Valvular heart disease

Heart Information Series Number 11

British Heart Foundation

This is one of the booklets in the *Heart Information Series*. For a complete list of booklets, see page 30.

We welcome your comments on this booklet. Please fill in the feedback form on page 41.

We update this booklet regularly. However, you may find more recent information on our website **bhf.org.uk**

Contents

About this booklet

This booklet is for people who have a problem with one or more of their heart valves, and for their family and friends. It explains:

- what valvular heart disease is
- what types of treatment are available, and
- what you can do to help yourself.

If you need to have heart valve surgery, you can find more information on what will happen in hospital, both before and after your operation, in our booklet *Having heart surgery*.

This booklet is not a substitute for the advice your doctor or cardiologist may give you based on his or her knowledge of your condition.

What is valvular heart disease?

Your heart is a muscle which pumps blood around your lungs and the rest of your body. There are four valves in your heart. These valves guard the entrances and exits of the two pumping chambers in your heart (the right and left ventricles). The job of a valve is to make sure that fluid flows only in the correct direction. The valves at the entrances to the pumping chambers are there to make sure that the blood only goes in. The valves at the exits only let blood out.

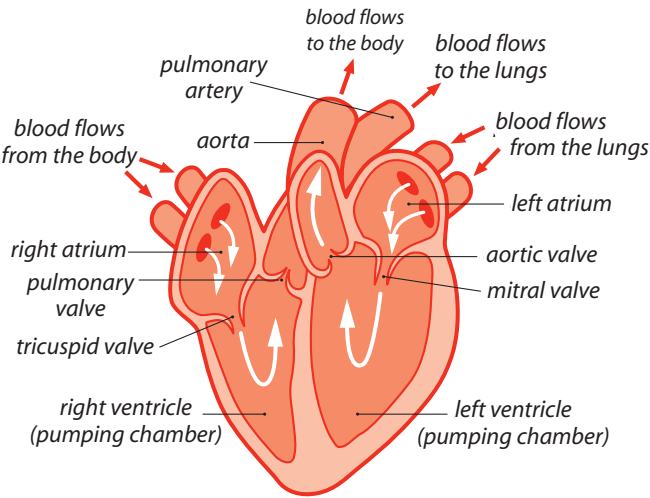
A diseased or damaged valve can affect the flow of blood in two ways.

- If the valve does not open fully, it will obstruct the flow of blood. This is called **valve stenosis**.
- If the valve does not close properly, it will allow blood to leak backwards. This is called **valve incompetence** or regurgitation.

Both stenosis and incompetence put an extra strain on the heart. If you have stenosis, the valve will obstruct the flow of blood, so your heart will have to pump harder to force the blood past the obstruction. If you have incompetence, your heart has to do extra work to pump the necessary volume of blood forwards against the blood flowing backwards through the leaking valve.

As well as your heart having to work harder, the blood behind the affected valve will be under increased pressure, called 'back pressure'. This can cause a build-up of fluid either in your lungs or in the lower part of your body, depending on the valve affected.

The heart



What are the symptoms of valvular heart disease?

The symptoms of valvular heart disease vary depending on which valve is affected. People with mild valvular heart disease may have few symptoms. However, increasing strain on the heart can cause tiredness or breathlessness when exercising, or palpitation. The back pressure can also cause shortness of breath, and swelling of the ankles and legs. A person with valvular heart disease may also get chest pains (angina) because there is not enough blood flowing through the coronary arteries. If the obstruction is severe, the person may have spells of dizziness and fainting.

How is valvular heart disease diagnosed?

Abnormalities of the heart valves are often picked up at a routine examination when the doctor listens to the heart with a stethoscope and hears an extra noise called a 'murmur'. However, murmurs are also heard in completely normal hearts. The doctor will usually be able to tell from the type of murmur he or she hears whether you need to have further investigations. Even after a valve condition has been diagnosed, it can sometimes be 10 or even 20 years before you have any symptoms.

If you have symptoms that may be caused by a faulty valve, or if you have a murmur that is suspicious, your doctor will probably arrange for you to have the following tests:

- an electrocardiogram (an ECG), which records the rhythm and electrical activity of your heart
- a chest X-ray, and
- an echocardiogram, which produces an ultrasound picture of the heart and valves.

