British Heart Foundation

How I've reduced my Blood cholesterol

Sulakhan Singh Dard

FIGHT FOR EVERY HEARTBEAT

bhf.org.uk

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As the nation's heart charity, we have been funding cutting-edge research that has made a big difference to people's lives.

But the landscape of cardiovascular disease is changing. More people survive a heart attack than ever before, and that means more people are now living with long-term heart conditions and need our help.

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For more information, see **bhf.org.uk**

Find out more about our life saving heart research at bhf.org.uk/research

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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 is
- what causes high cholesterol
- how to lower your total cholesterol level
- the medicines your doctor may prescribe as treatment
- information about the condition familial hypercholesterolaemia.

This booklet does not replace the advice that your doctors, nurses or dieticians may give you, but it should help you to understand what they tell you.

WHAT IS CHOLESTEROL?

We all have cholesterol in our blood. It is a fatty substance that is made naturally in the body by the liver. Cholesterol plays an important role as every cell in our body uses cholesterol. It helps make Vitamin D and some hormones, and is a component of bile, which is essential for our digestion.

However, having **too much cholesterol** in your blood increases your risk of heart and circulatory disease, such as a heart attack or stroke.

You can lower your cholesterol and therefore your risk of developing coronary heart disease (see page 16) by being physically active, changing your diet, and by reducing your alcohol intake or quitting smoking.

An inherited condition called familial hypercholesterolaemia (FH) can also cause unnaturally high levels of cholesterol even if you have a healthy lifestyle (see page 67) and you'll need to take medications to reduce your risk.

- **Find out about dietary cholesterol**, which comes from certain foods such as shellfish and egg yolks (page 27).

Understanding good and bad cholesterol

Cholesterol is carried around the body by proteins (our cells' building blocks). When cholesterol and proteins combine they are called lipoproteins. There are several types of **lipoproteins** but they can generally be divided into two main types:

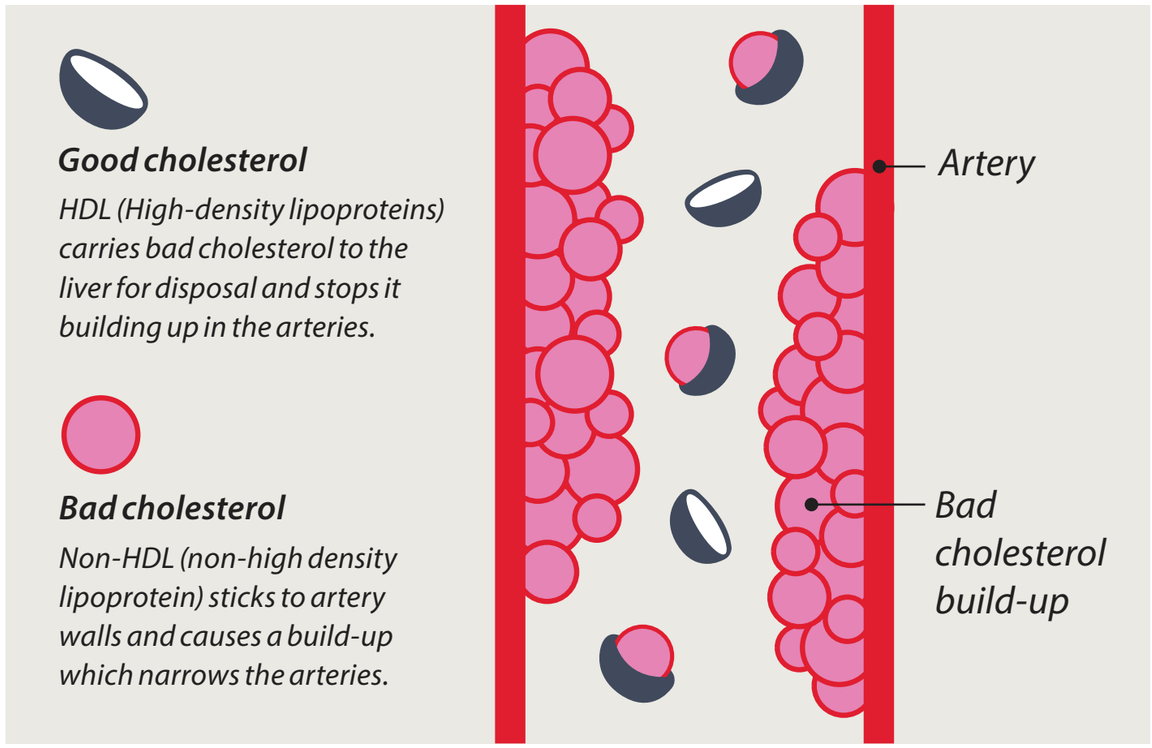
- High-density lipoproteins (HDL) known as good cholesterol
- Non-high density lipoprotein (non-HDL) known as bad cholesterol.

High-density lipoprotein (HDL) is 'good' because it helps to **remove** cholesterol from the cells and takes it back to the liver. Here it is either broken down or passed out as a waste product thereby lowering our total blood cholesterol levels and reducing our risk of heart and circulatory (cardiovascular) disease.

Non-high density lipoprotein (non-HDL) **delivers** cholesterol from the liver to the cells that need it. It is called 'bad' cholesterol because when there is too much of it, it can get into the walls of the blood vessels and stay there. This can clog up the blood vessels causing narrowing and stiffening of the arteries which can lead to a heart attack or stroke.

If you have been told you have high cholesterol, it means that you have too much bad (non-HDL) cholesterol in your bloodstream, which means you have an increased risk of developing coronary heart disease.

Your doctor may talk about low-density lipoprotein or LDL. This is because LDL was previously used as the main measure of bad cholesterol but we now know that other forms of non-HDL are also harmful.



Triglycerides

As well as cholesterol our blood contains another type of fatty substance called triglycerides. This is stored in the body's fat cells and is also found in foods such as dairy products, meat and cooking oils. **Triglycerides can contribute to the narrowing of the artery walls, which can increase your risk of heart disease.**

People who are very overweight, eat a lot of fatty and sugary foods or drink too much alcohol are more likely to have a high triglyceride level.

When people talk about keeping their cholesterol down, they usually mean their total cholesterol level.

Your total cholesterol level is worked out by using your good HDL cholesterol level, your bad non-HDL cholesterol level and your triglyceride level.

Blood Lipids

Blood lipids are fatty substances in the blood that include **cholesterol** and **triglycerides**. Some types are bad, but one type (HDL cholesterol) is good.

Cholesterol
Non-HDL cholesterol – **bad**
HDL cholesterol – **good**

Triglycerides – bad

How do I know if my cholesterol levels are high?

