

# Treatment and care

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AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE

*Care*

## Drug treatment

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

Drug use is expressed in the World Health Organization approved measurement unit—defined daily doses (DDDs) per 1,000 population per day (DDD/1,000/day). This is based on the assumed average dose per day of a drug used for its main indication in adults. The DDD enables valid comparisons between drugs independent of differences in price, preparation and quantity per prescription.

### Blood pressure-lowering drugs

Although drugs in this class are grouped as 'blood pressure lowering', in general they have other important and useful effects and are given to treat various conditions, not just high blood pressure. As the indication for which the drug is prescribed is not recorded, it is not possible to determine the actual drug use for specific conditions or purposes. These data therefore show the use of the drugs not only to lower blood pressure but also for other purposes.

#### Diuretics

Diuretics are effective in reducing blood pressure, which reduces the occurrence of strokes and heart disease. Diuretics are also helpful for treating symptoms in patients with heart failure. Although diuretics are still very popular, their prescription is falling in favour of more modern drugs such as ACE inhibitors and calcium channel blockers. Frusemide was the most commonly dispensed diuretic in 1998 (22.6 DDD/1,000/day).

#### Beta blockers

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

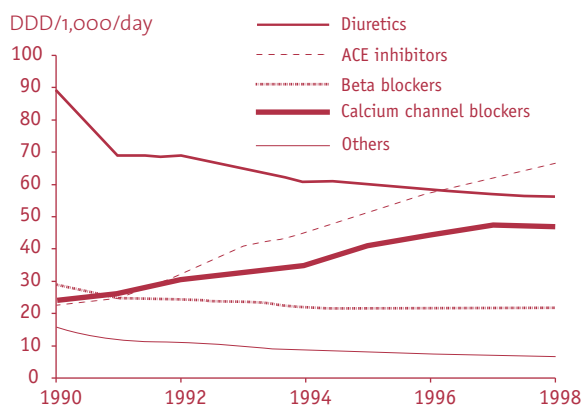
#### Calcium channel blockers

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

#### Angiotensin-converting enzyme (ACE) inhibitors

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

### COMMUNITY USE OF BLOOD PRESSURE-LOWERING DRUGS, 1990–98



#### Notes

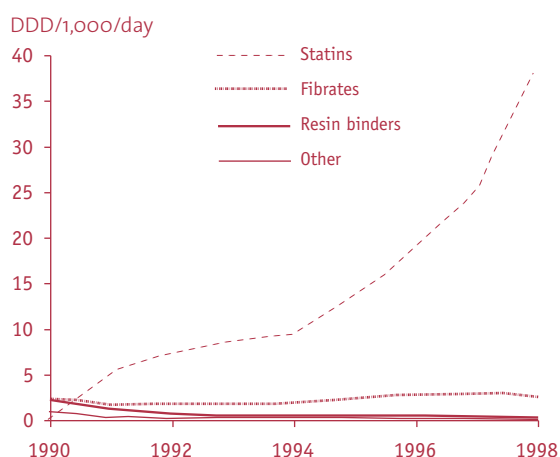
- 1.DDD = defined daily dose.
- 2.Data include use of drugs to lower blood pressure as well as for other purposes.

Source: DHAC 1999.

## Lipid-lowering drugs

Lipid-lowering drugs are effective in preventing heart attacks and reducing coronary heart disease deaths. HMG CoA reductase inhibitors (statins), resin binders, nicotinic acid, fibrates and probucol all reduce blood LDL (low-density lipoprotein) cholesterol to varying degrees, statins being the most effective. They also have variable effects in lowering blood triglycerides. The use of statins has increased dramatically since 1994 when their value was established conclusively in clinical trials. Simvastatin is the most widely prescribed lipid-lowering agent (22.0 DDD/1,000/day in 1998), followed by atorvastatin (11.0 DDD/1,000/day).

### COMMUNITY USE OF LIPID-LOWERING DRUGS, 1990–98



Note: DDD = defined daily dose.

Source: DHAC 1999.