There is also another test called 'cardiac catheterisation'. This is not very often needed to *diagnose* valvular heart disease, but you may need to have the test to assess how severe the disease is.

This test can also tell whether there is any narrowing of your coronary arteries.

Cardiac catheterisation involves passing a catheter (a fine tube) through an artery in the groin, to the heart. A dye is then injected and X-rays are taken from several angles. This test is usually done as a day case, which means that you do not have to stay overnight in hospital. You will be given a local anaesthetic in the groin where they insert the catheter, so you should not feel any discomfort.

The cardiac catheterisation test can give vital information about the blood pressure in your heart and about how well the pumping chambers and valves are working. For more information about cardiac catheterisation, and about electrocardiograms and echocardiograms, see our booklet *Tests for heart conditions*.

What causes valvular heart disease?

The main causes of valvular heart disease are:

- being born with an abnormal valve or valves (congenital heart disease)
- the effects of rheumatic fever
- ageing of the heart
- cardiomyopathy, or
- ischaemic heart disease.

Congenital heart disease

Some people are born with an abnormal valve or valves. Fortunately, most of these people never experience any symptoms. However, in some people the condition can get worse over the years, causing stenosis or incompetence, or both. An abnormal valve is at a greater risk of becoming infected. This infection can also spread to the lining of the heart. The infection is known as endocarditis. For more information on endocarditis see page 24.

The effects of rheumatic fever

The most common cause of serious valvular heart disease today is the long-term effect of rheumatic fever that occurred 20 to 30 years before. Rheumatic fever has not been common in the UK for many years, so most people affected by valve disease are middle-aged or elderly. However, some

people from Asian or African countries may have been affected by rheumatic fever when they were children, and may develop valve symptoms as young adults. Rheumatic fever can affect one, two or three valves, causing stenosis or incompetence, or both. The most commonly affected valves are the aortic and mitral valves.

Ageing of the heart

Among older people the most common cause of valve disease is when a valve thickens and becomes less supple and restricts the flow of blood. Investigation is needed to find out whether treatment is necessary, although in many cases it is not.

Cardiomyopathy

A disease of the heart muscle called cardiomyopathy can cause the muscle around the valve to thicken, which can obstruct the flow of blood.

Ischaemic heart disease

This happens when the heart muscle does not get a good supply of blood. This can make the heart muscle pump less efficiently and cause the valve to leak.

Treatment for valvular heart disease

Many people with valvular heart disease may need little treatment but may benefit from having a regular check-up, including an echocardiogram (see *Yearly check-up* on page 28).

Drugs

Some people may need to take drugs to relieve their symptoms. These drugs may include diuretics, ACE inhibitors and digoxin.

- **Diuretics**, which encourage the body to produce urine, can relieve the build-up of fluid in the lungs and the lower part of your body (see page 6).
- **ACE inhibitors** reduce the amount of work the heart has to do, and improve the flow of blood to the heart muscle.
- **Digoxin** stabilises the heart rhythm and helps the heart's pumping action.

Valve surgery

If the obstruction or leaking of valves is severe, medicines alone may not be enough to keep the heart working properly. If this happens, you may be advised to have valve surgery before there is any permanent damage to the heart. At this stage, you

may not even have many symptoms. For more information on valve surgery, see the next page.

'Balloon treatment' or mitral valvuloplasty

People with mitral stenosis (disease of the mitral valve) may be advised to have 'balloon treatment'. This is also called mitral valvuloplasty. Balloon treatment for other valves is possible but less common.

Balloon treatment involves putting a catheter (a very fine, hollow tube) into an artery in the groin. The catheter is then passed into the heart until its tip reaches the narrowed valve. A sausage-shaped 'balloon' on the end of the catheter is then gently inflated to stretch the valve. This procedure is carried out during cardiac catheterisation (see page 8). The main advantage of this procedure is that it avoids having to have an operation. However, the mitral valve may become narrow or leak again and need more attention later.

Valve surgery

If your valves are severely affected, you may be advised to have valve surgery. This can get rid of, or greatly improve, your symptoms and allow you to lead an almost normal life.

There are two types of valve surgery – valve replacement and valve repair.