Cholesterol and triglycerides are measured in units called millimoles per litre of blood, usually shortened to ‘mmol/Litre’ or ‘mmol/L’. Your doctor or nurse will need to know both your HDL and non-HDL levels, not just your total cholesterol.

Generally speaking, for a healthy heart the aim is to have a **low non-HDL** level and a **high HDL level**. There is no specific target cholesterol level, however, because your doctor is looking at your overall risk of developing heart disease or circulation problems, including whether you smoke or have high blood pressure.

A high total cholesterol level can mean that you have a lot of bad (non-HDL) cholesterol in your blood, which means you’re more likely to have a heart attack or stroke. But a high level of good (HDL) cholesterol can help keep that non-HDL in check.

Doctors can use your cholesterol measurements to assess your risk of developing heart and circulatory disease CVD over the next 10 years. To do this, they divide your total cholesterol level by your HDL cholesterol level. For example:

Total cholesterol: 4.5 mmol/L
Non-HDL cholesterol: 2.4 mmol/L
HDL cholesterol: 1.2 mmol/L
Cholesterol ratio: 4.5 ÷ 1.2 = 3.75

The lower the ratio, the better.

This figure is then used along with other information, such as your age, medical history and ethnicity, to establish your overall risk.

If you're reading this booklet then you may already know that your cholesterol levels are high but if you aren't aware of your cholesterol levels and are over 40 or have a history of heart disease in your family then you should get tested.

You can request a simple test from your GP who will take a blood sample or perform a simple finger prick test.

Your blood cholesterol levels can vary a lot, both from day to day and at different times of the day, so your doctor will usually wait to decide whether to prescribe cholesterol-lowering medicines until he or she has a series of readings.

You may be given some instructions before your test, such as not eating or drinking anything but clear fluids for 12 hours beforehand. It is very important that you follow these instructions.

What causes high cholesterol?

High cholesterol can be caused by a combination of factors, including a diet high in saturated and trans fats (bad fats), smoking, physical inactivity and too much body fat (especially around the abdomen). Other possible causes are kidney or liver disease or an underactive thyroid gland.

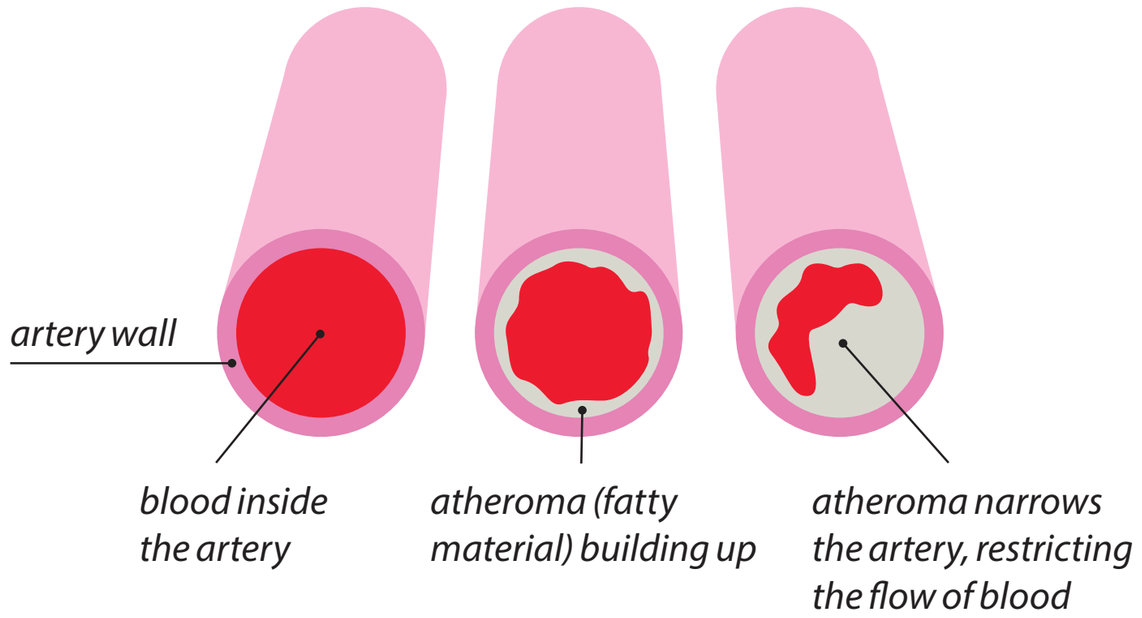
An inherited condition known as familial hypercholesterolaemia, or FH for short, can also cause unnaturally high levels of high cholesterol.

Why should I care if my cholesterol is high?

Coronary heart disease is caused when the coronary arteries (the arteries that supply the heart muscle with oxygen-rich blood) become narrowed by a gradual build-up of fatty material within their walls. This process is called atherosclerosis, and the fatty substance is called atheroma.

Cholesterol is a significant risk factor for heart and circulatory disease because when the level of bad (non-HDL) cholesterol is too high, it stays inside the arteries causing atheroma to develop.

How atheroma builds up



Your risk of coronary heart disease is much greater if you have a high total cholesterol level combined with one or more of the other risk factors – for example, if you have a high cholesterol level and you also smoke, have diabetes or high blood pressure, are overweight and/or don't take enough exercise.

A risk factor is something that increases your chances of developing a disease. The other major risk factors for developing coronary heart disease are:

- smoking
- high blood pressure
- physical inactivity
- being overweight
- having diabetes
- being of South Asian origin
- a family history of premature coronary heart disease. (This means if a close blood relative developed coronary heart disease (e.g. had a heart attack or developed angina) before the age of 55 for a man or 65 for a woman).

The more risk factors you have, the higher your risk of a heart attack.

WHAT CAN I DO TO LOWER MY CHOLESTEROL LEVEL?

Making some simple lifestyle changes may be all that you need to bring your cholesterol down to a good level. There are some simple ways you can do this:

- be active for at least 30 minutes a day
- eat a diet high in fruit and vegetables and low in saturated fat
- eat more foods known to lower cholesterol
- stop smoking

However, if your cholesterol is very high and if lifestyle changes are not enough, your doctor might suggest controlling it with medication (see page 54).

HOW DOES PHYSICAL ACTIVITY HELP LOWER MY CHOLESTEROL LEVEL?

Physical activity helps to increase your HDL (good) cholesterol.

It stimulates the body to move the bad (non-HDL) cholesterol to the liver for disposal rather than staying in the cells and blocking arteries. Physical activity also helps you to maintain a healthy weight and lower your blood pressure.

Aim to do at least two and a half hours of moderate exercise a week (150 minutes); for example, brisk walking or cycling. That's 30 minutes a day at least five days a week. You can do the 30 minutes all at once or in shorter bouts of at least 10 minutes each.

