

Patient information from the BMJ Group

Deep vein thrombosis

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Deep vein thrombosis

If you have deep vein thrombosis (DVT for short), it means a blood clot has formed in one of your deep veins, most likely in your leg. Parts of the clot can break off and travel to your lungs, which can be dangerous.

You can take drugs to treat the clot and stop it moving to other parts of your body, such as your lungs. You can also do things to reduce your risk of getting DVT again.

We've brought together the best research about DVT and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is deep vein thrombosis?

If you have deep vein thrombosis (DVT for short), it means a blood clot has formed in one of your deep veins, probably one going through the muscles of one of your legs.

Veins are blood vessels that carry blood back to your heart from all over your body. If a vein in your leg gets partly or completely blocked by a blood clot, your leg can become swollen and painful.

You can get a clot below the knee (this is called calf DVT), or above the knee (this is called proximal DVT).

If part of the blood clot in your leg breaks off, it can go back through your heart and get stuck in an **artery** in one of your lungs. This is called a **pulmonary embolism**, and it can be dangerous. A pulmonary embolism is more likely to happen if the clot is above your knee than if it's below your knee. So a clot above the knee is more serious. ^[1] ^[2]

Normally, your blood forms clots to stop the bleeding if you injure yourself. But clots can also form inside your blood vessels. Some people are more likely to get clots in a vein in their leg than others. You're more likely to get DVT if you are: ^[3] ^[4] ^[5] ^[6]

- Older
- Overweight.

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You are also more likely to get DVT if you: ^[3] ^[4] ^[5] ^[6] ^[7] ^[8]

- Have cancer
- Are a smoker
- Have had DVT before
- Have recently had a fracture
- Have [varicose veins](#)
- Have an inflammatory bowel disease (a condition that causes inflammation of your bowel, such as Crohn's disease or ulcerative colitis)
- Take corticosteroid tablets regularly
- Sit or lie for long periods without moving much
- Have had an operation, especially on your leg
- Have a problem with blood clotting (these problems can run in families).

If you are a woman, your chance of getting DVT is higher if you are: ^[9] ^[10]

- Pregnant
- Using oral contraceptives (the pill), transdermal contraceptives (patches), vaginal contraceptives (rings); or hormone replacement therapy (HRT).

Some research has found that long-distance travel increases your chance of having DVT. For example, one study suggested that, during long-haul flights, about 1 in 10 passengers older than 50 are at risk of getting DVT without any symptoms. ^[11] Another study suggested that 1 in 100 people travelling long distances by air may get symptoms of a blood clot. ^[12] To learn more about the symptoms, see [What are the symptoms of deep vein thrombosis?](#)

The higher risk may be because, during long-distance journeys, people are sitting still and not doing any exercise for long periods. But doctors aren't quite sure. It may be that people who get DVT while travelling long distances are at risk for other reasons.

If you have a long journey to make, you can do things that might lower your risk of getting DVT. To learn more, see [Long-distance travel and DVT](#) .

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What are the symptoms of deep vein thrombosis?

The most obvious symptoms of deep vein thrombosis (DVT) are swelling or pain in the calf or thigh of one leg, or both swelling and pain.

The affected part of the leg can also: ^[15]

- Feel hot
- Go red or purple.



If you have DVT your leg may go red or purple.

But some people with DVT don't get any symptoms.

If you have a blood clot and it travels to the **artery** of one of your lungs (called a **pulmonary embolism**), you can: ^[15]

- Get breathless
- Feel dizzy
- Have chest pains
- Cough up blood
- Feel your heart racing.

Some of these symptoms can happen with other illnesses too, not just DVT or pulmonary embolism.

To find out whether you have DVT, your doctor will want to know about your symptoms as well as your health in general. They will also examine your affected leg. But doctors can't tell whether you have DVT simply by examining you. If your doctor thinks you could have DVT, they will send you for some tests straight away.

- You will probably need an **ultrasound scan** to see whether there's a blood clot in your leg. This scan is good at detecting clots above your knee but less so at spotting clots below your knee. You'll need to go to hospital to have this test.