- **Valve replacement** is when the diseased valve is replaced with another valve. The most common types of replacement valves are manufactured valves (also called 'mechanical valves'), or animal valves (also called 'tissue valves' or 'biological valves'). In some cases, a preserved human valve (a homograft) may be used. In a very small number of patients, the aortic valve is replaced by the patient's own pulmonary valve, and the pulmonary valve is replaced by a preserved human valve. For more information on the different types of valve used, see page 17.
- **Valve repair** is most often used for mitral valves which leak but are not seriously damaged. Other valves can be repaired too, but they are more often replaced.

Whether you have a replacement or repair will depend on the cause of your problem. For

example, if you had rheumatic fever as a child (a condition that is rare these days), you are more likely to need to have the valve replaced. Generalised wear and tear through age responds reasonably well to a repair, but not in all cases. If you are having aortic valve surgery, the valve is usually replaced rather than repaired as this valve is under great pressure as the blood leaves the heart.

For information on what happens if you have valve surgery

If you have been told that you need to have valve surgery, read our booklet *Having heart surgery*. This describes:

- what happens in hospital in the days before your operation
- who's who in the surgical team
- your recovery period in hospital, and
- how to manage when you return home.

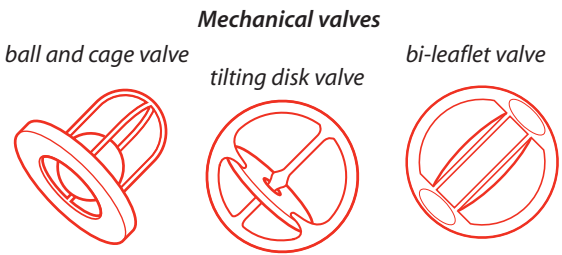
In most valve operations the surgeon reaches the heart by making an incision (cut) in the front of the chest and then cutting the breast bone lengthways. The heart is stopped and the blood circulation is kept going by a heart-lung bypass machine. The surgeon then opens up a heart chamber to reach the affected valve.

In a very small number of cases, a new type of valve surgery called minimally invasive surgery is used for valve surgery operations. This involves making a much smaller incision in the chest, to reduce the amount of discomfort after the operation. In some cases specially designed telescopes are used so that the incision can be even smaller. The breastbone does not need to be cut. Findings so far suggest that, with these new methods, there may be fewer complications such as bleeding, pain and breathing problems, and patients recover more quickly and return to work and other activities earlier than with conventional surgery. However, because the heart is less exposed, surgery can be difficult. Ongoing research is improving techniques all the time. If you are offered this type of surgery, you can discuss the advantages and disadvantages of it with your surgeon.

What sort of replacement valves are used?

There are two main types of replacement valves – mechanical valves and tissue valves.

Mechanical valves



Mechanical valves are artificial, manufactured valves. They are sometimes called 'metal valves' or 'plastic valves', although they are actually made of carbon fibre. There are many different types and all have been put through strict tests for function and wear. This is very important as the valves have to open and close about 40 million times a year!

Mechanical valves are made of hard materials, so many of them make a 'clicking' sound. Most people soon get used to this. In some cases, even if the person with the valve is aware of the clicking, other people will not be able to hear it. However,

sometimes partners say that the clicking sound is very noticeable to start with, especially at night! Some people find that the clicking may disturb their sleep if they are very light sleepers.

Because these valves are made of artificial materials and are lying in the bloodstream, there is a greater risk of a blood clot developing on the surface of the valve. To help prevent this, you will have to take drugs called 'anticoagulants' for the rest of your life. (See *Anticoagulants* on page 20.)

Tissue valves

A tissue valve

Some tissue valves are made from animal tissue (xenografts), mainly from pigs (porcine valves) but also from cows (bovine valves). Other tissue valves are fresh or preserved human valves (homografts). Because these valves are made from natural tissue, you do not always have to take anticoagulants. However, powerful anticoagulants are often recommended for the first few weeks after surgery, until the valve has settled in. (See *Anticoagulants*

on the next page.) After that you will need to take aspirin to reduce the risk of blood clots forming. Tissue valves have been specially treated so that they are not rejected by the human body.