To get the most benefit, you need to be active enough to make you feel warm and slightly out of breath but still able to have a conversation. It's important to build up the amount of activity gradually.

Think about how you can start to include more physical activity in your daily routine; for example, walk rather than drive, get off the bus or train a stop early and walk the rest of the way and climb the stairs rather than use the lift.

Doing regular physical activity can help improve your cholesterol level.

For more about how to get more active, see our website bhf.org.uk/staying-active

HOW DOES HEALTHY EATING HELP IMPROVE MY CHOLESTEROL LEVEL?

A healthy diet can help to lower your cholesterol, protect you against high blood pressure and diabetes, and help you to maintain a healthy weight, all of which will reduce your risk of a heart attack or stroke. In particular, the Mediterranean-style diet, as it is known, will help to keep your heart healthy (see page 28). This is similar to the government's healthy eating advice set out in the Eatwell Guide (see page 22 & 23). For more information visit **bhf.org.uk/heart-matters/healthy-eating-toolkit/eatwell-plate**

Making small healthy changes to your diet like replacing unhealthy saturated fat with healthy unsaturated fat, and eating more fruit, vegetables and wholegrain foods can help to lower cholesterol levels by 5–10%. In addition, regularly eating a few key foods like soluble fibre, plant stanols and sterols, soy protein and nuts (see pages 36-41) can help to lower your cholesterol level even further, up to 24%.

Eatwell Guide

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

Check the label on packaged foods

Each serving (150g) contains

Energy	Fat	Saturates	Sugars	Salt
1046kJ 250kcal	3.0g LOW	1.3g LOW	34g HIGH	0.9g MED
13%	4%	7%	38%	15%

of an adult's reference intake

Typical values (as sold) per 100g: 697kJ/ 167kcal

Choose foods lower in fat, salt and sugars

Eat at least 5 portions of a variety of fruit and vegetables every day

Fruit and vegetables

Raisins

Chopped tomatoes

Frozen peas

Choose wholegrain or higher fibre versions with less added fat, salt and sugar

Potatoes, bread, rice, pasta and other starchy carbohydrates

Potatoes

Whole grain cereal

Cous Cous

Porridge

Whole wheat pasta

Bagels

Rice

Spaghetti

Beans, pulses, fish, eggs, meat and other proteins

Lentils

Beans lower salt and sugar

Tuna

Plain nuts

Chick peas

Lean mince

Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat

Dairy and alternatives

Low fat soft cheese

Semi skimmed milk

Soya drink

Plain Low fat Yoghurt

Choose lower fat and lower sugar options

6-8 a day

Water, lower fat milk, sugar-free drinks including tea and coffee all count.

Limit fruit juice and/or smoothies to a total of 150ml a day.

Sauce

Crisps

Eat less often and in small amounts

Veg Oil

Lower fat spread

Oil & spreads

Choose unsaturated oils and use in small amounts

Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS

Source: Public Health England in association with the Welsh Government, Food Standards Scotland and the Food Standards Agency in Northern Ireland

How do the different types of fat in foods affect my cholesterol levels?

Saturated fats can increase both total cholesterol and non-HDL cholesterol. Non-HDL cholesterol increases the risk of fatty deposits building up in your arteries.

Monounsaturated fats can lower your non-HDL and your ratio of total cholesterol to HDL (and therefore your risk of heart attack and stroke – see page 8) when you use them instead of saturated fats and trans fats. They can also slightly increase the good HDL cholesterol and decrease triglycerides, when you use them to replace carbohydrates.

Polyunsaturated fats are an essential part of your diet. Like monounsaturated fats, they can help to lower your non-HDL cholesterol and your ratio of total cholesterol to HDL, and so reduce your risk of a heart attack.

Trans fats can increase non-HDL cholesterol and lower HDL cholesterol, both bad for your heart.

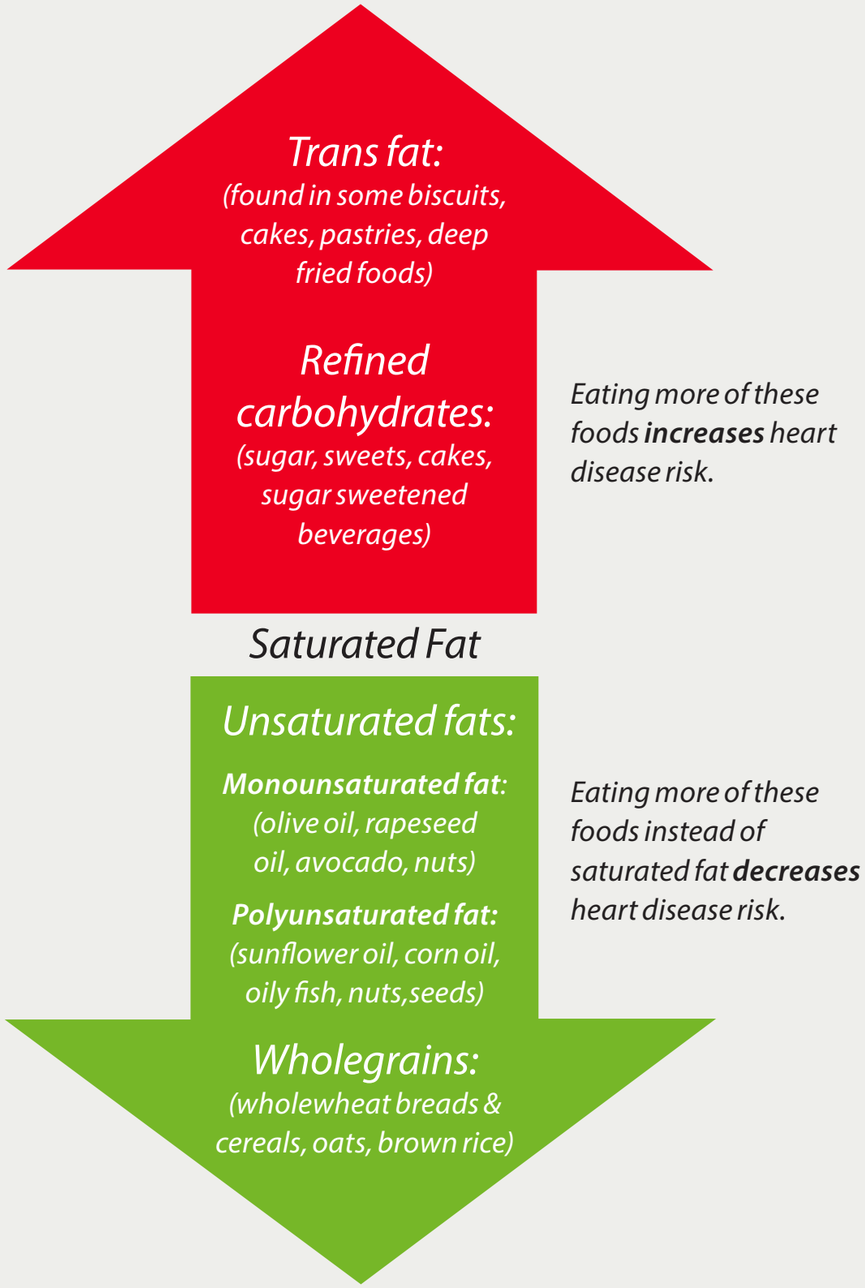
The omega-3 fats in fish oils have little effect on cholesterol but can help to reduce your triglyceride levels and therefore your risk of heart attack and stroke.