## Antithrombotic drugs

### Thrombolytic drugs

Thrombolytic drugs dissolve blood clots. These drugs are given only in hospital, under close supervision. They are particularly useful in patients suffering a heart attack, where a clot blocks blood supply to part of the heart, and in selected patients having a stroke caused by a clot impeding blood flow to part of the brain (ischaemic stroke). Thrombolytics are less commonly used in peripheral vascular disease. For best results, the drugs must be given early during the heart attack or stroke. Among 35–64-year-olds, an estimated 42% of people suffering a heart attack

were treated with thrombolytics in 1991–1993, a 5% increase per year since 1985. At this time, these drugs are given only in hospital.

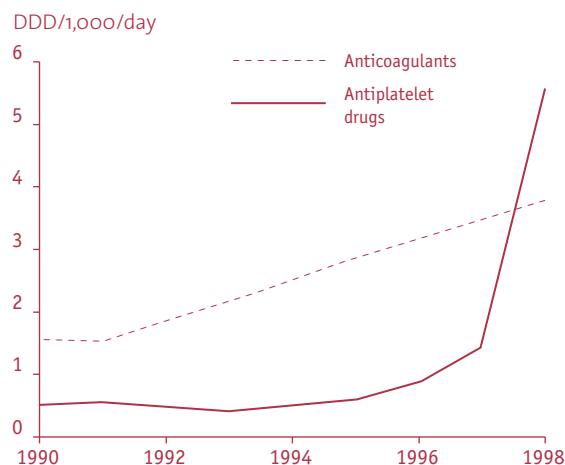
### Aspirin and other antiplatelet agents

Antiplatelet drugs interfere with the formation of blood clots that are made of platelets. Among these drugs are aspirin, ticlopidine and dipyridamole. If given during a heart attack, aspirin reduces the risk of death. Used long-term, it also reduces deaths and heart attacks among people with coronary heart disease. Given early during an ischaemic stroke (see above), aspirin reduces later similar strokes as well as deaths and disability. Antiplatelet agents used long-term in ischaemic stroke patients also prevent further strokes. The use of antiplatelet drugs on prescription, particularly aspirin, has risen dramatically in 1998 (aspirin 5.4 DDD/1,000/day in 1998, excluding over-the-counter supply, that is, without prescription).

### Anticoagulants

These drugs prevent the formation of clots that could block blood vessels by interfering with the clotting process. Anticoagulants are given to certain patients with heart disease, and less often with stroke and peripheral vascular disease, to lower their risk of subsequent disease. Warfarin and heparin belong to this class of drugs. The use of anticoagulants has steadily increased during the 1990s (warfarin 3.6 DDD/1,000/day in 1998).

### COMMUNITY USE OF DRUGS TO PREVENT BLOOD CLOTS, 1990–98



Note: DDD = defined daily dose.

Source: DHAC 1999.

# Australian Facts

## Other drugs

### Nitrates

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

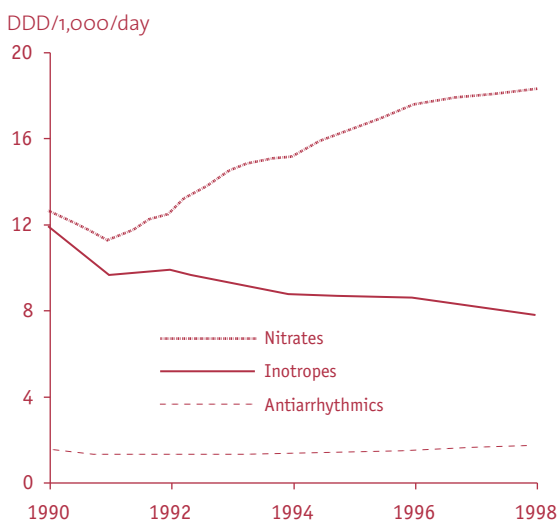
### Inotropes

Inotropes increase the force of contraction of the heart muscle. These drugs are useful in people with heart failure. There has been a slow decline in the prescription of these drugs since 1990 (all inotropes 7.8 DDD/1,000/day in 1998).

### Antiarrhythmics

Antiarrhythmic drugs are given to restore the normal heart rhythm or prevent serious (life-threatening) abnormal heart rhythms (arrhythmias). Amiodarone is the most commonly dispensed drug in this class. The level of use of these drugs in the community has remained fairly constant during the 1990s (amiodarone 1.2 DDD/1,000/day in 1998).

