



Reducing your blood cholesterol

Heart Information Series Number 3

Heart health is a free magazine produced by the British Heart Foundation especially for people with heart conditions. See page 41 for more information.

British Heart Foundation

14 Fitzhardinge Street, London W1H 6DH

Phone: 020 7935 0185

Website: bhf.org.uk

Heart Information Line • 08450 70 80 70

(A local rate number.)

A helpline service for the public and health professionals, providing information on a wide range of issues relating to heart conditions.

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This is one of the booklets in the *Heart Information Series*. For a complete list of booklets, see page 37.

We welcome your comments on this booklet. Please fill in the feedback form on page 49.

Acknowledgements

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- the British Dietetic Association.

Edited by Wordworks.

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

5 Are there any issues that you need to know about that are not covered in this booklet? If so, what are they?

6 Do you have any other suggestions for how we could improve this booklet?

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About this booklet

This booklet is for people with a high blood cholesterol level, and for their family and friends.

It explains:

- what cholesterol, lipoproteins and blood lipids are
- the role of cholesterol in coronary heart disease
- when a high blood cholesterol level matters
- what causes high blood cholesterol
- why smoking, physical inactivity and high blood pressure are important
- how blood cholesterol is measured
- how physical activity and healthy eating can help, and
- how medication can help.

It also gives information about the drugs that are used to treat high blood cholesterol levels, and about familial hyperlipidaemia (FH).

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

Your comments please

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

British Heart Foundation

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What are cholesterol, lipoproteins and blood lipids?

Cholesterol

Cholesterol is a fatty substance which is mainly made in the body. The liver makes it from the saturated fats in food. Very little cholesterol is found in foods, except for eggs, liver, kidneys, and seafood such as prawns, all of which do contain some cholesterol.

Cholesterol plays a vital role in how every cell wall works, throughout the body. It is also the material which the body uses to make other vital chemicals. However, too much cholesterol in the blood can increase your risk of getting coronary heart disease.

Cholesterol has a special 'transport system' for reaching all the cells which need it. It uses the blood circulation as its 'road system' and is carried on 'vehicles' made up of proteins. These combinations of cholesterol and proteins are called lipoproteins.

Lipoproteins

There are two main forms of lipoproteins.

- Low density lipoproteins (LDL), which carry cholesterol from the liver to the cells.

- High density lipoproteins (HDL), which return the extra cholesterol that isn't needed to the liver.

Blood lipids

You may also have heard the term 'blood lipids'. This is a name for all the fatty substances in the blood, including HDL cholesterol, LDL cholesterol and triglycerides.

If you have high levels of both triglycerides and blood cholesterol, you run a greater risk of coronary heart disease. The risk is particularly high if you also have a low level of HDL cholesterol and a high level of LDL cholesterol. (See the illustration on the next page.) A high level of triglycerides also increases the risk of coronary heart disease and stroke.

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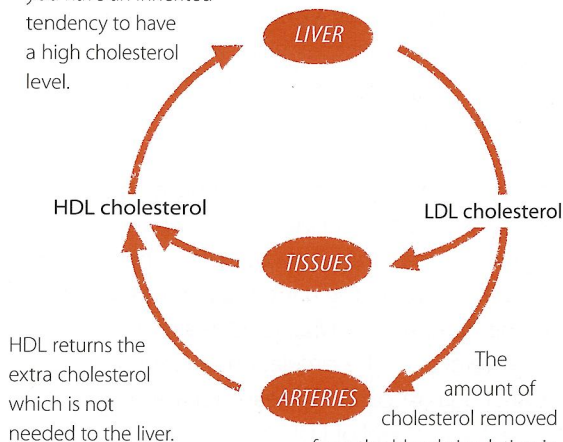
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mmHg	Millimetres of mercury. A unit for measuring blood pressure.
mmol/l	Millimols per litre. Used for measuring cholesterol and other fats in the blood.
omega-3 fat	A protective oil found in certain types of fish.
triglycerides	A type of fatty substance found in the blood.

How cholesterol is carried around the body

Your body produces more cholesterol if:

- you eat a diet that has a lot of saturated fat, or
- you have an inherited tendency to have a high cholesterol level.



If there is a high level of cholesterol in the blood, the artery walls take up too much LDL. The risk of this happening is greater if you smoke or have high blood pressure.