Replacing saturated fat

Eating foods high in saturated fat and trans fats are linked to higher levels of non-HDL (bad) cholesterol which, in turn, is linked to an increased risk of heart and circulatory disease. So that is why it's important to reduce the amount of these fats in your diet.

However it's also important to think about what you replace that saturated fat with. Replacing saturated fat with refined carbohydrates, like those in sugary food and drinks, won't improve your health. But replacing saturated fat with healthier mono and poly unsaturated fats and wholegrains does help to reduce your risk of heart attack and stroke (refer to diagram 'Unsaturated fats and whole grains lower coronary heart disease risk.' on page 26). The table on pages 34–35 'Which foods are these fats found in?' lists the types of fats you should be eating less and more of.

Unsaturated fats and whole grains lower coronary heart disease risk.



MYTHS

eggs are bad for your heart

1 Dietary cholesterol is found in food like eggs, liver and kidneys, shellfish such as prawns and fish roe. For most people dietary cholesterol has little effect on their blood cholesterol level. In fact, these foods are low in saturated fat.

2 To lower your cholesterol, the most important thing is to reduce the amount of saturated fat you eat. However people with familial hypercholesterolaemia (FH) – a condition which runs in the family and leads to very high cholesterol levels – are still advised to have no more than three or four eggs a week, lobster no more than twice a week and avoid offal.

3 Mussels, oysters, scallops and clams are low in dietary cholesterol and can be eaten freely. Talk to your doctor or a dietitian for more advice.

The Mediterranean Style Diet

Mediterranean cuisine varies by region but it is largely based on vegetables, fruits, nuts, beans, cereal grains, fish and unsaturated fat – typically olive oil – rather than saturated fat such as butter.

Research suggests that it may reduce our risk of developing conditions like type 2 diabetes, high blood pressure and raised cholesterol, which are all risk factors for heart and circulatory disease (cardiovascular disease: CVD).

It's not clear whether it is specific foods that provide the health benefit or the Mediterranean diet as a whole – that is, the combination of all the different foods, along with the lifestyle and eating pattern that go with it. But by changing your whole diet, opting for healthy fats and eating more fruit, vegetables, fish, beans and lentils and less meat, you will be benefiting your cholesterol level, blood pressure and weight.

Eating a healthy diet can help to improve your cholesterol levels.

Are all saturated fats the same?

The relationship between saturated fat and your risk of CVD is complex and not all saturated fats have the same effect on cholesterol. For example, stearic acid found in cocoa butter seems to have little impact. This doesn't mean that you should start eating chocolate. Most chocolate in the UK is high in calories with a lot of added sugar and fat, which can cancel out any benefit that cocoa may provide. A small amount of chocolate as part of a balanced diet is fine.

The consumption of dairy products appears to be either neutral or protective against CVD. Dairy products, apart from butter, also seem to be neutral or to give some protection against CVD and Type 2 Diabetes. We don't yet fully understand this but some of the nutrients in dairy products, such as protein and calcium, may have a beneficial effect. However, the advice is to choose those products with lower fat and sugar to help control your calorie intake and maintain a heathy weight without losing out on calcium and protein. Low-fat dairy products contain the same amount of protein and calcium as the standard ranges.

When it comes to coconut oil, the evidence is not strong enough to recommend it in preference to oils that we know are better for us, like rapeseed, olive or sunflower oil. If you like the taste of coconut oil then, as with butter, it's fine to use it occasionally. The same applies to creamed and desiccated coconut.

Saturated fats are not an essential part of our diet and there isn't enough evidence to recommend choosing one over another when you are trying to reduce your cholesterol. It's better to replace saturated fats with 'good' fats such as vegetable oils, nuts and oily fish.

What are trans fats?

Trans fats occur naturally in small amounts in dairy foods and meat. However, it is the industrially produced trans fats which have been linked to an increased risk of coronary heart disease. Industrially produced trans fats are formed when vegetable oils are made into solid fat through a process called hydrogenation. These trans fats have a similar effect to saturated fats in that they can increase your non-HDL cholesterol and reduce your HDL cholesterol. They are most usually found in processed foods like biscuits, cakes, pastries, fast food and some margarines and spreads.

In the UK trans fats are very rarely included in foods and are not likely to be found in margarine for example. However this may not be the same for imported foods. If you are uncertain, check the ingredients list. Foods that contain trans fats will have 'hydrogenated oils' or 'partially hydrogenated fat' in the list of ingredients.

Choosing healthier fats

All fats naturally contain a mixture of different fats – saturated and unsaturated fats. They tend to be classified (grouped) by the fat that makes up the largest percentage as listed in the table below. Some also contain high amounts of trans fats as a result of processing. Unsaturated fats include monounsaturated, polyunsaturated and omega-3. To help reduce your cholesterol, you should replace foods high in saturated and trans fats with those high in monounsaturated and polyunsaturated fats and omega-3.

Which foods are these fats found in?

Unsaturated fats		
Monounsaturated fats	Polyunsaturated fats	Omega-3 fats
• olive oil and rapeseed oil • avocado • nuts and seeds (almonds, cashews, hazelnuts, peanuts and pistachios). • some spreads	• corn oil, sunflower oil and soya oil • nuts and seeds (walnuts, pine nuts, sesame seeds and sunflower seeds • oily fish such as herring, mackerel, pilchards, sardines, salmon, trout and fresh tuna. • some spreads	• oily fish

Saturated fats	
Saturated fats	Trans fats
• butter • hard cheese • whole milk • fatty meat • processed meat and meat products • biscuits and cakes • cream, lard, dripping, suet and ghee • coconut and palm oil • pastry	• pastries • biscuits, cakes and crackers • fried food • takeaways • hard margarines

Eat more foods known to lower cholesterol

Four foods are known to lower cholesterol by a significant amount. They include soluble fibre, plant stanols and sterols, soy protein and nuts, often referred to as dietary portfolio cholesterol-lowering foods.

