

Patient information from the BMJ Group

Stroke, prevention

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Stroke, prevention

If you've had a stroke, you may be worried about having another one. But there are treatments that can lower your risk.

The treatments we talk about here are used to **prevent a second stroke** for people who've had a stroke or **mini-stroke** before. To read more, see [What treatments work for preventing another stroke?](#)

Stroke is a medical emergency, and someone who has a stroke will need urgent treatment as soon as possible after the symptoms start. To read about emergency treatments, and to find out more about what strokes are and how they happen, see our information on [Stroke, emergency care](#).

We've brought together the best research and weighed up the evidence about how to prevent strokes. You can use our information to talk to your doctor and decide which treatments will work best for you.

What increases the risk of a second stroke?

If you've had a stroke or a **mini-stroke**, you're at risk of having another one. Your doctor will probably want to know your stroke risk, because this helps determine what treatment you need.

If you've had a mini-stroke, your risk of having a full-blown stroke is highest in the first few days and weeks afterwards.^[1] It's very important to get treatment as soon as you can after a mini-stroke. Urgent treatment can stop you going on to have a stroke.^[2]

You're also more likely to have a stroke if you:

- Have **atrial fibrillation** (an irregular heartbeat)
- Have **heart failure** (your heart doesn't pump as well as it should)
- Have **high blood pressure**
- Are over 75

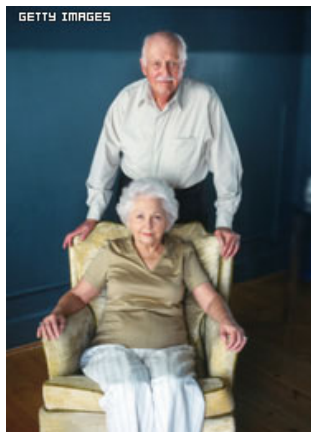
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- Have diabetes
- Have had a stroke or a mini-stroke before
- Binge drink. ^[3]

The more of these that apply, the more likely you are to have a stroke. For example, if you're 80, have already had two strokes, and have high blood pressure, your doctor may say you are at high risk of having another stroke.

What treatments work for preventing another stroke?

If you've had a stroke or a mini-stroke, you're at risk of another one. About 4 in 10 men who have had a stroke will have another one within five years. For women, this figure is more than 2 in 10.



You can have treatment to help stop you having another stroke.

A second or further stroke or mini-stroke often causes more damage than the first and is more likely to leave you disabled. The good news is that there are treatments that can help you lower your chances of having another one.

To find out more about why strokes happen and how they are treated, see our section on [Stroke, emergency care](#). Here, we discuss the treatments that can help prevent another stroke.

Key points about preventing another stroke

- Taking drugs to lower your blood pressure can help prevent another stroke.
- Taking aspirin every day can lower your chances of having another stroke.
- Taking drugs called statins to lower your cholesterol may make it less likely that you'll have another stroke.

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- If you have severe blockages in the blood vessels in your neck, having an operation to remove the blockages (called a carotid endarterectomy) can help prevent another stroke.
- Treatment to prevent strokes is different for people who have an irregular heartbeat (atrial fibrillation). An irregular heartbeat can cause blood clots. These can cause a stroke. You can lower your chance of having another stroke by taking anticoagulant drugs, which help prevent your blood clotting. These include warfarin, dabigatran, rivaroxaban, and apixaban.
- Treatments for preventing strokes make the most difference for people who are at high risk of having another stroke. To find out what increases a person's chance of having another stroke, see [Risk factors for having a second stroke](#).

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works. We've also looked at treatments to prevent a stroke for people who have an irregular heartbeat.

For help in deciding which treatment is best for you, see [How to make the best decisions about treatment](#).

We've looked separately at treatments to prevent a further stroke for people who've had one before, and treatments to prevent a further stroke for people who have an irregular heartbeat.

- [Treatments for people who have had a stroke or mini-stroke](#)
- [Treatments for people with an abnormal heartbeat \(atrial fibrillation\) who have had a stroke or mini-stroke](#)

If you're looking for information on emergency treatments for a stroke, see [What treatments work for a stroke?](#)

Treatment Group 1

Treatments for people who have had a stroke or mini-stroke

People who've had a stroke or mini-stroke often need treatment to prevent another.

Treatments that work

- [Drugs to lower blood pressure](#) : These are also called antihypertensive drugs. There are lots of different types. Your doctor may suggest diuretics, calcium-channel blockers, ACE inhibitors, angiotensin receptor blockers (ARBs), or beta-blockers. Many people will need a combination of drugs to control their blood pressure. [More...](#)

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- [Drugs to lower cholesterol](#) : Drugs called statins can lower cholesterol and also help prevent stroke. Some statins (and their brand names) are simvastatin (Zocor), atorvastatin (Lipitor), and rosuvastatin (Crestor). [More...](#)
- [Aspirin and other antiplatelet drugs](#) : These drugs work to stop blood clots forming. Clots can block blood vessels and lead to a stroke. Aspirin is the most common choice. Some other antiplatelet drugs (and their brand names) are clopidogrel (Plavix) and dipyridamole (Persantine). [More...](#)
- [Carotid endarterectomy](#) : This is an operation to remove blockages from your carotid arteries (these are the blood vessels that carry blood to your neck and head). [More...](#)

Treatments that need further study

- [Carotid angioplasty](#) : In this operation, a surgeon uses a tiny balloon to open up blocked arteries leading to your brain. [More...](#)

Treatments that are likely to be ineffective or harmful

- [Anticoagulants](#) : These drugs make it harder for blood to form clots. A common anticoagulant is called warfarin. If you have a normal heartbeat, the dangers of these drugs may outweigh any benefits. But if you have an irregular heartbeat, this treatment may help. See [Treatments for people with an abnormal heartbeat \(atrial fibrillation\) who have had a stroke or mini-stroke](#) . [More...](#)
- [Vitamin B supplements](#) : Some research has looked at whether combinations of different B vitamins could help prevent a stroke. [More...](#)

Treatment Group 2

Treatments for people with an abnormal heartbeat (atrial fibrillation) who have had a stroke or mini-stroke

If you have an irregular heartbeat (atrial fibrillation), blood doesn't always flow through your heart as smoothly as it should. This can lead to blood clots, and increase your risk of a stroke. Treatment can help to prevent blood clots.

The treatments we look at here are for people who have an irregular heartbeat and have already had a stroke. But people with an irregular heartbeat can still have a higher risk of a stroke, even if they've not had a stroke. To read more about treatments for people who have an irregular heartbeat but haven't had a stroke, see [Atrial fibrillation](#) .

Treatments that work

- [Anticoagulants](#) : These drugs make it harder for blood to form clots that can lead to a stroke. Examples of anticoagulants (and their brand names) include: warfarin, dabigatran (Pradaxa), rivaroxaban (Xarelto), and apixaban (Eliquis). [More...](#)

Treatments that need further study

- [Aspirin](#) : This drug works to stop blood clots forming. [More...](#)
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Treatments:

Drugs to lower blood pressure

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[How good is the research on drugs to lower blood pressure?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about drugs to lower your blood pressure, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Do they work?

Yes. If you've already had a stroke or **mini-stroke**, taking drugs to lower your **blood pressure** can reduce your chances of having another one.

What are they?

Drugs that lower your blood pressure lessen the force of your blood against the walls of your blood vessels. When doctors check your blood pressure, they're measuring how hard your blood pushes against the walls of your blood vessels as it moves through your body.

A blood pressure measurement has two numbers.

- The first number is the **systolic pressure**. This measures how hard your blood pushes on your blood vessel walls with each heartbeat as the heart tightens to pump out blood.
- The second number is the **diastolic pressure**. This measures the pressure of the blood flowing through the blood vessels as the heart relaxes between beats.

When doctors talk about blood pressure, they say the systolic number then the diastolic number. So your doctor might say that your blood pressure is '120 over 80'. This is written as 120/80. It means your systolic pressure is 120 mm Hg and your diastolic pressure is 80 mm Hg. (Blood pressure is measured in mm Hg. It stands for millimetres of mercury.)