What part does cholesterol play in coronary heart disease?

Coronary heart disease is caused when the blood vessels to the heart (the coronary arteries) become narrowed by a gradual build-up of fatty material within their walls. This condition is called 'atherosclerosis'. The fatty substance is called 'atheroma'.

Atheroma develops when LDL cholesterol is chemically changed (a process known as 'oxidation') and is taken up by cells in the coronary artery walls where the narrowing process begins. On the other hand, HDL cholesterol removes cholesterol from the circulation, and appears to protect against coronary heart disease. The goal is to have a low level of LDL and a high level of HDL.

The level of LDL cholesterol in the blood tends to rise, and HDL falls, with the amount of saturated fats you eat. On the other hand, unsaturated fats have a good effect as they tend to lower LDL levels.

As part of a healthy diet, it is important to eat unsaturated instead of saturated fats, and to reduce the total amount of fat you eat.

(For more on this, see page 17.)

Technical terms

atheroma	Fatty material that can build up within the walls of the arteries.
atherosclerosis	The build-up of fatty material within the walls of the arteries.
blood cholesterol	Cholesterol found in the blood.
blood lipids	Fatty substances found in the blood.
cholesterol	A fatty substance mainly made in the body by the liver.
coronary heart disease	When the walls of the arteries become narrowed by a gradual build-up of fatty material called atheroma.
ECG	See 'electrocardiogram'.
electrocardiogram	A test to record the rhythm and activity of the heart. Also called an ECG.
familial hypercholesterolaemia	Another term for 'familial hyperlipidaemia'.
familial hyperlipidaemia	An inherited condition in which the blood cholesterol level is very high.
HDL	High density lipoprotein. The 'protective' cholesterol.
hypertension	High blood pressure.
LDL	Low density lipoprotein. The more 'harmful' cholesterol.
lipids	Fatty substances in the blood.
lipoproteins	Combinations of cholesterol and proteins.



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

How is blood cholesterol measured?

Measuring blood cholesterol level involves a simple blood test. This can be done in two ways.

- Either a blood sample is taken with a syringe and needle and sent to a laboratory for analysis.
- Or a finger prick (capillary sample) is taken and analysed on a desktop analyser.

If you are having your triglyceride level measured, you will be asked not to eat anything, and to drink only clear fluids, for 12 hours before you have the test.

The total blood cholesterol, HDL cholesterol, LDL cholesterol and triglyceride levels are all measured in units called millimols per litre of blood, usually shortened to 'mmol/litre' or 'mmol/l'. Your target is to have:

- a total cholesterol level under 5 mmol/l
- an LDL level under 3 mmol/l
- an HDL level above 1 mmol/l, and
- a triglyceride level under 2 mmol/l.

There can be quite a lot of variation in the levels of blood cholesterol and other blood fats – both from day to day and at different times of the day. So your doctor won't be worried if you have one high

reading. He or she will not usually decide about treating you with drugs until they have a series of these readings.

After a heart attack or heart surgery the blood cholesterol measurement may give a falsely low reading. So, if you have recently had a heart attack or heart surgery, you might not have the blood test until about six weeks later.

Doctors can also assess your risk of coronary heart disease by measuring the ratio of your total cholesterol to your HDL cholesterol level. You can work this out yourself by dividing your total cholesterol level by your HDL cholesterol level. The higher the figure, the greater your risk of coronary heart disease. You need to aim for this figure to be below 4.5.

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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.

When does a high blood cholesterol level matter?

The average blood cholesterol level of people living in England is 5.5 mmol/l. This is high compared to other countries. For example, in China the average is 4.5 mmol/l.

A high level of cholesterol is one of the most important risk factors for coronary heart disease. (A risk factor is something that increases your chances of getting the disease.) The other major risk factors are:

- smoking
- high blood pressure
- not being physically active enough
- being overweight or obese (very overweight)
- diabetes, and
- if you have a family history of premature coronary heart disease. (This means if a close blood relative of yours developed coronary heart disease before the age of 55 for a man or 65 for a woman.)

The higher your cholesterol level, the higher your risk of coronary heart disease.

Your overall risk of having a heart attack is much greater if you have other major risk factors as well as a high cholesterol level – for example if you smoke or have high blood pressure, or if you are overweight or not physically active. The more risk factors you have, the higher your risk of having a heart attack.