Advantages and disadvantages of mechanical valves and tissue valves

There is little difference in the long-term survival of patients between mechanical or tissue valves. The advantages of tissue valves are that they do not make any clicking noise, and you do not need to take anticoagulants for the rest of your life. The disadvantage is that, in younger people who do more physical activity, the stresses placed on a tissue valve will cause the valve to wear out sooner than a mechanical valve, and a second replacement might be needed. However, in older people who do less vigorous activity, either a tissue valve or a mechanical valve will often last a lifetime. For this reason, tissue valves are usually used for older patients.

Valves do tend to wear out, but 8 out of 10 tissue valves are still working after 12 to 15 years.

If you need a replacement valve, you can discuss with your surgeon the type of valve that would be most suitable for you, taking into account your views and preferences, and your condition.

Anticoagulants

Anticoagulants change the clotting mechanism of the blood, to reduce the chances of a clot forming on the valve. Anticoagulants also reduce the risk of loose clots forming on the valve and breaking off into the circulation. The most common anticoagulant is called warfarin.

If you have a mechanical valve replacement, you will need to take anticoagulants for the rest of your life. If you have a tissue-valve replacement you may need to take anticoagulants for the first few weeks after surgery (see page 18).

People who take anticoagulants need to have regular blood tests to make sure the dose is right. For most people this means going to an anticoagulant clinic at the local hospital, at first once or twice a week, and later once every six to eight weeks. These visits are vital to check that you have the right level of warfarin in your blood. This is because too much warfarin can lead to bleeding and having too little could increase the risk of clots forming.

If you are taking oral (by mouth) anticoagulants, you should check with your doctor or pharmacist before you take any other drugs – including over-the-counter drugs, prescription drugs and homeopathic preparations. This is because oral anticoagulants interact with many medicines including antibiotics, aspirin, cimetidine (Tagamet), and with some drugs that are used to treat arthritis, gout, epilepsy, high blood cholesterol, and disorders of heart

rhythm. You should also avoid cranberry juice and large amounts of vegetables and fruit containing vitamin K – such as green vegetables or bananas. Your anticoagulation clinic will be able to give you more detailed advice.

If you are taking anticoagulants, you should always carry an *Anticoagulant card* and remember to tell any doctors and nurses who are treating you that you are taking anticoagulants.

Any of the following symptoms might suggest that your dose of anticoagulants is too high:

- prolonged bleeding from cuts
- bleeding that does not stop by itself
- nose bleeds that last for more than a few minutes
- bleeding gums
- red or dark brown urine
- red or black stools, or
- for women, heavier bleeding during periods, or other vaginal bleeding.

If you are worried, contact your anticoagulant clinic or the casualty department at your local hospital. Make sure that you have your dosage record card and any other medication with you.

New anticoagulants are being tested and should soon be available. People who take these don't need to have regular blood tests. Your clinic should be able to tell you whether these are available yet.

What are the risks of valve surgery?

Overall, 95 in every 100 people having valve surgery have a successful operation. But valve surgery, like any other surgery, is not risk-free. If you are about to have valve surgery, your surgeon will discuss your risk with you. Your risk will depend on your age, your current state of health, the degree of valve disease, which type of valve is affected, and whether or not you are also having coronary artery bypass grafts done at the same time as the valve surgery. Surgery on the mitral valve carries a slightly greater risk than surgery on the aortic valve, and the risk is also greater if you are having a valve replaced rather than repaired.

With so many factors involved, it is important that you discuss with your specialist all the factors affecting you. The surgeon will discuss with you both the risks and the benefits of the treatment.

Once you have recovered from your operation, problems are rare. However, no replacement valve is perfect. Having a 'foreign' valve in the circulation can sometimes cause problems. Both mechanical and tissue valves may become infected. To reduce the risk of infection, all patients with valve replacements should have antibiotics when having

dental treatment or surgery (see *Guarding against infection* on the next page).

Also, blood clots may form, particularly on mechanical valves, and especially if it has been difficult to control anticoagulation. And any type of valve can wear out or become damaged, although this is more likely with tissue valves in young people.

Guarding against infection

Any abnormal valve is at greater risk of becoming infected. This is because any bacteria that is being carried in the blood can stick onto the uneven surface of the abnormal valve and stay there. The bacteria then grows and the infection can spread to the lining of the heart. This is known as endocarditis. It can happen even when the abnormality is mild and is not otherwise causing any trouble.