It's normal for your blood pressure to rise and fall during the day. But if it stays high for a long time, then it's called high blood pressure. Your doctor will probably say you have high blood pressure if your blood pressure reading has been **at least 140 (top number)**

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over 90 (bottom number) for at least four months. ^[5] (This is written as 140/90.)
Another name for high blood pressure is **hypertension**.

To learn more, see [Understanding your blood pressure reading](#) in our section on high blood pressure.

Many drugs can lower blood pressure. They all work in slightly different ways. Doctors call these drugs **antihypertensives**.

The National Institute for Health and Care Excellence (NICE), which advises the government on NHS treatments, has written guidelines for doctors on drugs to lower blood pressure. They say that different groups of people should start on different types of drugs. ^[6] To read more, see [Guidelines for doctors on treating high blood pressure](#) .

We've listed some of the most common types of drugs used to lower blood pressure (with their brand names). You can find out more about each drug by looking at our detailed information on [treatments for high blood pressure](#) .

- **Diuretics:** These drugs are sometimes called water tablets because they work by flushing excess salt and water from your body through your urine. They include bendroflumethiazide (Aprinox, Neo-NaClex) and furosemide (Lasix).
- **ACE inhibitors:** ACE inhibitors stop a chemical in your body from narrowing your blood vessels. They include captopril (Capoten), enalapril (Innovace), and perindopril (Coversyl Arginine).
- **Angiotensin II receptor blockers:** These drugs (also called ARBs) work in a similar way to ACE inhibitors. They prevent narrowing of your blood vessels. These include candesartan (Amias), irbesartan (Aprovel), and losartan (Cozaar).
- **Beta-blockers:** These drugs slow your heart rate and make it beat less strongly. Types of beta-blocker include atenolol (Tenormin), propranolol (Inderal), and metoprolol (Lopresor).
- **Calcium channel blockers:** These drugs are sometimes called calcium channel antagonists. They help keep your blood vessels relaxed. They include diltiazem (Tildiem) and nicardipine (Cardene).

How can they help?

One large study found that if you've already had a stroke or **mini-stroke** , taking drugs to lower your blood pressure can **reduce your chance of having another** after about three years of treatment. On average, people in the study saw their systolic blood pressure fall by 8 mm Hg and their diastolic pressure fall by 4 mm Hg. ^[7]

The benefit of lowering your blood pressure holds true regardless of your age. It also doesn't matter whether your blood pressure isn't quite high enough to be called

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hypertension. In other words, if you've already had a stroke, it's worth treating your blood pressure **even if it is within the normal range.** ^[7] ^[8] Evidence suggests that it's safe for your diastolic blood pressure to drop as far as 80 mm Hg.

Overall, studies show that the drugs that reduce blood pressure the most are best able to prevent strokes. ^[7]

Guidelines for doctors say that diuretics, ACE inhibitors, and calcium channel blockers are more likely to prevent a stroke than beta-blockers. ^[6] A summary of studies also found that beta-blockers don't seem to have much effect on a person's risk of having another stroke. ^[9]

How do they work?

If you have high blood pressure, you're more likely to have a stroke. This is because the force of the blood, over time, can damage the walls of your **arteries** (the vessels that carry blood from your heart and around your body).

Scars can form on your artery walls, and your arteries can become hard and narrow. This makes it more likely that a blood clot will get stuck in an artery, blocking the flow of blood. If a clot cuts off the blood flow in a vessel that leads to your brain, you have a stroke. ^[10]

Doctors think that this is less likely to happen in people whose blood pressure is lower. And the evidence supports this. The higher your blood pressure, the greater your chance of having a stroke. About half of all people who have a **first stroke** have blood pressure higher than 160/95. ^[11] ^[12]

But many people who have strokes don't have high blood pressure. This is why researchers have looked at whether it's useful to treat blood pressure that isn't high in people who have already had a stroke. The evidence suggests that lowering your blood pressure can make you less likely to have another stroke, even if your blood pressure isn't especially high. This is probably because lowering your blood pressure means less wear and tear on your blood vessels. ^[11]

Can they be harmful?

The drugs that are used to lower blood pressure can cause side effects. These are usually mild. Your doctor may be able to reduce side effects by changing your dose or giving you a different drug. Some people find the side effects go away after they've been taking the drug for a few weeks.

Here's a summary of the main side effects of the different groups of drugs.

- **Diuretics.** Some people feel dizzy, feel sick, or get muscle cramps. Some men have erection problems. These side effects go when you stop taking the medicine. You may need to have checks on the levels of potassium, a mineral, in your blood.

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- **ACE inhibitors.** About 1 in 3 people get a dry cough, which can be annoying. Other possible side effects include dizziness, having too much potassium, and kidney problems.
- **Angiotensin II receptor blockers.** The most common side effect is dizziness. Some people (less than 5 in 100) also get sexual problems, a dry cough, or a slow heartbeat.
- **Beta-blockers.** The most common side effects are feeling tired, having cold hands and feet, and feeling sick. There's also a risk taking beta-blockers may increase your chances of getting diabetes.
- **Calcium channel blockers.** Side effects include headaches, feeling dizzy, swollen ankles, flushing red in the face, and having an uneven heartbeat. A type called verapamil can cause constipation.

How good is the research on drugs to lower blood pressure?

There's good evidence that lowering your **blood pressure** can make you less likely to have a stroke, especially if you've had a stroke or **mini-stroke** already.

We know this from the results of one large summary that looked at the results of lots of smaller studies.^[7] (This type of summary is called a **systematic review**.) The review found that if you've had a stroke or a mini-stroke, then taking drugs to lower your blood pressure will cut your chances of having another.

The studies show that you don't have to have high blood pressure to be helped by these drugs. Overall, the drugs that reduced blood pressure most were the best at preventing further strokes.^[7]

But there is some evidence that beta-blockers are not as good at preventing stroke as other treatments that lower blood pressure.^[13] One summary of the research (a **systematic review**) found that people taking beta-blockers were just as likely to have another stroke as people taking a dummy treatment (a **placebo**).^[9]

Drugs to lower cholesterol

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[How good is the research on drugs to lower cholesterol?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about drugs to lower your cholesterol, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Do they work?

Yes. If you've had a stroke, taking a drug called a **statin** can lower your chance of having another. This is the case even if your cholesterol level is normal to start with.

Changing your diet may also help lower your cholesterol. However, research does not show that following a diet reduces your risk of a stroke. For more information on diet and cholesterol, see [What treatments work for high cholesterol?](#) in our section on high cholesterol.

For more information about measuring cholesterol in your blood, see [How do doctors diagnose high cholesterol?](#)

What are they?

Lots of drugs can lower cholesterol. We've listed the most common ones.

Statins

Statins are by far the most commonly used treatments to reduce cholesterol. They can reduce your risk of having a heart attack or a stroke. They do this by decreasing your levels of 'bad' cholesterol (called **LDL cholesterol**) and harmful fats called **triglycerides**.

Statins come as tablets or capsules. The main ones (with brand names in brackets) are:

- Atorvastatin (Lipitor)
- Fluvastatin (Lescol)
- Pravastatin (Lipostat)
- Rosuvastatin (Crestor)
- Simvastatin (Zocor, Simzal).

Most of these drugs need to be prescribed by a doctor. They are usually given to people with a high risk of having a heart attack or a stroke.

You can buy a low dose (10 milligrams) of simvastatin over the counter at pharmacies. But if you've already had a stroke or **mini-stroke**, you probably need a higher-dose statin.

There is also a tablet that contains simvastatin and another drug called ezetimibe. Its brand name is Inegy. Ezetimibe is a type of drug called a **cholesterol absorption inhibitor**. Ezetimibe can reduce cholesterol levels, but there are no findings that it reduces the risk of stroke. ^[14] ^[15]

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Fibrates

These drugs lower levels of triglycerides and raise levels of 'good' cholesterol (called HDL cholesterol). Some examples (with their brand names) are:

- Fenofibrate (Lipantil)
- Gemfibrozil (Lopid).

Resins

These drugs help lower levels of 'bad' (LDL) cholesterol in the blood by helping the body to use up more of it. The most common one is cholestyramine (brand names Questran and Questran Light).

How can they help?

