www.mhca.org.au)

*Special thanks to the Mentally Healthy WA Act-Belong-Commit Campaign.*

ABOUT THIS SECTION

‘Exploring issues’ features a range of ready-to-use worksheets relating to the articles and issues raised in this book.

The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

As the information in this book is gathered from a number of different sources, readers are prompted to consider the origin of the text and to critically evaluate the questions presented.

Does the source have a particular bias or agenda? Are you being presented with facts or opinions? Do you agree with the writer?

The types of ‘Exploring issues’ questions posed in each Issues in Society title differ according to their relevance to the topic at hand.

‘Exploring issues’ sections in each Issues in Society title may include any combination of the following worksheets: Brainstorm, Research activities, Written activities, Discussion activities, Quotes of note, Ethical dilemmas, Cartoon comments, Pros and cons, Case studies, Design activities, Statistics and spin, and Multiple choice.

WORKSHEETS AND ACTIVITIES
Brainstorm, individually or as a group, to find out what you know about cardiovascular health.

1. What is cardiovascular disease?

2. What are some of the common symptoms of cardiovascular disease?

3. Define the following terms and consider how they differ from one another.
   - Coronary heart disease (CHD):
   - Cerebrovascular disease (stroke):
   - Heart failure:
   - Peripheral vascular disease:

4. What are the major risk factors for cardiovascular disease?

5. Which Australians are most at risk of cardiovascular disease?
Complete the following activities on a separate sheet of paper if more space is required.

1. There are modifiable risk factors and non-modifiable risk factors for cardiovascular disease. Identify the modifiable risk factors for the following cardiovascular diseases:
   - Coronary heart disease:

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   - Cerebrovascular disease (stroke):

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   - Heart failure:

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   - Peripheral vascular disease:

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WRITTEN ACTIVITIES

Complete the following activities on a separate sheet of paper if more space is required.

2. Heart disease is rarely caused by one thing and is often an accumulation of risk factors. Explain the ways in which lifestyle-related risk factors can be avoided and reduced.

3. Explain some of the treatment options available for cardiovascular diseases. Include drugs, medical operations and devices in your explanation.
1. Investigate the major groups at risk of cardiovascular disease. Who are the most disadvantaged groups in Australia, and why?

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2. Making simple changes to eating habits can improve your overall health and reduce the risk of cardiovascular diseases. After examining your own eating habits, suggest changes to your daily diet that may help to reduce these risks.

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DISCUSSION ACTIVITIES

1. Recognising a heart attack can save a life. In pairs, or as a group, identify your understanding of the warning signs of a heart attack and what you should do. One person can make a list of symptoms that may or may not be warning signs of a heart attack. The other person, or group, can then identify which of the symptoms are actual warning signs. Discuss what to do if these symptoms occur.

2. There are strong links between heart disease and depression, social isolation and a lack of social support. Discuss.
Complete the following multiple choice questionnaire by circling or matching your preferred responses. The answers are at the end of the next page.

1. Which of the following is *not* one of the major cardiovascular diseases in Australia:
   a. Coronary heart disease
   b. Stroke
   c. Heart failure
   d. Peripheral vascular disease
   e. Acute stress disorder

2. The following estimated number of people died from cardiovascular diseases worldwide in 2008:
   a. 625,400
   b. 1.7 million
   c. 4.6 million
   d. 17.3 million
   e. 124 million

3. Behavioural risk factors account for what percentage of coronary heart disease and cerebrovascular disease combined:
   a. 10%
   b. 30%
   c. 60%
   d. 80%
   e. 90%

4. Which one of the following is *not* considered to be a risk factor for a stroke:
   a. Smoking
   b. Diabetes
   c. Being overweight
   d. Cardiovascular exercise
   e. Excessive alcohol

5. Which one of the following categories of people is *not* particularly at risk of cardiovascular disease:
   a. Aged persons
   b. School leavers
   c. Smokers
   d. Aboriginal and Torres Strait Islander peoples
   e. Lower socioeconomic groups
   f. People living in remote areas

6. Which one of the following is *not* considered to be a warning sign of a heart attack:
   a. Shortness of breath
   b. Pain in the legs and/or feet
   c. Dizziness
   d. Nausea
   e. Pain in the neck and/or jaw
   f. A cold sweat
   g. Heaviness in the chest
   h. Pain in the shoulder and/or arms
MULTIPLE CHOICE

Complete the following multiple choice questionnaire by circling or matching your preferred responses. The answers are at the end of this page.