The more of these you eat as part of your healthy diet, the bigger the impact on your cholesterol. In fact, they can lower your level by up to 24%, as much as a low-dose statin.

Soluble fibre

Soluble fibre can help lower your cholesterol by cutting the amount of cholesterol absorbed into your bloodstream from your intestine. 15–20g per day can lower non-HDL cholesterol by 5–10%. Soluble fibre can be found in :

- Oats: 2–3 servings a day can lower your cholesterol by up to 5%. A serving can be a bowl of porridge, two oat breakfast biscuits or three oat cakes.
- Pulses such as baked beans, kidney beans, soya beans, peas, lentils and chickpeas. Aim for 80–100g a day.
- Fruit and vegetables: aim for 5 a day.
- Wholegrains: aim for 1–2 servings a day of wholegrain cereals, breads, brown rice and wholewheat pasta.

Plant stanols and sterols

Plant stanols and sterols are substances added to certain foods, including some margarine and cream cheese spreads, yoghurts and cholesterol-lowering mini-drinks. They can help to reduce non-HDL cholesterol levels by up to 10% when you eat 2g a day regularly as part of a healthy balanced diet. This may reduce the risk of heart attack, although this is not yet proven.

How much stanol or sterol should I take?

2g of stanols or sterols is equivalent to:

2–3 portions of a combination of the following products containing added stanols or sterols

- spread (10–12g, enough for 1–2 slices of bread)
- yoghurt (125g)
- milk (250ml)
- soft cheese (20g)

OR

- 1 mini yoghurt or dairy-free drink, which contains all of the recommended 2g a day.

Plant stanols and sterols are not a substitute for a healthy diet nor a replacement for cholesterol-lowering medicines, however. If you decide to use these products, follow the manufacturer's advice on the amount you need to consume each day to provide you with 2g of the plant stanol or sterol.

You can take them in addition to any cholesterol-lowering medicines your doctor has prescribed.

Plant sterol or stanol products should only be used by adults who need to lower their cholesterol levels. They are not suitable for women who are pregnant or breastfeeding, or for children.

Nuts

Nuts contain healthy unsaturated fats and soluble fibre, which can help lower cholesterol by up to 7.5%. See page 34 for healthy nuts. Try eating a handful of unsalted, unsweetened nuts a day (30g or about an ounce) either as a snack or as part of a meal.

Soya protein

Soya is a good vegetable protein, low in saturated fat and a good source of soluble fibre. Eating between 15 and 25g of soya protein a day can lower your cholesterol by around 4%. This is equivalent to about 2–3 servings of soya foods. You can get 15g of soya protein from, for example:

- 500ml of soya milk
- 28g (a handful) of soya nuts
- 50g of tofu; 30g of soya mince
- one soya burger
- a pot of soya dessert or yogurt.

Substituting foods that contain soya for those with saturated fat can lower your cholesterol even further. So, try using fortified soya milk instead of cow's milk or eating soya nuts or yoghurt as a snack. You can also replace some of the meat in dishes such as casseroles, stir-fries, pasta and salads with soya beans or mince.

For more information on how to include these cholesterol-lowering foods in your diet, go to the Heart UK site **heartuk.org.uk/ULCP**

SULAKHAN'S STORY

In 2000 Sulakhan had a heart attack that required bypass surgery. He discovered his arteries had become blocked due to high cholesterol.

"I was very surprised to learn I had high cholesterol, I don't smoke or drink alcohol and I'm a vegetarian so I thought I was healthy. Once my GP explained to me what high cholesterol was, I understood that I needed to make some positive lifestyle changes to improve my health. I now have less saturated fat and sugar in my diet and I eat things in moderation. I walk over a mile every day, gardening helps to keep me physically active and I have joined a gym.

Through healthy eating, regular exercise and medication I have lowered my cholesterol and managed to keep it under control. I have a very positive outlook and I use my experience to help others. I volunteer up to 20 hours a week bringing awareness to the South East Asian community about how to live a heart healthy lifestyle."

Other important ways to eat well to protect your heart

As well as lowering your cholesterol level, it is also important to eat well to protect your heart generally. You can do this in the following ways.

Eat more fruit and vegetables

Aim to have at least five portions of a variety of fruit and vegetables every day. Fresh, frozen, chilled, canned and dried fruit and vegetables, and 100% juice, all count. There is evidence that people who eat more than five portions of fruit and vegetables a day have a lower risk of CVD . We still need to do more research to find out why this is. What we do know is that fruit and vegetables contain fibre and a variety of vitamins and minerals, which make them an important part of a healthy, balanced diet. Eating more fruit and vegetables also means you have less room for foods that are high in saturated fat, salt and sugar. Dietary supplements don't seem to have the same benefits as fruit and vegetables.

Cut down on salt

Eating less salt can lower your risk of high blood pressure, which is linked to coronary heart disease. And if you already have high blood pressure, cutting down on salt can help to lower it. You should have no more than 6g of salt a day – that's about one level teaspoon. Try not to add salt to your food – use extra pepper, herbs, garlic or spices to add flavour instead. Choosing fresh foods rather than ready meals or processed food will also help you to cut down on salt.

Salt substitutes may not be suitable for some people – for example, those with kidney problems or heart failure. So check with your doctor first.

Drink alcohol within sensible limits

If you drink alcohol, you shouldn't drink more than 14 units a week and you should have several alcohol-free days a week. This applies whether you're a man or a woman and if you drink regularly or only occasionally. For further information visit **bhf.org.uk/heart-health/preventing-heart-disease/alcohol**

1 unit of alcohol =

- a small glass (100ml) of wine (10% ABV [alcohol by volume])

- **or** a pub measure (25ml) of spirits

- **or** half a pint (about 300ml) of normal-strength lager, cider or beer (for example, 3.5% ABV).