If you can cut your 'bad' (LDL) cholesterol, then it reduces your chances of having another stroke. One study shows that every 10 percent drop in your level of bad cholesterol reduces your chance of having another stroke by 15 percent. ^[16]

If you've already had a stroke or mini-stroke, taking a statin for about three years can cut your chance of having another. ^{[16] [17] [18] [19]} In one study: ^[18]

- About 25 in 100 people taking statins had a second stroke in the five years after their first.
- About 30 in 100 people taking a dummy treatment (a placebo) had a second stroke.

Taking a statin also seems to cut your risk of having another stroke, even if your cholesterol is normal to start with. ^[20]

Statin are the only cholesterol-lowering drugs that seem to cut your risk of having another stroke. Taking other drugs (such as fibrates or resins) or eating a special diet may bring down your cholesterol, but there's no evidence that these treatments do anything to cut your chances of having a stroke. ^{[21] [22] [23]}

How do they work?

Lowering the 'bad' (LDL) cholesterol in your blood makes your arteries less likely to become hard and narrow (a condition called atherosclerosis).

If you have atherosclerosis, layers of fat (called **plaques**) build up in your arteries. If these fatty areas get large enough to block an artery, or if a blood clot lodges in an artery that has become narrowed by plaque, blood can't get through the vessel. When this happens in an artery in your neck or head, it can cut off the flow of blood to part of your brain, causing a stroke.

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Statins work by interfering with the body's ability to make cholesterol.

Statins also lower levels of triglycerides, another fatty substance in the blood. This also helps prevent atherosclerosis.

Can they be harmful?

All drugs can cause side effects, including statins. But side effects don't seem to be a big problem with this treatment.

One study looked at 35,000 people. It found that people taking statins were no more likely to have side effects than people taking a dummy treatment (a placebo).^[24]

However, other studies have found that some people taking statins do get side effects. One review of the research found that treating 1,000 people with statins would prevent 37 heart attacks or strokes, but would cause side effects in five people.^[25]

Two of the more serious side effects that can happen with statins are liver damage and muscle pain.

Liver damage

Sometimes people taking statins have an increase in the amount of an enzyme called transaminase in their liver. If the level of this enzyme goes up, it can mean the liver is not working as well as it should.

The main job of the liver is to remove poisons (toxins) from the body. If the liver doesn't do this job, then poisons can build up in the body and lead to liver failure. If the level of transaminase rises to three times the normal level, then your doctor may take you off the statin.

Your doctor should check that your liver is working properly before you start taking a statin, and again after you've been taking it for one month to three months.^[26]

Muscle pain and muscle damage

These side effects aren't common in clinical trials. Some people who take statins get pain in their muscles, and a few actually get muscle damage, although this is rare. If you have new muscle pain after starting statins, you should tell your doctor.

Studies so far suggest that about 1 in 20 people may get muscle pain while taking statins.^[27] But serious muscle damage is much less common, affecting less than 100 in 35,000 people in one review of the evidence.^[24]

One study from the US has shown that Asian people who took rosuvastatin had twice as much of the drug in their blood as white people. This suggests that Asian people may not clear the drug from their body as quickly as other people. And they may not need such a big dose to get the same effect. In the US, doctors have been advised to start

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Asian people on a dose of 5 milligrams a day.^[28] Asian people should not take more than 20 milligrams a day.^[26]

Muscle breakdown

Rarely, people taking statins get a serious kind of muscle damage, called rhabdomyolysis. If this happens, muscle tissue starts to break down. It breaks down into chemicals that enter your bloodstream. These chemicals are harmful to your kidneys, and can even cause your kidneys to stop working. If your kidneys stop working, your life may be in danger.

In the UK, there have been six suspected cases of muscle breakdown in people taking a high dose of rosuvastatin.^[4]

There's no evidence that rosuvastatin is more likely to cause the problem than other statins, but doctors have been warned to be careful about giving people high doses. A high dose is 40 milligrams a day or more. This dose is only recommended for people at a high risk of a heart attack or stroke. For more details see [Advice about rosuvastatin \(Crestor\)](#).

There's also a higher risk of muscle breakdown if you take simvastatin together with another drug called amiodarone.^[29] Amiodarone is used to treat irregular heartbeats.

Having another type of stroke

Statins reduce your chance of having a stroke caused by a blocked artery (an ischaemic stroke). However, doctors worry that these drugs may make it more likely you'll have a stroke caused by bleeding in your brain (a haemorrhagic stroke).

Haemorrhagic strokes are more dangerous than ischaemic strokes, and more people die from them. However, one study involving more than 90,000 people found that taking a statin **did not increase the risk of bleeding in the brain.**^[16]

The drug atorvastatin may be less suitable for people who are at risk of a stroke caused by bleeding in the brain.^[30] One study found that people taking atorvastatin did have a higher risk of this kind of stroke than people taking a dummy treatment.^[17] Make sure you talk to your doctor about the risks and benefits of atorvastatin, especially if you've had a haemorrhagic stroke before.

Kidney damage

Some people who have taken statins have had kidney damage or kidney failure (when the kidneys stop working). But the US Food and Drug Administration (FDA), which checks the safety of drugs in the US, is not sure whether the kidney problems are due to taking the statin or whether the people would have got kidney problems anyway.^[28] Many people who take statins are at increased risk of kidney damage because of other conditions they have, such as diabetes and high blood pressure. The FDA is keeping a close watch to see what happens to people who take statins.

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If you get a fever, have dark urine, vomit, or feel sick, you should see your doctor as soon as possible. ^[31]

Other side effects

These side effects have been reported among people taking statins, although they are not common:

- Sleep disturbances, such as insomnia and nightmares
- Short-term memory loss
- Sexual problems (such as being unable to get an erection)
- Depression
- Interstitial lung disease. This is when tissue in the lungs becomes inflamed, making it hard to breathe. If you have breathing problems while taking statins, see your doctor.

The Medicines and Healthcare Products Regulatory Agency (MHRA), which monitors the safety of drugs in the UK, says patients should be warned about these possible side effects when taking any of the statins used in the UK. ^[32]

The MHRA has also warned that statin therapy is associated with an increased risk of developing diabetes, but the risk is very small. ^[33]

Other side effects sometimes mentioned include headaches, stomach upsets, and feeling tired. However, these symptoms are very common. We don't know for sure that they're caused by statins. ^[34]

How good is the research on drugs to lower cholesterol?

There's good evidence that taking a drug called a statin can reduce your chance of having another stroke if you've had one already, or had a **mini-stroke** .

We found one review that looked at the results of 42 studies, involving more than 120,000 people. Some of the people had already had a stroke and some hadn't. ^[16] ^[19] Overall, it found that statins cut the risk of a stroke. One study in the review looked only at people who had already had a stroke, and the results were the same. ^[18]

Other studies have found that statins are the only cholesterol treatments that help prevent strokes. ^[21] ^[22] ^[35] One other review found that statins can cut your risk of having a stroke even if your cholesterol levels are normal. ^[20]

Aspirin and other antiplatelet drugs

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[How good is the research on aspirin and other antiplatelet drugs?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about aspirin and other antiplatelet drugs, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Do they work?

Yes. If you've already had a stroke or **mini-stroke**, taking aspirin every day can lower your chances of having another. Or you can take aspirin plus another drug called dipyridamole.

Some people are **allergic** to aspirin or have a bad reaction to it. If you can't take aspirin, you can lower your chances of having a stroke by taking a drug that works in a similar way, such as clopidogrel.

What are they?

Aspirin is one of a group of drugs called **antiplatelet drugs**. These drugs help prevent blood clots, which can sometimes block blood vessels and cause a stroke. Other antiplatelet drugs (with their brand names) are:

- Clopidogrel (Plavix)
- Dipyridamole (Persantin, Persantin Retard)
- Dipyridamole with aspirin (Asasantin Retard).

If you have a stroke caused by a blocked blood vessel (an **ischaemic stroke**), your doctor may give you a high dose of aspirin as part of your emergency care. When you leave hospital, your doctor may advise you to take a daily dose of aspirin as part of your ongoing treatment.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors what treatments should be prescribed on the NHS, says that anyone who has had a stroke caused by blocked blood vessels (an ischaemic stroke) or a **mini-stroke** should get a combination of dipyridamole and aspirin for two years.^[36] After two years, or if you cannot take the combination treatment because of side effects, you should be treated with a low dose of aspirin.