## COMMUNITY USE OF OTHER DRUGS FOR CARDIOVASCULAR DISEASE, 1990–98



Note: DDD = defined daily dose.

Source: DHAC 1999.

## PRESCRIPTION DRUGS USED IN THE COMMUNITY IN AUSTRALIA, 1998

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

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

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

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

Source: DHAC 1999.

## Drug costs

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

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

## Further information

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## Main data sources

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## Did you know?

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

## Procedures

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

### Procedures for heart disease

#### Coronary angiography

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

#### Coronary artery bypass grafts

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

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

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

#### Coronary angioplasty

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

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

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

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

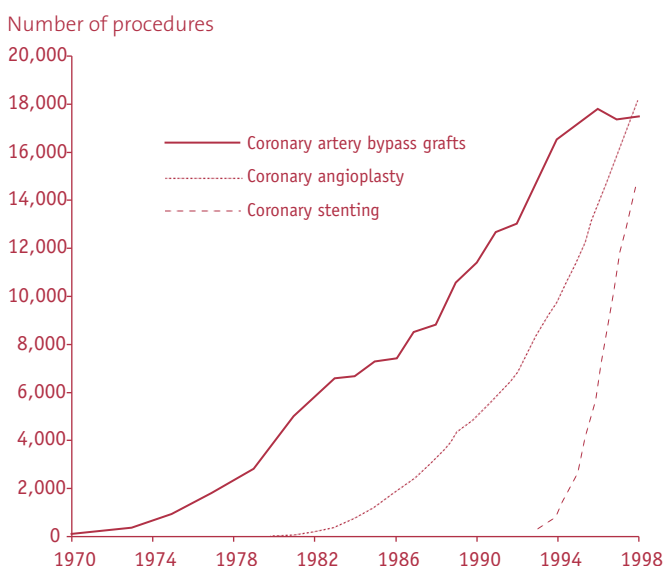
#### Coronary stenting

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

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

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

## TRENDS IN CORONARY REVASCULARISATION PROCEDURES, 1970–98



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

### Heart transplants

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

### Operations for congenital defects

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

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

### Surgery for heart valve defects

Valve surgery involves repairing or replacing the mitral, aortic, tricuspid or pulmonary valves. Valve disease may be age-related, a result of disease such as rheumatic fever, or congenital. Most valve procedures in Australia consist of replacing the damaged valve with a mechanical device, a pig

device or a human graft. Reconstruction of the damaged valve by stitching techniques is less common. Simpler valve procedures can be undertaken with catheter-based techniques.

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

### Electrophysiological treatments

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

### Implantable cardiac defibrillators

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

### Procedures for stroke

#### CT brain scan

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



## Carotid endarterectomy

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

## Magnetic resonance imaging scan and ultrasound of carotid arteries

Magnetic resonance imaging (MRI) of the brain and ultrasound of the carotid arteries are non-invasive investigations done to help diagnose stroke or assess the risk of stroke. There are no national figures on the number of these procedures performed for stroke.

## Procedures for peripheral vascular disease

### Amputation for peripheral vascular disease

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

### Surgery for abdominal aortic aneurysm

Abdominal aortic aneurysm is an abnormal widening of the aorta (the main artery leading from the heart) below the level of the renal arteries. They are life-threatening if they rupture so surgery is performed in severe cases. In 1998–99 there were 2,280 such operations in Australia. People aged 65 years and over accounted for 86% of these procedures.

## Further information

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### Main data sources

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

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

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## Did you know?

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



## Rehabilitation

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

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

### Cardiac rehabilitation

#### What is cardiac rehabilitation?

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

The broad aims of cardiac rehabilitation are to:

- 1 maximise physical, psychological and social functioning to enable patients to live productively and with confidence; and
- 2 assist and encourage behaviours that are likely to minimise the risk of further cardiac events and conditions.