Dietary swap suggestions

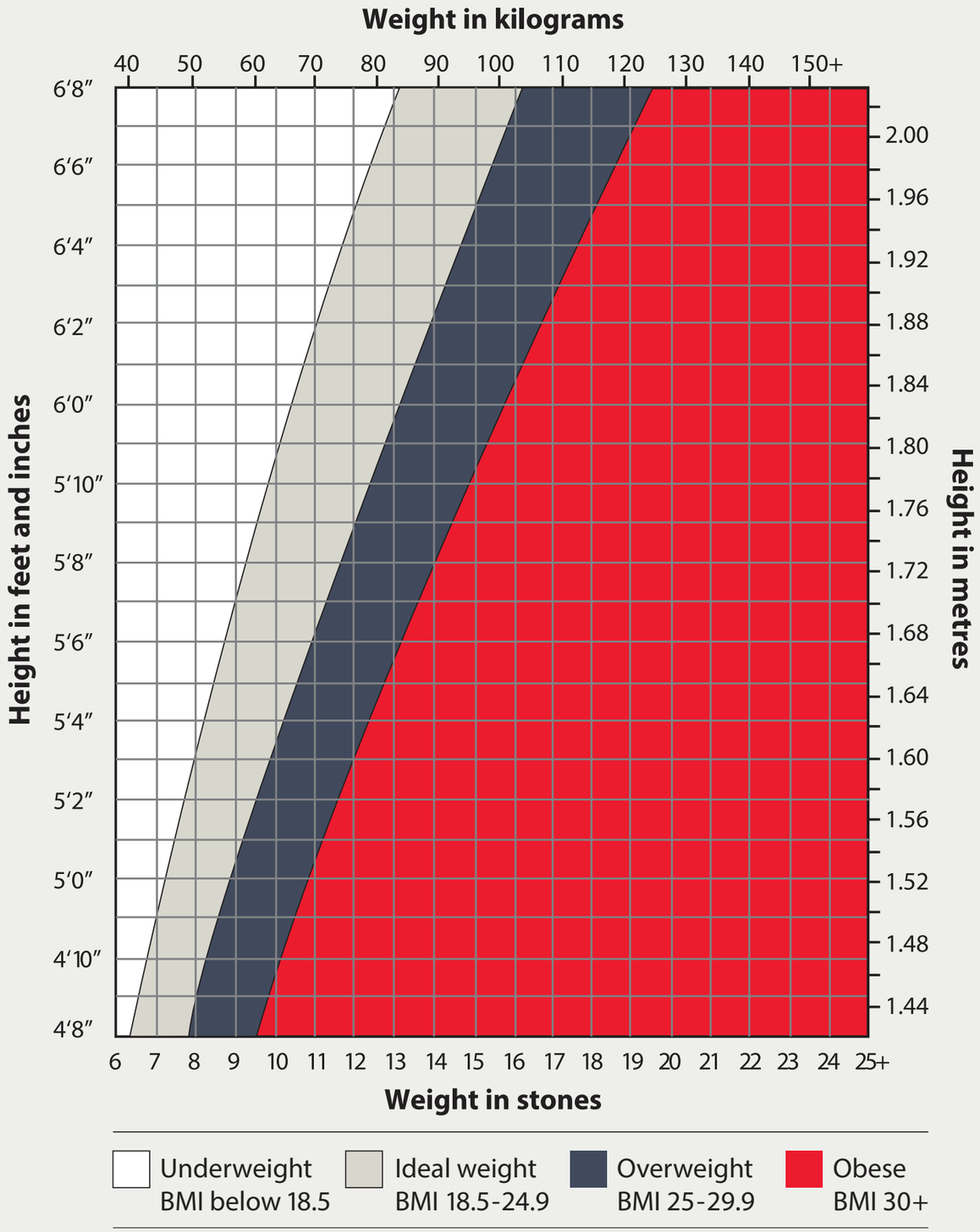
- butter to lower fat butter or spreads
- whole milk to 1% milk
- sour cream to natural yogurt
- biscuits to fruit
- meat to fish
- sugary cereal to wholegrain cereal
- cheese to reduced fat cheese
- crisps to unsalted nuts

Be a healthy body weight and shape

Being overweight and carrying too much weight around your waist can put you at greater risk of heart problems, high blood pressure, high cholesterol and diabetes. If you're not sure if you are overweight or if your body shape puts your health at risk, talk to your doctor or practice nurse.

Your weight

A measurement called body mass index (BMI) is often used to find out if you are overweight. This is calculated from your weight and height. Use the BHF BMI calculator to see if you are a healthy weight **bhf.org.uk/bmi/BMI_Calc**



Your body shape

To measure your waist, find the midpoint between the bottom of your ribs and the top of your hips. For most people this is on a line with their navel. Breathe out normally, try to relax and avoid breathing in while you are taking your measurement.

Check your measurement in the box opposite.

If you're South Asian, Afro-Caribbean, Black African, Chinese, Middle Eastern or have parents from two or more different ethnic groups, you may be at increased risk of some health conditions at a lower BMI body mass index and waist size than white Europeans. This is why the measurements that indicate high risk are lower for people from these groups.

	Your health is **at risk** if your waist size is:	Your health is **at high risk** if your waist size is:
Men **– White European**	Over 94 centimetres (about 37 inches)	Over 102 centimetres (about 40 inches)
Men **– African Caribbean** **– South Asian** **– some other minority ethnic groups**	–	Over 90 centimetres (about 35½ inches)
Women **– White European**	Over 80 centimetres (about 31½ inches)	Over 88 centimetres (about 34½ inches)
Women **– African Caribbean** **– South Asian** **– some other minority ethnic groups**	–	Over 80 centimetres (about 31½ inches)

SHIRLEY'S STORY

When Shirley discovered her cholesterol levels were high, she was determined to make some lifestyle changes to improve her heart health.

"I realised I hadn't been looking after myself very well. I wanted to lose some weight and be more active. I started by walking everywhere and I cut down on the fatty foods I was eating.

I read food labels carefully and I buy lean mince and low fat sausages. I love cheese but I have less of it and eat more fruit and vegetables with my meals. I do a lot of charity fundraising through my walks, and I can walk up nine flights of stairs.

I've lost nearly three stone in 20 months, I've lowered my cholesterol level and my doctor is really happy with my progress. If I can do it, anyone can!"

Whether you need to take cholesterol-lowering medicine depends not just on your cholesterol level but on your overall risk of heart and circulatory (cardiovascular) disease. The higher your risk, the more likely your doctor will recommend that you take cholesterol-lowering medicines, usually statins.

Even if you don't have high cholesterol, your doctor may still feel that you will benefit from cholesterol-lowering medicines if he or she thinks you are at still at high risk; for example, if you have several major risk factors for heart and circulatory (cardiovascular) disease (see below). On the other hand, if your cholesterol is slightly raised but you have no other risk factors, you might not be prescribed medication.

Your doctor is likely to prescribe medicines such as statins if you have one or more of these conditions:

- diabetes
- high blood cholesterol, particularly if you also have other risk factors – for example, high blood pressure or if you smoke
- familial hypercholesterolaemia (an inherited condition, see page 67)
- a previous heart attack or stroke
- angina or peripheral arterial disease (conditions involving hardening or narrowing of the arteries)
- previous bypass surgery or coronary stents (tubes inserted into your arteries to keep them open).

We explain more about the different types of cholesterol-lowering medicines on the next page.