If you can't take aspirin (say, because you are allergic to it or you have had indigestion due to aspirin), you should be treated with clopidogrel.

How can they help?

If you've already had a stroke or a **mini-stroke**, taking an antiplatelet drug (such as aspirin) can reduce your chance of: ^[37] ^[38]

- Having another stroke
- Having a heart attack
- Dying from a stroke or heart attack.

Clopidogrel prevents strokes at least as well as aspirin, and may even work slightly better. ^[37] ^[39]

The combination of aspirin and dipyridamole works better than aspirin alone at preventing strokes and heart attacks, and deaths from a heart attack or stroke. ^[40] One big study found the chances of having another stroke or a heart attack, or dying from a stroke, fell from 17 in 100 to 14 in 100 for people who took aspirin and dipyridamole together. ^[41]

But adding a third drug, clopidogrel, doesn't seem to help. ^[42] And taking aspirin and clopidogrel together doesn't seem to be any better than either drug on its own. ^[43] ^[44]

For most people, lower doses of aspirin (as low as 75 milligrams a day) work as well as high doses. ^[37] ^[45]

The Food and Drug Administration (FDA), the body that checks the safety of drugs in the United States, says that taking ibuprofen with low doses of aspirin can make the aspirin less effective. ^[46] This means that if you take ibuprofen **regularly** together with aspirin, the aspirin may not reduce the risk of another stroke or heart attack so well.

Ibuprofen is a type of painkiller called an **NSAID**. NSAIDs are often used to treat conditions where there is pain and inflammation, such as arthritis. The FDA says that other NSAIDs may also stop aspirin working properly.

At the moment, doctors in the UK have not been given any guidance about using these two drugs together. US guidance suggests taking your aspirin at least half an hour before taking ibuprofen.

How do they work?

Platelets are cells in your blood that form clots to stop the bleeding when you cut yourself. Usually they do this without getting in the way of normal blood flow. In some people, however, the platelets become **activated**, which means they are more likely to stick together. When this happens, they can form clots that can block blood vessels. If a clot blocks one of the blood vessels leading to your brain, it can cause a stroke.

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Activated platelets also release chemicals that make blood vessels tighten up and become narrower. This process is called **vasoconstriction**. This narrowing can also cut back the blood flow to your brain and make a stroke more likely.

Some medical conditions can activate platelets, such as **diabetes** and **high blood pressure**. Smoking can also activate platelets. Your platelets may be activated for many years before you have a stroke. ^[47]

Antiplatelet drugs work by stopping platelets sticking together and forming clots. Aspirin works in a slightly different way to clopidogrel. So taking more than one drug at a time may lower the odds of having a stroke more than taking one drug alone. ^[47] ^[48]

Can they be harmful?

Most people who are at risk of having a stroke and who take antiplatelet drugs will have to use these drugs for the rest of their lives. The biggest worry about taking aspirin or another antiplatelet drug for a long time is that this treatment can cause dangerous bleeding (called a **haemorrhage**), especially in your brain or stomach.

Normally, platelets plug up any holes in the blood vessels, stopping bleeding before it becomes serious. Antiplatelet drugs make the platelets less sticky and less able to repair any holes. This makes bleeding more likely anywhere in the body.

However, there's only a very small chance you'll have bleeding. Experts agree that the risk is worth taking, because the benefits of treatment far outweigh the possible harmful effects. ^[37]

Aspirin has other common side effects, including causing upset stomachs and indigestion. The more aspirin you take, the more likely you are to have these symptoms. There's some evidence that clopidogrel is less likely than aspirin to cause stomach problems, including indigestion, **stomach ulcers**, and bleeding. But clopidogrel is more likely to cause a rash or **diarrhoea**. ^[37] ^[39] Some people taking dipyridamole get throbbing headaches. ^[49]

For people who get stomach problems when they take aspirin, taking a drug called a proton pump inhibitor (PPI) such as omeprazole or lansoprazole as well as aspirin may help. ^[50] These drugs work by reducing the amount of acid in your stomach and may be used to protect against heartburn (also called acid reflux or **GORD**) and stomach ulcers. Other PPIs include pantoprazole (Protium) and esomeprazole (Nexium).

Clopidogrel may not work as well with PPIs. Research shows these drugs may stop the body from breaking down clopidogrel properly, and doctors have been advised to avoid using PPIs with clopidogrel. ^[51]

How good is the research on aspirin and other antiplatelet drugs?

There's very good evidence that aspirin and other antiplatelet drugs help prevent strokes.

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A large number of studies have looked at whether these treatments work for people at high risk of having a stroke or **mini-stroke** (this includes people who have already had a stroke or mini-stroke, people who have had a heart attack or have another heart condition, and people with **diabetes**).^[37] ^[38] The results have shown time and time again that antiplatelet drugs can lower people's chances of having a stroke.

A big summary of the research shows that taking dipyridamole as well as aspirin works better than taking aspirin alone, to reduce the chance of having another stroke, having a heart attack, or dying from a stroke.^[41]

Research also shows that lower doses of aspirin (as low as 75 milligrams a day) are as good at preventing strokes as higher doses.^[37] For people who can't take aspirin, the drug clopidogrel works just as well.^[37] ^[39]

Carotid endarterectomy

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[How good is the research on carotid endarterectomy?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about carotid endarterectomy, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Does it work?

Yes. But it only works for some people. The benefits depend on how badly blocked your arteries are.

- If you've already had a stroke or **mini-stroke**, and if blood vessels that lead to your brain are badly clogged up with fatty deposits, having surgery to remove the blockage can lower your chances of having another stroke. But if these vessels are almost totally blocked, the operation may not help.
- If the blockage in these blood vessels is not very severe, having surgery probably won't help and may cause a stroke rather than prevent one.

What is it?

Carotid endarterectomy is an operation to remove fatty deposits (called **plaques**) from inside the arteries in your neck. These arteries, which carry blood to your brain, are called the **carotid arteries**.

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Plaques make your arteries hard and narrow, so blood can have trouble flowing through them. Doctors call this condition **atherosclerosis**. Blood clots can form or get stuck in the narrowed arteries.

If these blockages cut off or greatly reduce the blood supply to your brain, you'll have a stroke or **mini-stroke**.

Some people don't know they have narrowing of their arteries until they have a stroke or mini-stroke. Others find out by chance, during a routine health check. Your doctor may be able to tell if your neck arteries are narrowed by listening to the sound of your pulse through a **stethoscope** placed on your neck. If your doctor thinks there is narrowing, you may be sent for more [tests](#).

Doctors call this sort of narrowing **stenosis**. You can have mild, moderate, or severe stenosis.

- **Mild stenosis** means that less than 50 percent of your artery is blocked.
- **Moderate stenosis** means that 50 percent to 69 percent of your artery is blocked.
- **Severe stenosis** means that 70 percent or more of your artery is blocked.

Your chance of having another stroke depends on how much your arteries are narrowed and how healthy you are overall. Before you and your doctor decide whether you should have this operation, you need to know how narrow your arteries have become. If you've already had a stroke, your doctor will also check to see whether the stroke was in a part of your brain that gets blood from a blocked artery. If so, it's likely that the blocked artery led to the stroke.

To do the operation, the surgeon makes a cut in your neck. The surgeon opens up the blocked artery, removes the plaque, and stitches your artery closed again. If your artery is in poor condition, the surgeon may remove it and replace it with a blood vessel from elsewhere in your body. If the operation takes a long time, the surgeon might use a machine to keep the blood flowing to your brain. How long this operation takes depends on the amount of blockage, your age, and your general health.

How can it help?

If you've already had a stroke or **mini-stroke**, the chance that carotid endarterectomy will help prevent another stroke depends on how severe your blockage is. ^[52]

- If your arteries are almost completely blocked, the operation is unlikely to help.
- If you have a severe blockage (your artery is at least 70 percent blocked), this operation can help. It halves your chance of having another stroke in the next five to eight years.

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- If you have a moderate blockage (your artery is 50 percent to 69 percent blocked), this operation can help. It can reduce your chances of having another stroke by about one-third.
- If you have a mild blockage (your artery is 30 percent to 49 percent blocked), this operation is unlikely to help.
- If you have a very mild blockage (your artery is less than 30 percent blocked), this operation can actually increase your chances of having another stroke.