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

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

#### Who receives cardiac rehabilitation services?

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

#### Where is cardiac rehabilitation provided and by whom?

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



## Australian Facts

### Utilisation of programs

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

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

### Health outcomes of patients attending outpatient cardiac rehabilitation

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

### Stroke rehabilitation

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

Informal carers (family members, neighbours, friends and volunteers) play an important role in the lives of disabled stroke survivors. Carers provide assistance with a wide range of daily activities including mobility outside the home,

managing money, organisation of appointments and services, housekeeping, and house and garden maintenance tasks. Some carers provide assistance with personal care tasks such as bathing and dressing. Carers themselves face considerable psychological strain in their caring role and require both emotional and practical support.

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

### What is stroke rehabilitation and who provides it?

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

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

### Who receives stroke rehabilitation services?

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

### Where is stroke rehabilitation provided?

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

### Utilisation of programs

It is not known how many people in Australia currently participate in a rehabilitation program (inpatient or outpatient) following stroke. It has been estimated that in Perth during 1989–90, about 25% of hospitalised stroke patients underwent a period of inpatient rehabilitation in a specialised rehabilitation unit. In north-east Melbourne during 1996–97, it is estimated that about 39% of hospitalised stroke patients were admitted for a period of inpatient rehabilitation. This latter estimate excludes cases of subarachnoid haemorrhage. The reasons for the difference in the proportion of patients receiving inpatient rehabilitation in these two cities are uncertain. Possible explanations include variation in the organisation of stroke rehabilitation services and changes in clinical practice over time.

### Further information

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

### Further reading

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## Health care costs

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

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

### Cost of cardiovascular disease

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

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

### Sex

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

for high blood pressure costs of \$500 million compared with males at \$335 million. Stroke costs for females were nearly \$350 million compared with males at \$280 million. Costs of heart failure for females were nearly \$250 million compared with males at \$170 million.

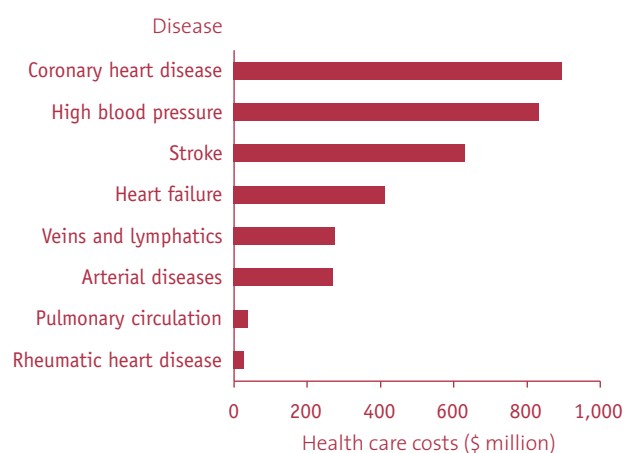
### Age

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

### Coronary heart disease

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

HEALTH CARE COSTS FOR CARDIOVASCULAR DISEASES, 1993–94



Source: Mathers & Penm 1999.

## Stroke

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

## Heart failure

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

## High blood pressure

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

## High blood cholesterol

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

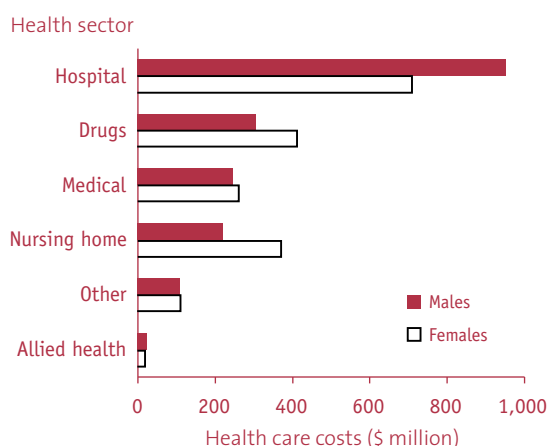
## Physical inactivity

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

## Costs by health service

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

### HEALTH CARE COSTS FOR CARDIOVASCULAR DISEASES BY HEALTH SECTOR, 1993–94



#### Notes

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

Source: Mathers & Penm 1999.

## Sex

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

## Further information

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## Detailed data

Refer to the **Statistical tables** section.

## Main data sources

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

## Further reading

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



## Did you know?

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