Cholesterol-lowering medicines are a long-term and effective treatment. However, the right lifestyle is important too. Stopping smoking, eating a healthy diet, doing regular physical activity, controlling your weight and making sure your blood pressure is normal will all help to lower your cholesterol and protect your heart. If you are concerned, talk to your doctor or nurse about what changes you could make to your lifestyle to reduce your risk.

Statins

These are the main type of medicine used to reduce cholesterol.

Statins can reduce total cholesterol levels by more than 40% and levels of low density lipoprotein (a type of 'bad', non-high density lipoprotein) by more than 30%. They can increase 'good' high density lipoprotein by between 3% and 10%. Overall, they can cut the risk of heart attack or stroke by about a quarter.

Statins work by helping to stop the build-up of fatty deposits (atheroma) in your arteries. This is why most people who are at high risk of a heart attack, stroke or peripheral arterial disease (a build-up of fat in the arteries that restricts the blood supply to parts of the body), or who have diabetes, are prescribed a statin even if their cholesterol is normal.

Several statins are available in the UK. Many have been tested in long-term trials not only for their effect on cholesterol but also for their long-term safety. If you are at high risk of a heart attack, then the benefits of statins are likely to outweigh the risk of any side effects.

Your doctor will choose the best statin and dose for you, depending on your medical history and your target cholesterol level. He or she may change your statin if it doesn't lower your cholesterol enough. However, you should have your blood cholesterol and liver function tested before and after any such change to make sure that the new medicine works well for you.

Statins are not suitable for people with liver disease or for women who are pregnant or breastfeeding. If you're already taking statins and thinking of starting a family, speak to your doctor before stopping your medicines.

Some statins should be taken in the evening, because our bodies make most of our cholesterol over night while we are asleep.

If you are taking a statin called simvastatin, you should avoid drinking grapefruit juice or eating grapefruit. However, with other types of statin, you may be able to have a small amount of grapefruit or grapefruit juice. If you have any questions about statins and grapefruit, talk to your doctor or pharmacist.

Possible side effects of statins

Side effects of statins can include feeling sick, being sick, diarrhoea and headaches. A rare side effect is inflammation of the muscles (myositis). If you have any unexpected muscle pain, tenderness or weakness, you should tell your doctor. He or she may ask for a blood test and then change your statin or the dose.

Stories in the press can cause people to worry about their medication but statins are one of the most studied medicines available. Research, including studies that we have funded, has shown them to be very safe and effective. It is only natural to have concerns though, especially when there is so much negative coverage, particularly about side effects.

Over-the-counter statins

You can buy low-dose statins at some pharmacies without a prescription but they are not a substitute for prescription statins or for making lifestyle changes.

Other cholesterol-lowering medicines

Other types of medicines can be used to control cholesterol either instead of, or as well as, statins.

These are:

- fibrates
- medicines that bind bile acids
- ezetimibe
- PCSK9 Inhibitors.

A specialist may prescribe one of these if statins don't work for you or if you are not able to take statins for some reason.

Many of these medicines act by preventing the intestine from absorbing cholesterol. This, in turn, prevents cholesterol entering the bloodstream.

Fibrates

Fibrates are useful for people with high triglycerides. They may be prescribed with other medicines if you can't take statins. You will not usually be given fibrates if you are also taking statins (see page 56) except under strict medical supervision. You should not take fibrates if you are pregnant or have liver or kidney disease.

Medicines that bind bile acids

These medicines (also called 'bile-binding medicines' or 'bile-acid-binding resins') prevent what are known as bile acids, which the liver makes from cholesterol, from being re-absorbed into the bloodstream. The liver then makes up for the loss by converting more cholesterol into bile acids, so lowering the level of cholesterol in the blood.

Bile-binding medicines come in powder form or as granules or tablets. The powder and granules are taken immediately before or during a meal in water, fruit juice or yoghurt. They may make you feel fuller than usual at first but most people get used to this.

They are not absorbed into the body, so they can also be used safely by children and pregnant women under specialist medical supervision.

You will need to take any other medication at least an hour before or four hours after, your bile-acid-binding medicines. Ask your GP about the best times to take all your medicines.

Possible side effects

Some people get heartburn or constipation but usually only if they are on larger doses.

These medicines can interfere with the absorption of fat-soluble vitamins (vitamins A, D, E and K), so your doctor may advise you to take vitamin supplements.

Ezetimibe

Ezetimibe can be used with a statin or on its own, if you can't take statins for any reason. It helps to lower cholesterol by preventing the small intestine from absorbing it.

Ezetimibe can reduce low density lipoprotein (a type of "bad" cholesterol) by about 20% and when combined with low-dose statins, it can be even more effective.

Possible side effects

These can include headaches, fatigue, stomach pain and diarrhoea.

It's important to get your lifestyle right, as well as taking your medicines.

PCSK9 inhibitors

PCSK9 inhibitors are relatively new medications given by injection. They are known to significantly reduce non-HDL, 'bad' cholesterol, and may be used alone or together with statins. They are currently only recommended for people with what are known as lipid disorders (high levels of fatty substances in the blood, including cholesterol) whose cholesterol levels are not well controlled by other medicines such as statins or who can't tolerate statins.

Medicines to help reduce triglyceride levels

If your weight is under control and you drink within sensible limits and yet you still have high triglycerides, your doctor may prescribe fish oil supplements or fibrates.

If you're taking fish oil supplements that have not been prescribed, tell your doctor so that he or she can make sure they don't interfere with any other medicines you are taking, such as warfarin.

For more information on cholesterol-lowering medicines, see our booklet Medicines for your heart.

Metabolic syndrome

When someone has several of certain conditions at the same time, they are said to have metabolic syndrome, which increases their risk of coronary heart disease, stroke and diabetes.

You're considered to have metabolic syndrome if you're overweight, particularly if you have too much fat around your waist, and you have two or more of the following:

- high blood pressure
- high triglyceride levels
- low levels of HDL (the good cholesterol)
- a high blood glucose after fasting
- type 2 diabetes.

Pre-diabetes

Pre-diabetes is when your glucose levels are higher than normal but not high enough to be diagnosed as diabetes. Pre-diabetes increases the risk of developing type 2 diabetes. Lifestyle changes such as losing weight if you're overweight and doing more physical activity can delay or even prevent type 2 diabetes from developing.

Pre-diabetes is sometimes called borderline diabetes, impaired glucose tolerance or impaired fasting glucose.

Familial hypercholesterolaemia

About one in 250 people in the UK is believed to have a condition called familial hypercholesterolaemia, or FH, which can lead to exceptionally high levels of cholesterol. FH is genetic, which means it is passed on through families, and is caused by one or more altered genes.