You're more likely to do well after surgery if: ^[53]

- You've had a stroke in the past two weeks
- You've had a full stroke and not just a mini-stroke
- You're a man (women do less well after this kind of surgery, maybe because their blood vessels are smaller and more difficult to operate on)
- You're older (we don't know exactly how old, but possibly over 70).

If you have severe narrowing in your carotid arteries but have not yet had a stroke or mini-stroke, this operation will probably help you. ^[54] However, the benefit is likely to be small. In studies of carotid endarterectomy in people who hadn't had a stroke before:

- About 6 in 100 people had a stroke or died in the next three or four years if they had drug treatment
- About 4 in 100 people had a stroke or died in the three or four years after surgery.

Some research suggests that although older people may do well after surgery, the operation itself could be riskier if you're older. ^[55]

How does it work?

If you have a blockage in an artery that leads to your brain, it's more likely that you'll have a stroke. This is because the blockage narrows your artery, so it's harder for the blood to get through. And small clots (called emboli) can break off from the main blockage and get stuck in small blood vessels in your brain (this is called an embolism).

If the blockage gets bigger or if a clot gets stuck in the small blood vessels, you could have a stroke. So it makes sense that clearing this blockage would make you less likely to have a stroke.

Can it be harmful?

Having a carotid endarterectomy can actually cause a stroke. In fact, 7 in 100 people who have this surgery have a stroke within the first 30 days.^[52] And 1 person in 100 dies within the first 30 days.^[52]

Still, if your carotid artery is severely blocked (more than 70 percent blocked), the chance that the blockage will cause another stroke is higher than the chance that you'll have a stroke from having surgery. Overall, then, you're likely to benefit from the operation.

But if your arteries are only slightly blocked (less than 50 percent blocked), your chances of having a stroke may be higher with surgery than without. For this reason, your doctor will probably recommend that you have this surgery **only if the blockage in your artery is severe**.

Having surgery can also cause some other problems (called complications).^[56]

- Your wound can become infected. This happens to 3 in 100 people who have this surgery.
- A pool of blood (**haematoma**) can collect at your wound. This happens to 5 in 100 people who have this surgery.
- Nerves can be injured during the surgery. Up to 7 in 100 people get this problem.

It's especially important to consider the risks of having surgery if you haven't had a stroke before. Doctors are concerned that doing surgery on people just because they have narrowed neck arteries may cause more strokes than it prevents. For this reason, doctors are cautious about using this type of surgery in people who haven't already had a stroke or **mini-stroke** , especially if the narrowing of the arteries is not very great.^[57]

How good is the research on carotid endarterectomy?

Evidence for people who have already had a stroke

There's good evidence from one large summary of the research (called a **meta-analysis**) that people with severe or moderate blockages in their **carotid arteries** can lower their chances of having another stroke with an operation called carotid endarterectomy. But surgery will probably do more harm than good for people whose arteries are almost completely blocked or only slightly blocked.^[52]

Evidence for people who haven't had a stroke

There's some good evidence to show that if you haven't had a stroke but you have severely blocked arteries, then surgery can reduce your chances of having a stroke. But even without surgery, your risk of having a stroke is much smaller than it is for someone

who has already had a stroke. We need more research to know for certain whether surgery would be worth the risk. ^[58]

Surgery may be more risky for women who haven't had a stroke than it is for men who haven't had a stroke. ^[59]

Carotid angioplasty

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[How good is the research on carotid angioplasty?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about carotid angioplasty, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Does it work?

We're not sure. If you've had a stroke because of a blockage in an **artery** that leads to your brain, carotid angioplasty may help prevent another stroke. This operation lets a surgeon clear a blocked artery from the inside. So far, though, there is not enough good research to say for sure whether this operation helps. Also, the operation has risks.

What is it?

Carotid angioplasty is an operation to open up a clogged artery in your neck. These arteries, which carry blood to your brain, are called the **carotid arteries**.

Arteries anywhere in the body can become clogged with fatty deposits (called **plaques**). Plaques make your arteries hard and narrow, so blood may have trouble flowing through them. Doctors call this condition **atherosclerosis**. You might hear it referred to as 'hardening of the arteries'.

Plaques can trap some types of blood cells and debris carried in the blood. This narrows your arteries even further. Clots can form or get stuck in the narrowed parts. If these blockages stop blood reaching an organ, that organ won't be able to work properly. If a blockage in a carotid artery cuts off or greatly reduces the blood supply to your brain, you'll have a stroke or **mini-stroke**.

Doctors have used angioplasty for many years to open up narrowed blood vessels that supply the heart, **kidneys**, and legs. More recently, doctors have used the operation to open the arteries in the neck.

During the operation, the surgeon puts a flexible tube into an artery in the **groin**. The surgeon threads the tube through the body's blood vessels until it reaches the blocked artery. The tube has a tiny balloon at the end. The surgeon positions the end of the tube in the narrowed part of your artery and inflates the balloon. This opens up the narrowed

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area. Before removing the tube, the surgeon might leave a small wire mesh cylinder (called a **stent**) in your artery to keep it open.

How can it help?

There hasn't been much research on carotid angioplasty. For now, we can't say whether this operation will reduce your chances of having a stroke.

We don't know enough about how carotid angioplasty compares with having an operation called **carotid endarterectomy**. In that operation, a surgeon cuts open the blocked artery to remove the plaque.

In some studies, the two kinds of surgery worked just as well as each other.^{[60] [61] [62] [63] [64] [65] [66] [67]} But in other studies, people did better after endarterectomy than after angioplasty.^[68]

How does it work?

If you have a blockage in an artery that leads to your brain, it's harder for the blood to get through. If the blockage gets bigger or a blood clot gets stuck in the narrowed artery, you could have a stroke. Clearing the blockage makes it less likely that you'll have a stroke.

Can it be harmful?

Doctors are still very careful about using carotid angioplasty. That's because the angioplasty operation might push some of the plaque further up your artery, towards your brain. This could cause a complete blockage and stroke.

Doctors are concerned that carotid angioplasty may be less safe than carotid endarterectomy.

The research about the relative safety of these operations is not yet clear.

One study found that carotid angioplasty is **at least as safe** as carotid endarterectomy. People who had carotid angioplasty were actually less likely to have certain problems.

- About 7 in 100 people who had carotid endarterectomy had nerve damage afterwards, compared with none of the people who had angioplasty.^[60]
- Nearly 7 in 100 people who had carotid endarterectomy had a serious **haematoma** (a pool of blood collecting where a blood vessel has been cut) in their groin or neck. This happened to just over 1 in 100 people who had angioplasty.^[61]

Another study also found that angioplasty is as safe as carotid endarterectomy.^[62] But one study found that angioplasty is more risky. It found that people given angioplasty were more likely to have a stroke or die within a year than people given a carotid

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endarterectomy.^[68] In the UK, this operation is still being tested. It is not used routinely.^[69]

How good is the research on carotid angioplasty?

There's not enough evidence to say whether carotid angioplasty helps prevent strokes. So far, two summaries of the research (called [systematic reviews](#)) and several high-quality studies (called [randomised controlled trials](#)) have looked at this question.^[61] ^[62] ^[65] ^[66] ^[67] ^[70] ^[71]

The summaries of the research and some of the studies found that angioplasty worked just as well as [carotid endarterectomy](#) . But two other studies found that people given angioplasty were more likely to have a stroke than those given carotid endarterectomy.^[68] ^[72]

Vitamin B supplements

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[How good is the research on vitamin B supplements?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about vitamin B supplements, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Do they work?

Probably not. Combinations of B vitamins don't seem to work, and the B vitamin folic acid on its own doesn't seem to help either.

What are they?