Other 'lifestyle' factors which increase the risk of heart disease are:

- not getting enough omega-3 fats (which are found in oily fish)
- not eating enough fruit and vegetables
- drinking too much alcohol, and
- having too much salt.

The risk of having a heart attack is also increased if you already have angina or if you have already had a heart attack. There is also a greater risk of heart attacks among people who have familial hyperlipidaemia – an inherited condition in which the blood cholesterol level is very high. For more information on this see page 30.

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 **01604 640 016**.

Heartstart UK

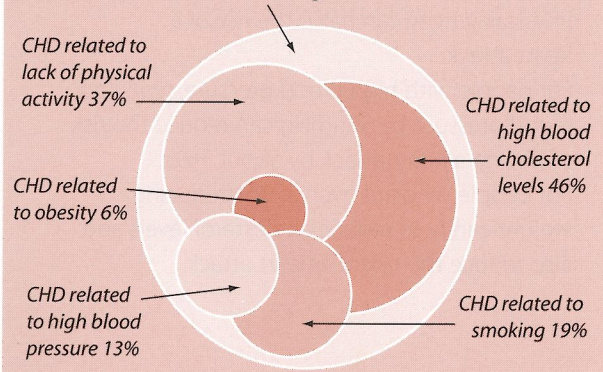
For information about a free, two-hour course in emergency life-support skills, contact Heartstart UK at the British Heart Foundation. The course teaches you to:

- 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.

<p>Page 14 For people who are overweight, reducing weight can help reduce cholesterol levels and also reduce the risk of a heart attack.</p>	<p>From <i>A Handbook of Hyperlipidaemia</i>. By GR Thompson. Published in 1989 by London Current Science.</p>
<p>Page 17 Eating healthily can help reduce your cholesterol level by between 5% and 10%.</p>	<p>From: 'Changes in risk factors explain changes in mortality from ischaemic heart disease in Finland.' By E Vartiainen, P Puska, J Pekkanen et al. Published in 1994 in <i>the British Medical Journal</i>, volume 309, pages 23-27.</p>
<p>Page 25 Statins can reduce total cholesterol levels by more than 20%. Overall, they reduce the risk of dying from coronary heart disease by around 25%.</p>	<p>From: 'Randomised trials of cholesterol lowering in 4444 patients with coronary heart disease: the Scandinavian Simvastatin Survival Study (4S); by the Scandinavian Simvastatin Survival Study Group. Published in 1994 in <i>The Lancet</i>, volume 344, pages 1383-39.</p>

How the individual risk factors add up

All people who died from coronary heart disease (CHD) under the age of 75



This diagram shows how important the individual risk factors – lack of physical activity, obesity, high blood pressure, high blood cholesterol levels and smoking – are in coronary heart disease. For example, 46% of the people who die from coronary heart disease under the age of 75 have a high blood cholesterol level.

The more individual risk factors you have, the higher your risk of coronary heart disease.

What you can do to help yourself

- Smokers can halve their risk of a heart attack within one year of quitting smoking.
- Physical activity can halve the risk of a heart attack.
- For people with high blood pressure, reducing blood pressure by 5 mmHg can reduce the risk of having a heart attack by about 16%.
- For people who are overweight, reducing weight can help reduce cholesterol levels and also reduce the risk of a heart attack.

Page 14

Physical activity can halve the risk of a heart attack.

From: 'Physical activity and the incidence of coronary heart disease'. By KE Powell et al. Published in the *Annual Review of Public Health* in 1987, volume 8, pages 253-287.

Page 14

For people with high blood pressure, reducing blood pressure by 5 mmHg can reduce the risk of having a heart attack by about 16%.

From: 'Blood pressure, stroke and coronary heart disease: Part 1 Prolonged difference in blood pressure: prospective observational studies corrected for the regression dilution bias'. By S MacMahon, R Peto, S Cutler et al. Published in *The Lancet* in 1990, volume 115, pages 765-774.

and

'Blood pressure, stroke and coronary heart disease: Part 2 Short-term reductions in blood pressure: overview of randomised drug trials in their epidemiological context'. By R Collins, R Peto, S MacMahon et al. Published in *The Lancet* in 1990, volume 135, pages 827-838.

For more information on eating well

You can get the following booklets and video from the British Heart Foundation.