People with FH have high levels of blood cholesterol from birth. Their body removes bad cholesterol from their blood only about half as well as it should. An adult with FH may have a total cholesterol level of between 7.5 and 12 mmol/L, and sometimes much higher. Children and young people may have lower levels but still usually above 6.7 mmol/L. Anyone who is thought to have FH should be referred to a specialist clinic for an assessment.

British Heart Foundation website

bhf.org.uk

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

Genetic Information Service

0300 456 8383

(A similar cost to 01 or 02 numbers.)
For information and support on inherited heart conditions.

Online community

community.bhf.org.uk

Share your experiences, stories, tips and ideas with other people like you in our online community.

Heart Helpline

0300 330 3311

(A similar cost to 01 or 02 numbers.)
For information and support about your heart condition and keeping your heart healthy.

Twitter

@TheBHF

Get our latest news and views directly into your Twitter feed.

Facebook

facebook.com/bhf

Join the conversation and get our latest news and updates on Facebook.

Familial hypercholesterolaemia

For more information on FH, how it's inherited and the treatment for it, see our booklet *Life with Familial hypercholesterolaemia*.

You can also get more information on FH from:

HEART UK – The Cholesterol Charity
7 North Road
Maidenhead
Berkshire SL6 1PE

Helpline: **0345 450 5988**
(Monday to Friday, 10am to 3pm. Calls are charged at a local rate.)

www.heartuk.org.uk
ask@heartuk.org.uk

Booklets and DVDs

To order our booklets or DVDs:

- call the BHF Orderline on **0870 600 6566**
- email **orderline@bhf.org.uk** or
- visit **bhf.org.uk/publications**

You can also download many of our publications from our website.

Our resources and services are free of charge, but we rely on donations to continue our vital work. If you'd like to make a donation, please call our donation hotline on **0300 330 3322** or visit our website at **bhf.org.uk/donate**

Heart Information Series

This booklet is part of the *Heart Information Series*. The booklets in this series are:

- Angina
- Atrial fibrillation (AF)
- Blood pressure
- Cardiac rehabilitation
- Caring for someone with a heart condition
- Coronary angioplasty
- Diabetes and your heart
- Having heart surgery
- Heart attack
- Heart rhythms
- Heart transplant
- Heart valve disease
- Implantable cardioverter defibrillators (ICDs)
- Keep your heart healthy
- Living with heart failure
- Medicines for my heart
- Pacemakers
- Reducing my blood cholesterol
- Returning to work
- Tests

Our services

For more information about any of our services, contact the BHF on **0300 330 3322** or visit **bhf.org.uk**

Nation of life savers

The BHF has a vision to create a nation of life savers. As part of that vision, we're doing everything we can to make sure the UK public know CPR and can use public access defibrillators. Join the fight for every heartbeat and help us save the lives of thousands of people across the UK every year. Find out more at **bhf.org.uk/cpr**

- **Heartstart** is a free, two-hour course where you can learn CPR and other emergency life saving skills.
- Our **Call Push Rescue** training kit training kit is available free to secondary schools and eligible community groups, and for a small fee to workplaces. It has everything you need to learn CPR, including a training DVD.

Heart Matters

Heart Matters is the BHF's free, personalised service offering information to help you lead a heart-healthy

lifestyle. Join today and enjoy the benefits, including *Heart Matters* magazine and access to online tools. Call the **Heart Matters Helpline** on **0300 330 3300**, or join online at **bhf.org.uk/heartmatters**

Heart Support Groups

Local Heart Support Groups give you the chance to talk about your own experience with other heart patients and their carers. They may also include exercise classes, talks by guest speakers, and social get-togethers. To find out if there is a Heart Support Group in your area, contact the **Heart Helpline** on **0300 330 3311**.

Help Shape the BHF – Heart Voices

Heart Voices is a growing network of heart patients who use their experiences to make sure our work meets the needs of patients. By signing up, you'll get the chance to shape the BHF by getting involved with anything from helping us to make new resources to informing our research. Visit **bhf.org.uk/heartvoices** for more information and to sign up.

Here we explain some common terms that you may come across, both in this booklet and elsewhere. See the main text for more detailed explanations.

Angina – the most common form of coronary artery disease, where the arteries are narrowed, so restricting the supply of oxygen-rich blood to the heart. The main symptoms are feelings of heaviness or tightness in the centre of the chest.

Atheroma or Atherosclerosis – a build-up of fatty deposits in the arteries.

Blood lipids – a medical term for all fatty substances in the blood.

Cardiovascular disease or CVD – a group of diseases affecting the heart and the circulation including; heart failure, atrial fibrillation and stroke.

Cholesterol – a fatty substance made by the body and found in the blood. At normal levels it is essential to health but too much can increase the risk of heart attack and stroke.

Coronary artery disease – a type of cardiovascular disease (see above) where the arteries supplying blood to the heart muscle become hard and narrow, increasing the risk of a heart attack.

Coronary heart disease – a type of cardiovascular disease (see above).

Coronary stent – a tube inserted into a narrowed or blocked coronary artery to restore blood flow to the heart muscle.

High-density lipoprotein or HDL – the "good" type of cholesterol that helps to keep down the overall level of cholesterol in the blood.

Lipid disorders – the name for a group of conditions where there is too much fat in the blood, such as cholesterol and triglycerides.

Lipoproteins – a combination of cholesterol and proteins. The proteins carry the cholesterol around the body in the bloodstream.

Low-density lipoprotein or LDL – a type of non-high density lipoprotein, or "bad" cholesterol (see below).

Non-high density lipoprotein or non-HDL – the "bad" type of cholesterol that increases the risk of a build-up of fatty deposits in the arteries and thus the risk of heart disease and stroke.

Peripheral arterial disease – also known as peripheral vascular disease or PVD. A condition where the build-up of fat in the arteries restricts the blood supply to certain parts of the body, usually the legs.

Triglycerides – another type of fatty substance found in the blood, which, like non-high density lipoproteins, increase the risk of heart disease and stroke.

HAVE YOUR SAY

We would welcome your comments to help us produce the best information for you. Why not let us know what you think? Contact us through our website **bhf.org.uk/contact**. Or, write to us at:

BHF Customer Services
Lyndon Place
2096 Coventry Road
Birmingham B26 3YU.

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THANK YOU

This booklet is part of the *Heart Information Series*. We distribute 2 million booklets from this series each year. Without your hard work and support the British Heart Foundation wouldn't be able to provide this vital information for people with heart conditions.

Donate to the fight at **bhf.org.uk/donate**

British Heart Foundation

For over 50 years our research has saved lives.

We've broken new ground, revolutionised treatments and transformed care.

But heart and circulatory disease still kills one in four people in the UK.

That's why we need you.

With your support, your time, your donations, our research will beat heart disease for good.

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FOR EVERY
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