Vitamins are nutrients that your body needs to work properly. There are several types of vitamin B. In some of the research on preventing a stroke, people took a tablet containing three B vitamins. In other research, people took only folic acid. The three vitamins that have been looked at in clinical trials were:

- Vitamin B6. This is found in several foods, including pork, chicken, bread, soya beans, peanuts, milk, and potatoes^[73]
- Vitamin B12. This is found mainly in animal products, such as meat, dairy products, and eggs. There's also some vitamin B12 in yeast extracts, such as Marmite^[74]

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- Folic acid, also called vitamin B9. The natural form of this vitamin, found in foods, is called folate. Small amounts of folate are found in lots of foods. Good sources are broccoli, Brussels sprouts, peas, chickpeas, and brown rice. ^[75]

The supplement used in some studies contained 50 milligrams (mg) of vitamin B6, 1 mg of vitamin B12, and 2.5 mg of folic acid.

How can they help?

It is unlikely that they can help. A summary of 12 studies found that taking B vitamins worked no better than taking a dummy treatment (a placebo) at preventing strokes.

One study looked at more than 5,000 women. ^[76] They were followed for seven years, and took either a combination of B vitamins or a dummy treatment (a placebo).

The researchers looked at the number of people who had a stroke. There wasn't much difference between people taking B vitamins and people taking a placebo. About 3 in 100 people had a stroke over the seven years, whether they took B vitamins or a placebo.

Taking folic acid (vitamin B9) on its own is unlikely to lower your chances of having another stroke. A summary of eight studies found that taking folic acid didn't seem to work any better than taking a placebo. ^[77]

How do they work?

High levels of a chemical called **homocysteine** in your blood may play a part in increasing your risk of a heart attack or stroke. Vitamin B supplements help reduce the levels of this chemical. So researchers thought B vitamins might also protect against strokes.

The research on vitamin B doesn't seem to show any benefits.

Can they be harmful?

The research doesn't give much information about side effects.

Taking very high doses of vitamin B6 (more than 200 milligrams a day) can lead to nerve problems and a loss of feeling in your arms and legs. ^[73] Most of the time, these side effects go away when you stop taking these vitamin supplements. The dose that causes this side effect is much higher than the dose used in the research, and higher than the amount found in most vitamins you can buy.

How good is the research on vitamin B supplements?

We can't say for certain whether or not vitamin B supplements help to prevent strokes. The research so far suggests that combinations of three B vitamins probably don't help, and that folic acid (vitamin B9) on its own probably does not reduce the risk of stroke either.

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A big study looked at more than 5,000 women who took three B vitamins or a dummy treatment (a [placebo](#)).^[76] The risk of having a stroke was roughly the same for everyone, whether or not they took the B vitamins.

Folic acid on its own did not reduce the risk of stroke in one summary of research findings. The summary, from eight studies with 16,841 people, found that people who took folic acid were as likely to have a stroke as those who did not.^[77]

Anticoagulants

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[How good is the research on anticoagulants?](#)

This information is for people who have had a stroke or mini-stroke. It tells you about anticoagulants, a treatment used for stroke prevention. It is based on the best and most up-to-date research.

Do they work?

Probably not. **If your heartbeat is normal**, then taking an anticoagulant such as warfarin is unlikely to lower your chances of having another stroke. In fact, taking this kind of drug may increase your risk of dying from bleeding in your brain.

But if you have an irregular heartbeat, and you've already had a stroke or [mini-stroke](#), taking an anticoagulant will lower your chances of having another stroke. For more information, see [Anticoagulants for people with an abnormal heartbeat](#).

What are they?

Anticoagulants are drugs that help prevent clots forming in the blood. You can take them as injections, as a liquid, or as tablets or capsules. Here, we look only at tablets, capsules and liquids, because they're what your doctor might prescribe to help protect you from a stroke. Doctors use injected anticoagulants as an emergency treatment for strokes. To learn more, see [Anticoagulants](#) in our section on emergency care for strokes.

Some people call these drugs blood thinners, but that isn't really what they do. They can't remove clots from the blood. However, they can stop clots getting bigger, and they can prevent new clots forming. There are a few different types of anticoagulant. The most common is warfarin.

How can they help?

For most people, anticoagulants don't help. If your heartbeat is normal (that is, you don't have [atrial fibrillation](#)) and you've had a stroke, then taking an anticoagulant won't lower your chances of having another stroke.^[78] ^[79]

How do they work?

Anticoagulants change the way that blood cells stick together to form clots. They can't remove clots that have already formed. But they can stop clots getting bigger, and they can stop new clots forming. If a clot forms in a blood vessel in your brain or in a blood vessel leading to your brain, this can cause a stroke.

If you've already had a stroke or **mini-stroke** because a clot blocked a blood vessel in your brain, there's a strong chance this could happen again. This is why your doctor might prescribe anticoagulants to stop clots forming or growing.

Can they be harmful?

Yes. If your heart beats normally (you don't have **atrial fibrillation**), taking an anticoagulant can make it more likely that you'll have bleeding that doesn't stop (a **haemorrhage**). When this happens in your brain, it's called a **haemorrhagic stroke**. Dangerous bleeding can also happen elsewhere in your body, such as in your stomach. ^[78] ^[79] ^[80]

Here are the risks you face if you have a normal heartbeat and you take an anticoagulant. ^[78] ^[79] ^[76]

- You're more likely to die from bleeding in your brain than someone who doesn't take an anticoagulant. Over about two years, 3 in 100 people taking an anticoagulant died of bleeding in the brain in studies. This compared with 1 in 100 people not taking an anticoagulant.
- You're also more likely to have dangerous bleeding somewhere else in your body (for example, in your stomach), compared with someone who doesn't take an anticoagulant. In studies, over two years, nearly 7 in 100 people taking an anticoagulant got bleeding. This compared with nearly 2 in 100 people who didn't have this treatment.
- You **shouldn't take anticoagulants if you are or could be pregnant**. They can harm your baby, especially if you take them during the first and last three months of pregnancy. ^[81]

How good is the research on anticoagulants?

The evidence is fairly strong that, for most people, taking anticoagulant drugs will not cut their risk of having another stroke. The only people who do benefit are those with an [abnormal heartbeat](#) called **atrial fibrillation**.

We found two large summaries of the results of the research (**systematic reviews**) and one large study. ^[78] ^[79] ^[76]

The first large summary found that for people who had already had a stroke, anticoagulants did not cut their risk of having another stroke. The second summary and

the large study found that anticoagulants worked just as well as [antiplatelets](#) to prevent further strokes. But both summaries found that people taking anticoagulants were much more likely to have dangerous bleeding (a [haemorrhage](#)).

Anticoagulants for people with an abnormal heartbeat

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[How good is the research on anticoagulants for people with an abnormal heartbeat?](#)

This information is for people with an abnormal heartbeat (atrial fibrillation) who have had a stroke or mini-stroke. It tells you about anticoagulants, a treatment used for stroke prevention in people with an abnormal heartbeat. It is based on the best and most up-to-date research.

Do they work?

Yes. If you've already had a stroke or [mini-stroke](#) and you have a type of irregular heartbeat called [atrial fibrillation](#), taking an anticoagulant can reduce your chances of having another stroke.

What are they?

Anticoagulants are drugs that help prevent clots forming in the blood. You can take them as injections, as liquids, or as tablets or capsules. Here, we look only at tablets, capsules, and liquids, because that's what your doctor might prescribe to help protect you from a stroke. Doctors use injected anticoagulants for the emergency treatment of strokes. For more information, see [Anticoagulants](#) in our section on emergency care for strokes.

Some people call these drugs blood thinners, but that isn't really what they do. They can't remove clots from the blood. However, they can stop clots getting bigger, and they can stop new clots forming.

Until recently, most people who needed medicine to help prevent blood clots were offered an anticoagulant called **warfarin**. However, newer anticoagulants are becoming more widely used. These include (with brand names):

- dabigatran (Pradaxa)
- rivaroxaban (Xarelto)
- apixaban (Eliquis)

Warfarin requires regular blood tests to make sure you're getting the right dose. The newer anticoagulants do not. But different drugs suit different people. You should discuss with your doctor which drug is the best and safest for you.

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Anticoagulants can also help people with atrial fibrillation who are at risk of a stroke but haven't had one before. To read more, see our information on [Atrial fibrillation](#) .

How can they help?

Anticoagulants can help people who have a type of irregular heartbeat called [atrial fibrillation](#) . If you have this heart condition, you have a slightly higher chance of having a stroke than someone with a normal heartbeat.