So you want to lose weight ... for good. A guide to losing weight for men and women

Food should be fun ... and healthy!

Eating for your heart

Cholesterol on the level (video)

For more information on statistics quoted in this booklet

Statement	Where you can find out more about this
Page 13 How the individual risk factors add up (diagram)	From: <i>Monitoring the Progress of the 2010 Target for Coronary Heart Disease Mortality</i> . By A Britton and K McPherson. Published in 2000 by the National Heart Forum.
Page 14 Smokers can halve their risk of a heart attack within one year of quitting smoking.	From: <i>The Health Benefits of Smoking Cessation – A Report of the Surgeon General</i> , pages 239-240. Published in 1990 by the United States Department of Health and Human Services, Maryland.

What causes high blood cholesterol?

The most common cause of high blood cholesterol levels in people in the UK is too much saturated fat in the diet.

Some people have high cholesterol levels as a result of an underactive thyroid gland, chronic renal (kidney) failure, or alcohol abuse. Also, 1 in 500 people have high cholesterol levels because of an inherited disorder called familial hyperlipidaemia (see page 30).

How can physical activity help to improve my cholesterol level?

Doing regular physical activity – for example brisk walking, swimming or cycling – for 30 minutes a day at least five times a week can help improve your cholesterol level. Physical activity increases the level of HDL cholesterol (the protective cholesterol), but does not affect LDL cholesterol.

Physical activity also plays an important part in helping you to maintain or reach a healthy weight. People who are obese are more likely to have higher cholesterol levels.

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
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- 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

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 helpline service for the public and health professionals, providing information on a wide range of issues relating to heart conditions.

Publications and videos

The British Heart Foundation produces a range of publications and videos. You can order these through our website. The address is bhf.org.uk

For a complete publications list and order form, please contact:

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Phone: 01604 640016

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

How can healthy eating help lower my cholesterol level?

It is possible to lower cholesterol levels by cutting down on the total amount of fats you eat, and replacing some of the saturated fats with unsaturated fats. The aim is:

- to reduce your total cholesterol, and
- to raise your level of HDL cholesterol (the 'protective' cholesterol).

Foods containing fat are made up of a combination of saturated, polyunsaturated and monounsaturated fats. **Saturated fats** increase LDL cholesterol. **Monounsaturated fats** can lower the LDL level and do not lower the level of HDL cholesterol (the more protective cholesterol).

Polyunsaturated fats are an essential part of the diet and can help lower LDL cholesterol, but they also lower HDL cholesterol.

Eating healthily can help reduce your cholesterol levels by between 5% and 10%. However, it is easier for some people to reduce their cholesterol level by eating healthily than it is for others.

Choosing healthier fats

To help reduce your cholesterol level you need to do the following.

- Cut right down on saturated fats and replace them with moderate amounts of monounsaturated fats and polyunsaturated fats. See pages 20 and 21 for examples of foods containing these fats.
- Reduce the *total* amount of fat you eat – especially if you are overweight (as fat is also very high in calories). For example, you could cut down on the amount of fatty foods you eat, such as pastries, crisps and biscuits, and replace them with healthier alternatives such as fruit. Or, at mealtimes, you may be able to cut down on the amount of fatty foods you eat by filling up with starchy foods such as bread, pasta or rice instead.

Enjoy oily fish as this provides the richest source of omega-3 fatty acids, which can help reduce triglyceride levels and help prevent blood clotting.

The cholesterol found in foods – for example in eggs, liver, kidneys, and in seafood such as prawns – does not usually make a great contribution to blood cholesterol levels. (There should be no

also having FH is very small (about 1 in 500). However, if he or she does have FH, you will need special genetic counselling to advise you about the risk of your child being seriously affected. If your partner does not have FH, each of your children will have an even (50/50) chance of inheriting your type of FH.

Being diagnosed early and modern treatments are likely to be effective, so you should not make FH a major reason for limiting your family, certainly until you have had one or two children.

For more information

For more information on familial hyperlipidaemia (FH), contact Heart UK, 7 North Road, Maidenhead SL6 1PE.

Phone: 01628 628638.

Website: www.heartuk.org.uk

the woman's mother or sister had developed heart trouble before the age of 50.