7. Which of the following are not modifiable risk factors of cardiovascular disease (hint: more than one may apply):
   a. High blood pressure
   b. Family history
   c. Lack of physical activity
   d. High blood cholesterol
   e. Social isolation
   f. Ethnicity
   g. Diabetes
   h. Chronic kidney disease
   i. Age
   j. Overweight
   k. Depression
   l. Gender

8. Match the condition with its alternate name:
   a. Coronary heart disease
   b. Cardiomyopathy
   c. Heart attack
   d. Cerebrovascular disease
   e. Mini stroke
   1. Stroke
   2. Ischaemic heart disease
   3. Transient ischaemic attack
   4. Myocardial infarction
   5. Myocarditis

MULTIPLE CHOICE ANSWERS:
1 = e; 2 = d; 3 = d; 4 = d; 5 = b; 6 = b; 7 = b, f, i, l; 8 – a = 2, b = 5, c = 4, d = 1, e = 3.
The main underlying causal mechanism of cardiovascular disease (CVD) is atherosclerosis, a process marked by abnormal build-ups of fat, cholesterol and other substances in the inner lining of the arteries. (pp.1-3)

Cardiovascular disease is the largest cause of premature death in Australia. (pp.1, 9, 10, 11, 29)

The health and economic burden of cardiovascular disease continues to exceed that of any other disease. (p.1)

In 2007, cardiovascular disease was recorded as the primary cause of death for 46,623 Australians, accounting for just over a third of all deaths in that year. (pp.1, 3)

Over 78% of the cardiovascular disease deaths in 2007 were of people aged 75 years and over, more than half were female (52.7%). (pp.1, 3)

It is estimated that 3.5 million Australians aged 16-85 years had a long-term chronic condition of cardiovascular disease in 2007. (pp.2, 4)

Coronary heart disease, stroke, heart failure and peripheral vascular disease are the major contributors to the burden of cardiovascular disease. (p.3)

The major preventable risk factors for cardiovascular disease are tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, overweight and obesity, poor nutrition and diabetes. (p.3)

Cardiovascular disease is the most expensive disease group in Australia in terms of direct health care expenditure. (p.4)

Coronary heart disease (CHD) is the most common form of heart disease. (pp.4, 45)

There are two major clinical forms of coronary heart disease – heart attack and angina. (p.4)

Coronary heart disease is a major cause of disability in Australia as well as of death. (p.5)

An estimated 60,000 stroke events occur in Australia every year – one about every 10 minutes. (p.5)

Cerebrovascular disease accounted for 11,491 deaths (8.3% of all deaths) in 2007. (p.6)

Age-standardised death rates for cerebrovascular disease fell by 34.2% (males) and 30.3% (females) over the period 1998-2007. (p.6)

Five of the top 20 leading underlying causes of death in 2009 were attributable to some form of cardiovascular disease. (p.6)

The potential life lost due to cardiovascular disease is much higher for males than females; 116,996 years for males compared with 47,420 for females in 2009. (p.6)

The rate of hospitalisations with cardiovascular disease as the principal diagnosis has been declining over the past decade. (p.9)

In 2007-08 there were over 70 million government-subsidised prescriptions for medicines used to prevent or treat cardiovascular disease, dispensed to over 3.8 million patients. (p.9)

In 2007-08, about 3.5 million Australians had a long-term cardiovascular disease. (p.10)

Cardiovascular disease was the main cause for 475,000 hospitalisations in 2007-08. (p.10)

The overall death rate for cardiovascular disease has fallen by about 80% since the 1960s and continues to fall. (p.10)

Cardiovascular disease is the cause of more female deaths than male deaths. This is because females usually live longer than males. (p.10)

Over 80% of cardiovascular disease deaths take place in low- and middle-income countries and occur almost equally in men and women. (p.11, 12)

Behavioural risk factors are responsible for about 80% of coronary heart disease and cerebrovascular disease. (p.11)

Operations used to treat cardiovascular diseases include coronary artery bypass, balloon angioplasty, valve repair and replacement, heart transplantation, and artificial heart operation. (p.13)

Heart failure affects approximately 4% of Australian adults aged over 45 years. (p.14)

The most common cause of heart failure is damage to the heart muscle, often due to coronary heart disease or long-term high blood pressure. (p.14)

The warning signs of heart attack can be varied and may not always be sudden or severe. (p.17)

The heart is a double pump consisting of four chambers, each separated by valves that only permit blood to flow in one direction. (pp.19, 20, 21)

Disorders of the heart include coronary heart disease, angina, heart attack, valve diseases and congenital disorders. (p.20)

Heart disease was largely unknown before the twentieth century. (p.21)

Atherosclerosis (heart disease and stroke together) accounts for 40% of all deaths in Australia. (p.21)

The most common cause of heart failure is death of heart muscle from coronary artery disease. (p.24)

Every hour, 5 Australians die from heart, stroke and blood vessel disease. (p.29)

Cardiovascular disease kills almost 22,000 men and more than 24,000 women each year (34% of all deaths). (p.29)

Men have a higher risk than women of developing coronary heart disease in middle age. (p.33)

People with diabetes have a greater chance of developing heart disease than those who don't have diabetes. (p.35)

High levels of cholesterol in the blood stream are a risk factor for coronary artery disease (heart attacks and angina). (p.39)

High blood pressure can speed up common forms of heart disease that can lead to stroke. (p.43)

In Australia in 2004-05, 40% of all deaths due to coronary heart disease occurring in males between the ages of 35 and 39 were due to smoking. Among women aged 40-44, smoking caused about 34% of all deaths due to coronary heart disease. (p.46)

Within the first 12 months after a heart attack psychological factors such as depression can treble the risk of having another heart attack independent of other factors. (p.48)
Angina
Severe pain around the heart caused by a relative deficiency of oxygen supply to the heart muscle. It occurs most often after increased activity, exercise or a stressful event. Pain or numbness typically radiates to the left shoulder and down the left arm.