If you've already had a stroke or a [mini-stroke](#) and have atrial fibrillation, taking an anticoagulant will lower your chances of having another stroke. In one study of people with an abnormal heartbeat who'd had a stroke, 9 in 100 of those taking anticoagulants had another stroke. In comparison, 23 in 100 of those who weren't taking anticoagulants had another stroke. ^[82]

Anticoagulant treatment works better at preventing strokes than [aspirin](#) (or drugs like it). In one study, people taking aspirin were twice as likely to have a stroke as those taking anticoagulants. ^{[82] [83]}

Much of the research on anticoagulants has looked at warfarin. However, recent studies show that the newer anticoagulants work at least as well as warfarin to prevent a stroke. ^{[84] [85] [86] [87] [88]}

How do they work?

Anticoagulants change the way that blood cells stick together to form clots. They can't remove clots that have already formed. But they can stop clots getting bigger, and they can stop new clots forming. If a clot forms in a blood vessel in your brain or in a blood vessel leading to your brain, this can cause a stroke.

If you have [atrial fibrillation](#) , you're more likely than other people to have clots in your blood. If you have this heart condition, a problem with the electrical signals in your heart causes your heart to beat irregularly. Your heart has trouble pushing blood through its chambers, and some blood may stay in one chamber longer than it should. When blood stays in one place, it can form clots. These clots can travel to your brain and cause a stroke.

Because atrial fibrillation makes it more likely that you'll have dangerous blood clots, your doctor may give you anticoagulants to stop clots forming. You're especially likely to have this treatment if you've already had a stroke or [mini-stroke](#) that happened because a clot blocked a blood vessel in your brain.

Can they be harmful?

The biggest worry about taking anticoagulants is that you'll have dangerous bleeding, either in your brain or in another part of your body. That's because these drugs don't prevent just harmful clots. They also prevent the helpful clots that your body uses to stop

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bleeding. If you take an anticoagulant, it's more likely that you'll have bleeding that doesn't stop.

Aspirin is another drug that prevents clots, but is less likely to cause dangerous bleeding.

One summary shows that 13 in 1,000 people who take an anticoagulant will have dangerous bleeding.^[89] That compares with 10 in 1,000 people who take aspirin.

Other studies put the chances of dangerous bleeding in your brain higher for people taking anticoagulants. In these studies, between 1 in 100 and 3 in 100 people taking warfarin had dangerous bleeding.^[90]

You **should not take anticoagulants if you are or could be pregnant**. They can harm the developing fetus, especially during the first and last three months of pregnancy.^[81]

How good is the research on anticoagulants for people with an abnormal heartbeat?

There's good evidence that anticoagulants help lower the chances of having a second stroke in people with **atrial fibrillation** (a type of irregular heartbeat) who have already had one stroke.

We found one summary of the research (called a **systematic review**) that looked at using the anticoagulant warfarin as a treatment for people with atrial fibrillation.^[82] It found that if you have atrial fibrillation and have had a stroke or **mini-stroke**, then taking warfarin can lower your chances of having another.

We also found good-quality studies looking at newer anticoagulants, including dabigatran, rivaroxaban, and apixaban. These studies found that the newer anticoagulants work at least as well as warfarin to prevent a stroke for people with atrial fibrillation.^[84] ^[85] ^[86]
^[87] ^[88]

Aspirin for people with an abnormal heartbeat

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[How good is the research on aspirin for people with an abnormal heartbeat?](#)

This information is for people with an abnormal heartbeat (atrial fibrillation) who have had a stroke or mini-stroke. It tells you about aspirin, a treatment used for stroke prevention in people with an abnormal heartbeat. It is based on the best and most up-to-date research.

Does it work?

We don't know for certain whether taking aspirin will reduce your chances of having another stroke if you have a type of abnormal heartbeat called **atrial fibrillation**. Not enough good research has been done.

We do know that taking aspirin doesn't work as well as taking drugs called **anticoagulants**, although aspirin may have fewer side effects. If you can't take an anticoagulant, your doctor may advise you to take aspirin instead.

What is it?

Aspirin is a common painkiller. It also makes your blood less likely to clot, which can help prevent some kinds of strokes.

For people who are especially likely to have a stroke, aspirin can help prevent dangerous blood clots. Most strokes happen because a clot blocks a blood vessel in the head or neck, cutting off the blood supply to part of the brain. Aspirin works by preventing small pieces of blood cells called **platelets** sticking together to form clots. ^[47]

How can it help?

We don't know for certain whether it can help. One study with 782 people found that taking aspirin worked no better than taking a dummy treatment (a **placebo**) at preventing strokes in people who had an abnormal heartbeat and had already had a stroke or **mini-stroke**.

However, aspirin seems to work better for some people than others. It's not clear which types of people are helped most. ^[91]

How does it work?

Platelets are cells in your blood. They help your blood clot and stop the bleeding when you cut yourself. In some people, however, the platelets become **activated**, which means they're more likely to stick together. When this happens, they can form clots inside your blood vessels. If a clot blocks one of the blood vessels leading to your brain, it can cause a stroke.

Activated platelets also release chemicals that make blood vessels tighten up and become narrower. This is called **vasoconstriction**. This narrowing can reduce blood flow to your brain and make a stroke more likely.

Some medical conditions can activate platelets, such as **diabetes**, **high blood pressure**, and a raised **cholesterol** level. Smoking can also activate platelets. Your platelets can be activated for many years before you have a stroke. ^[47]

Aspirin can prevent a stroke in three main ways.

- It stops platelets sticking together, so it may help reduce the number or size of clots.

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- It opens up the blood vessels by preventing vasoconstriction.
- It prevents the platelets releasing chemicals that cause the blood vessels to become **inflamed** and narrowed.

If you have a type of irregular heartbeat called **atrial fibrillation**, you're more likely than other people to have clots in your blood. With this heart condition, a problem with the electrical signals in your heart causes your heart to beat irregularly. Your heart has trouble pushing blood through its chambers, and some blood may linger in one chamber longer than it should. When blood sits in one place, it can form clots. These clots can travel to your brain and cause a stroke.

If you have this heart condition, you are slightly more likely to have a stroke than someone with a normal heartbeat.

Because atrial fibrillation makes it more likely that you'll have blood clots, your doctor may give you aspirin to stop clots forming and growing. You're especially likely to be given this treatment if you've already had a stroke or **mini-stroke** because of a clot that blocked a blood vessel in your brain.

Can it be harmful?

The biggest worry with taking a drug that cuts down on clotting in the blood is that you'll have dangerous bleeding, either in your brain or in another part of your body. That's because these drugs don't prevent just harmful clots. They also prevent the helpful clots that your body uses to stop bleeding.

If you take aspirin, you are more likely to have bleeding that doesn't stop. However, the danger of bleeding is far greater if you take an anticoagulant, which is another type of drug that prevents blood clots. ^[92]

One summary shows that 10 out of 1,000 people taking aspirin will have dangerous bleeding. That compares with 13 out of 1,000 who take an anticoagulant. ^[92]

This is why doctors recommend aspirin instead of an anticoagulant for people who may be especially likely to have dangerous bleeding.

If you take aspirin regularly, you may find that it irritates your stomach and causes problems such as **ulcers**. This is more likely if you're an older person or you're taking high doses. About 1 in 10 people have these unpleasant side effects.

If you've ever had a stomach ulcer, tell your doctor. Up to one-third of people with stomach ulcers find that they have more stomach problems if they take aspirin. For example, their ulcer may bleed and require emergency medical treatment.

Aspirin can also make you feel sick, but this is less likely if you take your aspirin with food.

How good is the research on aspirin for people with an abnormal heartbeat?

We found one summary of the research (called a [systematic review](#)). Researchers looked carefully at the results of all the studies and found no good evidence that aspirin helps prevent strokes in people who have already had a stroke and have a type of abnormal heartbeat called [atrial fibrillation](#) .^[91]

Another study has found that [anticoagulants](#) work better than aspirin at preventing strokes among people who have an abnormal heartbeat but who haven't had a previous stroke.^[83] For people with an abnormal heartbeat, taking an anticoagulant is the best way to prevent a stroke. But if you can't take an anticoagulant, taking aspirin may give you some protection.