What you can do to help yourself if you have FH

Healthy eating and treatment with cholesterol-lowering drugs are clearly important (see pages 17 and 25). However, it is not possible to say that treatment from an early age will completely remove the risk of heart trouble. Also, at present in the UK, most people with FH do not discover that they have it until they are in middle age or already have heart trouble. People with FH can benefit from the many remarkable advances that there have been in treating coronary heart disease, both with drugs and surgery. If you have FH and you experience any chest discomfort, especially with exercise or stress, you should report it promptly to your doctor.

If you have FH and are thinking of having a child

There is an extremely rare cause of particularly high blood cholesterol in childhood called 'homozygous FH'. This can happen if both parents have FH. If you have FH and are thinking of having children, your partner should ask the doctor to check his or her blood cholesterol level. The chance of your partner

problem in having up to four eggs a week, as long as your overall diet is healthy and well balanced.) If you need to reduce your cholesterol level, it is much more important that you eat food that is low in saturated fat.

Eating a high-fibre diet may also help to reduce the amount of cholesterol that is absorbed from your intestine into the bloodstream. For example, porridge, beans, pulses, fruit and vegetables are all high in a type of fibre which can help lower cholesterol. And a high-fibre diet helps to fill you up – making you less likely to snack on fattening foods.

To help reduce your cholesterol level, cut down on saturated fats and replace them with small amounts of monounsaturated and polyunsaturated fats. Omega-3 fats are good for your heart too.

<p>What do they do?</p>	<p>Monounsaturated fats</p> <p>Monounsaturated fats can help lower LDL levels and do not lower the HDL cholesterol level.</p>
<p>Which foods are they found in?</p>	<p>Monounsaturated fats are found in: olive oil walnut oil rapeseed oil avocado.</p> <p>Some margarines and spreads are made from monounsaturated fats.</p>

happen in more common kinds of high blood cholesterol and sometimes even in people who do not have high blood cholesterol.

The effects of FH

The main medical problem for people with FH is that they may develop heart trouble. FH affects men and women equally. However, its effect on the risk of coronary heart disease is rather different. Without treatment, most men and half of women with FH will suffer angina or a heart attack before they are 60. Even at the age of 70 some women who do not have treatment are free of heart trouble, whereas this would be very rare for a man. So, a man who inherits FH from his mother may develop heart trouble long before she does. This is probably the most common reason why some men with FH have no apparent family history of angina or heart attacks.

Many women with FH may, after talking it over with their doctor, choose to put off treatment with drugs until there is no longer any chance of them becoming pregnant while on medication. However, pregnant women can safely take bile acid binding drugs, as these are not absorbed by the body. But it would not be sensible to carry on without medication right up to the menopause if

29. FH is very unlikely to respond to diet alone, and many people will need to take cholesterol-lowering drugs as well as keeping to a healthy diet. Children may need medication if there is a particularly strong family history of FH.

Ideally, you should see a doctor who has specialist knowledge of FH. This will help make sure that you get the most appropriate treatment. A specialist can also tell if you have any symptoms or signs of heart trouble, or if you may develop them.

What are the signs of FH?

If a child has a blood cholesterol higher than 6.7 mmol/l and has normal triglyceride levels, it is almost certain that he or she has FH.

Among adults, certain tell-tale signs of FH may develop, which in themselves carry no risk. These include hard lumps in the tendons at the back of the ankles and often also in the tendons which run near the knuckles on the back of the hands. The lumps at the back of the ankles can be troublesome because they can get inflamed and painful and this can make it very uncomfortable to wear shoes. A white ring may also develop around the outside of the coloured part of the eye. However, this is not a feature just of FH. It can also

Unsaturated fats		Saturated fats
Polyunsaturated fats	Omega-3 fats	
<p>Polyunsaturated fats can help lower LDL cholesterol, but they also lower HDL cholesterol (the 'protective' cholesterol).</p>	<p>Omega-3 fats are a particular type of polyunsaturated fat. They can help prevent blood clotting, and help reduce triglyceride levels.</p>	<p>Saturated fats increase LDL cholesterol levels.</p>
<p>Polyunsaturated fats are found in: cornflower oil sunflower oil soya oil fish oil.</p> <p>Some margarines and spreads are made from polyunsaturated fats.</p>	<p>Omega-3 fats are found in: fish oil oily fish such as herring, kippers, mackerel, pilchards, sardines, salmon, trout and fresh tuna.</p> <p>Our bodies can also make omega-3 fats from rapeseed oil, and from the oil in walnuts and soya.</p>	<p>Saturated fats are found in: butter hard cheese lard dripping suet ghee coconut oil palm oil.</p>

Will eating sterol-enriched margarines and spreads help reduce my cholesterol level?