Arteriosclerosis
Condition in which the walls of arteries become hard and thick, sometimes interfering with blood circulation.

Cardiac arrest
The lack of adequate contraction of the left side of the heart, which immediately causes circulatory failure throughout the body, caused by a lack of coordinated contractions.

Cardiac arrhythmia
The loss of rhythm in heart contractions called fibrillation.

Cardiomyopathy
Disease of the myocardium, especially that caused by primary disease of the heart muscle.

Cardiovascular disease
Cardiovascular disease, or diseases of the circulatory system, includes all diseases of the heart and blood vessels. Widely known cardiovascular conditions include coronary heart disease, heart failure, rheumatic heart disease, stroke, and peripheral vascular disease. The terms 'cardiovascular disease', 'circulatory disease' and 'heart, stroke and vascular diseases' are used interchangeably to convey the same meaning.

Cardiovascular health
Cardiovascular health relates to the health of the heart and blood vessels. It also relates to the health of organs that are critically dependent on a strong blood supply.

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

Cerebrovascular disease
A disease which affects an artery's ability to supply blood to the brain. See also stroke.

Congenital heart disease
Malformations of heart structures existing at birth may be caused by genetic factors or by adverse exposures during gestation. Examples are holes in the heart, abnormal valves, and abnormal heart chambers.

Heart attack
A heart attack is the everyday term for myocardial infarction, which literally means 'death of heart muscle because of inadequate oxygen'. A heart attack (myocardial infarction or 'coronary') refers to damage to the heart caused when the blood supply to part of the heart muscle is blocked. A heart attack happens because the blood supply has been cut off following a blockage in a branch of one of the coronary arteries (the blood vessels which supply the heart muscle).

Heart failure
Inability of the heart to pump blood with normal efficiency, resulting in a lack of blood flow to essential organs such as the brain. Heart failure occurs when the heart pumps blood less effectively around the body. It can result from heart attack, high blood pressure or a damaged heart valve.

High blood pressure
A condition forcing the heart to pump blood through the circulatory system at a force much greater than is necessary to maintain a steady flow. See also hypertension.

Hypertension
Condition in which the blood is pumped through the body under abnormally high pressure. See also high blood pressure.

Ischaemic heart disease
Narrowing or blockage of one or more of the coronary arteries resulting in decreased blood supply to the heart (ischaemia).

Myocarditis
Sometimes called cardiomyopathy, myocarditis is the inflammation of the heart muscle (myocardium). It is usually caused by viral infection of the heart muscle.

Peripheral arterial disease
The narrowing of blood vessels in the legs or arms, causing pain and possibly tissue death (gangrene) as a result of a reduced flow of blood to areas supplied by the narrowed vessels.

Peripheral vascular disease
Disease of the arteries supplying the arms and legs.

Rheumatic heart disease
Damage to the heart muscle and valves from rheumatic fever, caused by streptococcal bacteria.

Risk factors
There is no single cause for cardiovascular disease, but there are 'risk factors' that increase your chance of developing it. Modifiable risk factors (ones you can change) include: smoking, high total blood cholesterol, high blood pressure, diabetes, being physically inactive, being overweight, depression, social isolation and a lack of quality social support. Non-modifiable risk factors (ones you cannot change) include increasing age, being male and having a family history of heart disease. Aboriginal and Torres Strait Islander people are also at increased risk of coronary heart disease. You can reduce your overall risk of developing coronary heart disease by leading a healthy lifestyle and taking medicines as prescribed by your doctor.

Stroke
Stoke occurs when a blood vessel to the brain is suddenly blocked or bleeds. As a result, brain function may be lost and activities such as movement, thinking and communication may be impaired.
Websites with further information on the topic

Australian Absolute Cardiovascular Disease Risk Calculator  www.cvdcheck.org.au
Australian Bureau of Statistics  www.abs.gov.au
Australian Institute of Health and Welfare  www.aihw.gov.au
Better Health Channel  www.betterhealth.vic.gov.au
Heart Attack Facts  www.heartattackfacts.org.au
myDr (Heart and Stroke topics)  www.mydr.com.au/topics/cardiovascular-conditions
National Heart Foundation of Australia  www.heartfoundation.com.au
National Stroke Foundation  www.strokefoundation.com.au
World Health Organization  www.who.int/topics/cardiovascular_diseases/en/

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