Further informations:

Advice about rosuvastatin (Crestor)

The Committee on Safety of Medicines has published this advice for doctors who are prescribing rosuvastatin (brand name Crestor).^[4]

- Anyone taking rosuvastatin (including people who have taken another statin before) should start with a dose of 10 milligrams (mg) daily.
- The dose should be increased to 20 mg a day only if necessary and only after taking the 10 mg dose for four weeks.
- Only people with very high cholesterol levels should take 40 mg a day.
- People who have a high risk of muscle disease should not take the 40 mg dose. You may be at risk of muscle disease if you have low [thyroid hormones](#), you have [kidney disease](#) , you drink a lot of alcohol, or you have other muscle problems.
- People who are prescribed 40 mg a day should be under the care of a specialist doctor, such as a cardiologist.

If you have any unexpected muscle problems (such as pain) you should stop taking rosuvastatin and see your doctor as soon as possible.

Tests to check narrowing in your carotid arteries

Doctors can use any of these tests to measure the blockage in your [carotid arteries](#) (the [arteries](#) that bring blood to your brain).

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- An **ultrasound scan** uses sound waves to create an image of the arteries in your head and neck.
- A **magnetic resonance angiogram (MRA)**, done with an MRI scanner, uses magnetic fields to create a computerised picture of your arteries.
- An **intra-arterial angiogram** uses x-rays. The doctor puts a dye into the arteries in your neck through a small tube inserted in your leg. When the dye enters your arteries, the shape of the inside of your arteries can show up on an x-ray film.

Glossary:

mini-stroke

When the supply of blood to a part of your brain is blocked off for a short time, but not long enough to cause permanent damage, it's called a mini-stroke. Doctors call it a transient ischaemic attack (or TIA for short). A mini-stroke can make you lose control of one side of your body, or you may lose the sight in one eye. But these problems go away within 24 hours.

atrial fibrillation

Atrial fibrillation happens when your heart beats in an uneven or irregular way. Normally the beating of your heart is controlled by electrical signals. The signals make the upper parts of your heart (the atria) squeeze blood into the lower parts, which then squeeze blood out into your blood vessels. If you have atrial fibrillation, the electrical signal doesn't work well, so the upper parts of your heart don't beat at the right time.

heart failure

When the heart loses its ability to push enough blood through the blood vessels, it is called heart failure.

high blood pressure

Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

diabetes

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

thyroid gland

Your thyroid gland is a small organ that sits in your neck, just in front of your windpipe. It sends out a hormone called thyroxine. This acts on receptors within cells. By acting on the receptors it gives the cells a message to speed up their metabolism and work harder.

kidney disease

Your kidneys are the organs in your body that make urine. Kidney diseases are diseases in which your kidneys have been damaged. Kidney disease can be caused by several things, including high blood pressure (hypertension).

carotid arteries

Carotid arteries are large blood vessels that carry blood from the heart to the front of the brain. The carotid arteries travel through the neck on the way to your head. You can feel the pulse in your carotids if you press the tips of your fingers in the space under your jawbone and back towards your ears, but don't press too hard because you might faint.

arteries

Arteries are the blood vessels that take blood that is rich in oxygen and food away from your heart. The arteries carry this blood to all the tissues in your body.

MRI scan

A magnetic resonance imaging (MRI) machine uses a magnetic field to create detailed pictures of the inside of your body.

X-ray

X-rays are pictures taken of the inside of your body. They are made by passing small amounts of radiation through your body and then onto film.

blood pressure

Blood pressure is the amount of force that's exerted by your blood on to your blood vessels. You can think of it like the water pressure in your home: the more pressure you have, the faster and more forcefully the water flows out of the shower. Blood pressure is

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measured in millimetres of mercury (written as mm Hg). When your blood pressure is taken, the measurement is given as two numbers, for example 120/80 mm Hg. The first, higher, number is called the systolic pressure, and the second, lower, number is the diastolic pressure. The systolic number is the highest pressure that occurs while your heart is pushing blood into your arteries. The diastolic number is the lowest pressure that happens when your heart is relaxing and is not pushing your blood.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better.

Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

LDL cholesterol

Cholesterol is a fatty substance in your blood. You can get it from food and it is also made by your liver. Having a lot of cholesterol in your blood can cause health problems. LDL cholesterol is often called 'bad' cholesterol. It can build up in your arteries and increase your risk of heart disease. LDL stands for low-density lipoprotein.

triglycerides

Triglycerides are the form in which fat is stored in your body. Triglycerides are made from the fat found in food. They can be used by your body for energy.

HDL cholesterol

Cholesterol is a fatty substance in your blood. You can get it from food and it is also made by the liver. Having a lot of cholesterol in your blood can cause health problems. But HDL cholesterol is sometimes called 'good' cholesterol, because it may lower the risk of heart disease. HDL stands for high-density lipoprotein.

atherosclerosis

Atherosclerosis is also called 'hardening of the arteries'. It happens when fatty material sticks to the inner wall of your arteries. Over time, cholesterol, fats and other things in your blood stick to the same area and the artery wall becomes thick and narrow, making it progressively more difficult for blood to flow through the affected vessels.

enzymes

Enzymes are chemicals in your body. They have lots of different functions, including playing a part in helping to digest food and starting other chemical reactions that keep the body working.

ischaemic stroke

An ischaemic stroke happens when a blood vessel is blocked and suddenly stops blood from getting to part of your brain. If this happens, brain cells get damaged because they don't get enough oxygen and nutrients. About 8 in 10 strokes are ischaemic.

haemorrhagic stroke

A haemorrhagic stroke is what happens when a blood vessel in the brain breaks, causing a haemorrhage or bleeding. The blood can damage parts of the brain. This may cause the loss of control of one side of the body or difficulty speaking.

kidney

Your kidneys are organs that filter your blood to make urine. You have two kidneys, on either side of your body. They are underneath your ribcage, near your back.

allergy

If you have an allergy to something (such as pollen or a medicine), your body always overreacts to it. The reaction happens because your immune system (your body's system for fighting infection) is too sensitive to it.

NSAIDs

NSAID stands for nonsteroidal anti-inflammatory drug. NSAIDs help with pain, inflammation and fever. They are called 'nonsteroidal' because they don't contain any steroids. Aspirin and ibuprofen are both NSAIDs.

vasoconstriction

Vasoconstriction is when a blood vessel gets narrower, changing the amount of blood that can flow through it. Vasoconstriction can be caused by a number of different chemicals released by cells in your body. Vasoconstriction is part of the normal way that your body regulates blood flow, but it can also play a part in the development of certain diseases.

haemorrhage

Haemorrhage is a word doctors use for bleeding. Any time blood escapes from a vessel, it's called a haemorrhage.

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stomach ulcer

A stomach ulcer is a break in the surface that covers the inside of your stomach.

diarrhoea

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

stethoscope

A stethoscope is a tool doctors use to listen to people's bodies. One part of the stethoscope is a disc (called the bell), which doctors put over a part of someone's body (like their heart or a vein). The bell is connected to ear pieces, which the doctors put in their ears so they can listen to sounds that come from that part of the person's body.

haematoma

A haematoma is a collection of blood in any part of your body. The blood has usually clotted or dried.

meta-analysis

A meta-analysis puts together the results of a number of studies. A meta-analysis is used if individual studies are too small for any definite conclusions to be drawn about a treatment. Pooling together results from a number of studies may help say for sure what the effects of the treatment are.

groin

Your groin is the top, inside part of your thighs.

stent

A stent is used to open up a blood vessel that has become blocked. It is a metal tube with holes in it. If you have a blocked coronary artery a doctor may place a stent inside it to keep the blood flowing to the affected part of your heart.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

platelets

Platelets are small disc-shaped particles found in your blood (along with red blood cells and white blood cells). Platelets form the clots that stop the bleeding when you've been cut. People who don't have enough platelets have problems with bleeding too much.

cholesterol

Cholesterol is a fat-like substance made by your liver or absorbed from food. It is used by your body to make bile acids (which help your intestines absorb nutrients) and steroid hormones (like testosterone or oestrogen). Cholesterol is also an important part of cell membranes, which are the structures that surround cells. 'Good cholesterol' is called HDL; 'bad cholesterol' is LDL.

inflammation

Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

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