There is evidence that substances called plant sterols and stanols – which are added to certain margarines and spreads – may reduce blood cholesterol levels. However, these margarines and spreads are expensive. These products may be helpful for people who cannot take the statin drugs (drugs to reduce cholesterol levels – see page 25), or people who have high cholesterol levels even though they have already made changes to their diet. Even if you do eat these types of margarines and spreads, it is still important to make sure you follow a healthy diet.

Other important ways to eat well to protect your heart

While it is important to lower your cholesterol level, it is even more important to focus on protecting your heart by eating a healthy diet. You can do this in the following ways.

- Eat more oily fish – such as sardines, trout, mackerel, pilchards, salmon and herrings. These fish contain special omega-3 fats which can help to lower blood triglyceride levels and to prevent the blood from clotting and the heart from beating irregularly. Aim to have 2 portions

had any heart trouble, he or she will have raised blood cholesterol.

FH is a ‘dominantly inherited’ disorder. This means that if you have FH, your brothers and sisters and your own children will each have an even (50/50) chance of having FH too.

If you have been told you have FH, it is important to ask other members of your family to talk to their doctor about this, and have their blood cholesterol levels measured. Many people with FH are not obese and may not have any other risk factors for coronary heart disease. If you are related to someone with FH, don’t put off asking for a blood cholesterol test just because you feel you are fit and well at the moment. Anyone with FH who has a child should find out as early as possible if their child has inherited FH. It is important to find out at least by the time the child is five because even at this age, healthy eating is important. As the child gets older it is particularly important that he or she does not start to smoke.

Treatment for FH

The treatment for FH is very similar to the treatment used for other more common types of high blood cholesterol described on pages 16 to

FH (familial hyperlipidaemia)

What is familial hyperlipidaemia?

About 1 in 500 people in the UK have inherited a high blood cholesterol level due to a condition called 'familial hyperlipidaemia' or FH. This condition is also sometimes called 'familial hypercholesterolaemia'.

In people with FH, the way LDL cholesterol is removed from the blood circulation works only about half as effectively as normal. This means that their blood cholesterol level roughly doubles. So an adult with FH may have a cholesterol level of between 9 and 12 mmol/l, and sometimes higher. Children and young women may have lower levels, but the level is usually above 6.7 mmol/l in children and above 7.5 mmol/l in adults.

How is FH passed on?

FH is almost always inherited from a parent. ('Familial' means running in the family.) One parent may have had a heart attack or developed angina at an early age. Angina and heart attacks are increasingly common in people in the UK from their mid-60s onwards. If they happen at an earlier age, they are considered as happening 'prematurely'. Even if the parent with FH has not

of fish a week. One of these portions should be oily fish. There is some evidence to suggest that people who have angina or have had a heart attack should aim to have 2 or 3 portions of oily fish a week, to help protect their heart.

- Eat more fruit and vegetables. Aim for at least 5 portions of a variety of fruit and vegetables every day.
- Cut down on salt. Don't add salt to your food. Use extra pepper, herbs, garlic or spices to add flavour to your food instead. Choosing more fresh foods rather than ready meals or processed foods can also help.
- Drink alcohol in moderation. Keep within the sensible limits – no more than 14 units of alcohol a week for women, and no more than 21 units a week for men.
- Keep to a healthy weight for your height. If you are not sure whether you are overweight, ask your doctor or practice nurse. If you are overweight, losing weight can help lower your cholesterol level, and also reduce other risk factors for coronary heart disease such as high blood pressure and diabetes.

Aim to eat at least five portions of fruit and vegetables a day

What counts as a 'portion'?

Fruit	
Apple, orange or banana	1 fruit
Very large fruit (for example, melon or pineapple)	1 large slice
Small fruits (for example, plums, kiwis, satsumas)	2 fruit
Raspberries, strawberries, grapes	1 cupful
Fresh fruit salad or stewed or canned fruit	2 to 3 tablespoonfuls
Dried fruit	½ to 1 tablespoonful
Fruit juice	1 glass (150mls)
Vegetables	
Raw, cooked, frozen or canned vegetables	2 tablespoonfuls
Salad	1 dessert bowlful

cholesterol levels usually rise with age. Your sex is relevant too, as women's risk of coronary heart disease lags about 10 years behind that of men. Your risk may also be greater if you have a strong family history of premature coronary heart disease (if a close relative developed coronary heart disease before the age of 55 for a man, or 65 for a woman).