Endocarditis can be very serious and life-threatening. If treatment is not started quickly, it can affect the performance of the valve and the heart. Treatment involves having intravenous antibiotics (antibiotics injected directly into a vein) for quite a long time, which means a long stay in hospital. In some cases, it may be necessary to operate on the infected valve.

The most common source of bacteria is the mouth. The bacteria can enter the bloodstream through unhealthy gums, or when you have dental surgery. Fortunately, there are things you can do to prevent infection. The most important thing is to make sure that you keep your teeth and gums as healthy as possible. Make sure you go to your dentist for regular check-ups. If you need dental treatment,

you should have a dose of antibiotics first. So, when your dentist is planning any dental treatment for you, discuss with him or her whether you will need to take antibiotics first.

Women who are having an IUCD fitted for contraception should also take antibiotics first. You may need to take antibiotics before other surgical procedures too. For more details, talk to your doctor.

For a free *Endocarditis card*, which you can show to your dentist and dental hygienist before each visit, contact the British Heart Foundation (address on back cover). There are two different cards – a general one, and one for people who are allergic to penicillin. You should always carry your endocarditis card with you. If a child of school age needs to carry an endocarditis card, make sure that you give one to the school nurse too.

Valvular heart disease and pregnancy

Most women with mild to moderate valvular heart disease do not have heart trouble during pregnancy, although very careful medical supervision is always advisable. However, if the valve disease is severe, the risk of pregnancy to both mother and baby is greater.

If you have severe valvular heart disease and are keen to have a baby, your cardiologist may advise you to have valve surgery before you become pregnant. Occasionally, severe valve disease only comes to light during pregnancy. If this happens, it is usually possible to continue with the pregnancy under strict medical supervision. If necessary, you can have valve surgery while you are pregnant.

Mitral valve prolapse

The mitral valve may be slightly deformed in about 5 in every 100 people, causing it to leak. This causes a heart murmur but only very rarely leads to problems. However, it is a possible site for infection and, if you have this condition, it is important to take antibiotics before dental treatment and surgery (see *Guarding against infection* on page 24). A murmur doesn't mean that you definitely have valvular heart disease but if your doctor discovers that you have a murmur, you should have it investigated.

Yearly check-up

Most patients with valvular heart disease will have a yearly check-up with a cardiologist. This check-up is very important, even if you feel completely well. The aim is to start medicine or to have surgery at the right time – before it is too late and there is permanent damage to the heart. The check-up usually includes an electrocardiogram (ECG), chest X-ray and echocardiogram (see page 8). In many cases treatment will not be needed for many years, if ever, but a careful, regular watch will make sure that you get any treatment you need.

For more information

British Heart Foundation website

bhf.org.uk

For up-to-date information on the BHF and its services.

Heart Information Line • 08450 70 80 70

(A local rate number.)

An information service for the public and health professionals on issues relating to heart health.

Publications and videos

The British Heart Foundation (BHF) also produces other educational materials that may interest you. To find out about these, or to order a **Publications and videos catalogue**, or to order publications, please go to **bhf.org.uk/publications,** call the **BHF Orderline on 0870 600 6566** or e-mail **orderline@bhf.org.uk** You can download many of our publications from **bhf.org.uk/publications**

Our publications are free of charge, but we would welcome a donation.

Heart Information Series

This booklet is one of the booklets in the *Heart Information Series*. The other titles in the series are as follows.

1 Physical activity and your heart
2 Smoking and your heart
3 Reducing your blood cholesterol
4 Blood pressure
5 Eating for your heart
6 Angina
7 Heart attack and rehabilitation
8 Living with heart failure
9 Tests for heart conditions
10 Coronary angioplasty and coronary bypass surgery
11 Valvular heart disease
12 Having heart surgery
13 Heart transplantation
14 Palpitation
15 Pacemakers
16 Peripheral arterial disease
17 Medicines for the heart
18 The heart – technical terms explained
19 Implantable cardioverter defibrillators (ICDs)
20 Caring for someone with a heart problem

Heart health magazine

Heart health is a free magazine, produced by the British Heart Foundation especially for people with heart conditions. The magazine, which comes out four times a year, includes updates on treatment, medicines and research and looks at issues related to living with heart conditions, like healthy eating and physical activity. It also features articles on topics such as travel, insurance and benefits. To subscribe to this **free** magazine, call **0870 600 6566**.