There are various sets of guidelines to help doctors decide whether to recommend you to take cholesterol-lowering drugs. This means that people with a wide range of cholesterol levels may be treated with cholesterol-lowering drugs. For example, a man of 40 who had four major risk factors might be treated with statins even if his cholesterol level was 5.0 mmol/l. However, a man with no risk factors might not be treated with statins even if his cholesterol level was much higher.

Statins are a long-term and effective treatment. However, it is important to lower your overall risk of coronary heart disease as much as possible. This includes getting your lifestyle right as well as taking statins. Stopping smoking, changing your diet, taking regular physical activity, controlling your weight and making sure your blood pressure is normal, will all help.

Will I need to take medication?

The choice of whether or not to take cholesterol-lowering drugs depends on your overall risk of coronary heart disease as well as your total cholesterol, HDL and LDL levels.

The higher your risk of coronary heart disease, the more likely it is that your doctor will recommend cholesterol-lowering drugs. Doctors prescribe statins for people who have high blood cholesterol levels and people who are at greatest overall risk of suffering from coronary heart disease. People at highest risk are:

- those who have already had a heart attack
- those who have angina or peripheral vascular disease, and
- those who have had bypass surgery or angioplasty.

There is also evidence that many people with diabetes would benefit from taking statins.

Your doctor may consider that your risk is sufficiently high to justify having statin treatment if you also have a combination of other major risk factors such as being a smoker and having high blood pressure. Your age is also relevant, as

How can medication help?

Statins

The main type of drug used to reduce cholesterol levels is statins. Examples of statins are simvastatin, pravastatin and atorvastatin. Statins are cholesterol-lowering drugs which became available in the mid-1990s. Statins can reduce total cholesterol levels by more than 20%. Overall, they reduce the risk of dying from coronary heart disease by around 25%. Treating people in their 70s with statins is as effective as it is in middle-aged people.

There are several statins available in the UK. Many of these have been tested in long-term trials that have looked not just at the cholesterol levels they produce but also at their effect on health and long-term safety. So far the research has covered over 12 years of treatment. For people who are already at high risk of having a heart attack, the benefits of taking statins are likely to outweigh the possible risk of side effects.

Statins are not used for people who have liver disease or for women who are pregnant or breastfeeding.

A rare side effect of statins is inflammation of the muscles (myositis). So you should tell your doctor if you have any unexpected muscle pain, tenderness or weakness.

It's best to take statins in the evening as most of our cholesterol is made at night.

Other cholesterol-lowering drugs

There are two other types of drugs which can be used when statins are not suitable. These are fibrates and drugs which bind bile acids.

Fibrates

Fibrates come in tablet or capsule form. They include bezafibrate, ciprofibrate, fenofibrate and gemfibrozil. Fibrates are used for people who have a high level of both blood cholesterol and triglycerides. You will not usually be given them if you are also taking statins (see opposite), except under strict medical supervision. If you are also taking anticoagulants, your doctor will start you on them cautiously.

Drugs which bind bile acids

These drugs (which are also called 'bile acid binding drugs') include cholestyramine and colestipol. They come in powder form, in sachets.

You must soak some types in fruit juice before you take them. Others are already mixed with fruit flavouring and you just need to add water. You can make them up beforehand and keep them in the fridge if you want to.

You should take these drugs immediately before or during a meal. A convenient time to take them might be before breakfast. A dose of two sachets before breakfast is often a good starting point in treating high blood cholesterol. At first this dose may make you feel fuller than usual, but most people gradually get used to this. Some people who take these drugs may get heartburn or constipation, but this is more likely with larger doses. These drugs are not absorbed into the body, so they can also be used safely by children and pregnant women.

Drugs which reduce absorption of cholesterol

Some people are unable to take statins. A drug called ezetimibe has recently been produced to help lower blood cholesterol levels. It works by preventing cholesterol from being reabsorbed from the bowel. More research is needed to confirm the long-term benefits of this drug.