Heartstart UK

For information about a free, two-hour course in emergency life support, visit our website at bhf.org.uk or contact Heartstart UK at the British Heart Foundation. The course teaches you to:

- recognise the warning signs of a heart attack
- help someone who is choking or bleeding
- deal with someone who is unconscious
- know what to do if someone collapses, and
- perform cardiopulmonary resuscitation (CPR) if someone has stopped breathing and his or her heart has stopped beating.

For more information on statistics quoted in this booklet

Statement	Where you can find out more about this
Page 19 Valves do tend to wear out, but 8 out of 10 tissue valves are still working after 12 to 15 years. **Page 22** Overall, 95 in every 100 people having valve surgery have a successful operation. Surgery on the mitral valve carries a slightly greater risk than surgery on the aortic valve, and the risk is also greater if you are having a valve replaced rather than repaired.	From: Society of Cardiothoracic Surgeons of Great Britain and Ireland 5th National Adult Cardiac Surgical Database Report 2003. Improving Outcome for Patients. Published in 2004, by the Society of Cardiothoracic Surgeons of Great Britain and Ireland.
Page 27 The mitral valve may be slightly deformed in about 5 in every 100 people, causing it to leak.	From: 'Choice of prosthetic heart valve for adult patients' by SH Rahimtoola. Published in 1993, in the Journal of the American College of Cardiology, volume 41, number 6, pages 893-904.

Notes

About the British Heart Foundation

The British Heart Foundation (BHF) is the leading national charity fighting heart and circulatory disease – the UK's biggest killer. The BHF funds research, education and life-saving equipment and helps heart patients return to a full and active way of life.

We rely on donations to continue our vital work. If you would like to make a donation, please ring our **credit card hotline on 0870 606 3399**. Or fill in the form opposite.

We need your help. Please send a donation today.

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Please send your form to the British Heart Foundation. The address is over the page.

Technical terms

ACE inhibitor	A drug.
anticoagulant	A drug.
atrium	One of the chambers of the heart.
balloon treatment	A procedure to stretch a narrowed valve.
bovine	Of a cow.
cardiac catheterisation	A test to assess the condition of the heart.
cardiologist	Doctor specialising in heart disease.
cardiomyopathy	Disease of the heart muscle.
catheterisation	See 'cardiac catheterisation'.
diuretic	A drug.
ECG	See 'electrocardiogram'.
echocardiogram	An ultrasound picture of the heart which shows the structure of the heart and how it is working.
electrocardiogram	A test to record the rhythm and the electrical activity of the heart. Also called an ECG.
endocarditis	Infection of the heart muscle.
homograft	Replacement of a heart valve with a preserved human valve.
incompetence	When a valve does not close properly, allowing blood to leak backwards.

intravenous	Through the vein.
mechanical valve	A manufactured valve.
mitral stenosis	Obstruction in the mitral valve.
mitral valve prolapse	When a mitral valve is deformed and leaks.
mitral valvuloplasty	See 'balloon treatment'.
murmur	An extra noise in the heart, heard through a stethoscope.
porcine	Of a pig.
regurgitation	See 'incompetence'.
stenosis	Obstruction.
tissue valve	A valve from an animal or human.
valve	A device to make sure that fluid flows only in one direction.
ventricle	A chamber of the heart.
xenograft	Valve replacement using a valve of animal tissue.

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Your comments please

We would be very interested to hear your views about this booklet. Please fill in this form and send it to:

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easy to understand? ❑
not very easy to understand? ❑

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7 Are you…

…a patient with a heart condition? ❑

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Acknowledgements

The British Heart Foundation would like to thank all the GPs, cardiologists and nurses who helped to develop the booklets in the *Heart Information Series*, and to all the patients who commented on the text and design.

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Edited by Wordworks.

Heart health is a free magazine produced by the British Heart Foundation especially for people with heart conditions. See page 31 for more information.

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An information service for the public and health professionals on issues relating to heart health.

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