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- You might be offered a blood test that can tell doctors whether you have a high or low chance of having DVT. This is called the **D-dimer blood test**.
- If your doctor is still uncertain about whether you have DVT, you may need a special type of **x-ray** where you have dye injected into a **vein**. This is called **venography**.
- If your doctor thinks you have a clot in your calf, you may need another ultrasound scan in about one week to find out whether the clot has travelled above your knee (this is called proximal DVT). If you have proximal DVT, part of the clot is more likely to break off and travel to your lungs. This is a pulmonary embolism and it is dangerous.

To find out whether you have a pulmonary embolism, you'll need other hospital tests, including scans of your lungs.

How common is deep vein thrombosis?

It's difficult to know exactly how many people get deep vein thrombosis (DVT). Many people don't know they have this condition, so they never get diagnosed.

- One large summary of the research (a **systematic review**) found that every year about 1 in 5,000 people are diagnosed with DVT. ^[16]
- Among older people, the risk is greater. About 2 in 1,000 people aged 70 are diagnosed with DVT every year. Most of the research has been done in Sweden and the United States. ^[16]
- About 1 in 1,000 pregnant women get DVT or a **pulmonary embolism**. And about 2 in 1,000 women get these conditions after giving birth. ^[17]
- About 1 in 10 people would get DVT after a major operation if they didn't have treatment to prevent it. And as many as 8 in 10 would possibly get it after having a hip or a knee replacement operation. ^[18]

What treatments work for deep vein thrombosis?

You will need medicines to treat your deep vein thrombosis (DVT) and to reduce your chance of having another blood clot. These medicines are called **anticoagulants**. Your doctor will also advise you to wear elastic stockings to reduce your chance of having problems related to your DVT.

- You may be given an anticoagulant called heparin for five to seven days to prevent the clot getting any bigger. You may be given this drug in hospital through a drip (also called an **intravenous infusion** or IV), or by regular injections. If you are well enough, the hospital may show you how to give yourself these injections at home.

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- If you take heparin, you will also probably take an anticoagulant tablet called warfarin for six weeks or longer to lower your chance of getting new clots. You will probably start warfarin while you are still taking heparin and continue the warfarin after you have stopped the heparin.
- Newer anticoagulants are sometimes used instead of heparin and warfarin for treating DVT. One example is a drug called rivaroxaban (brand name Xarelto), which you take as a tablet. You will probably take two doses a day for three weeks, then one dose a day for three months or longer.
- Wearing special support stockings will reduce your chance of having problems related to your DVT and your chance of getting DVT again.

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

Treatment Group 1

Treatments for deep vein thrombosis

Treatments that work

- [Wearing special elastic stockings \(to prevent problems related to DVT\)](#)

Treatments that are likely to work

- [Heparin](#)
- [Warfarin](#)
- [Newer anticoagulants](#)

What will happen to me?

Deep vein thrombosis (DVT) can be dangerous. So it's very important to go to your doctor if you have any symptoms of DVT.

The most obvious symptoms of deep vein thrombosis (DVT) are swelling or pain in the calf or thigh of one leg, or both swelling and pain. To learn more, see [What are the symptoms of deep vein thrombosis?](#)

In about 1 in 2 people who have a clot that starts in their calf, the clot spreads to above their knee.^[19] Blood clots that are above the knee are more likely to lead to a **pulmonary embolism**, which is dangerous. It happens when a blood clot travels to one of your lungs and gets stuck in an **artery** that brings blood to this lung.

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So if your doctor thinks you have a clot in your calf, it's important to get this checked again in seven days to see whether the clot has travelled above your knee.

Without treatment, about 1 in 10 clots above the knee will move and lodge in the artery of a lung (a pulmonary embolism). And as many as 1 in 10 people who get a pulmonary embolism die. ^[20]

Each year, about 1 in 4 people who have a clot below the knee get another one. ^[21] ^[22] DVT is more likely to come back if you have a blood-clotting problem or cancer. If you have cancer, your blood may tend to clot more. This can be caused either by the disease or by the treatment for it.

A large review of studies looked at nearly 12,000 people diagnosed with DVT and treated for six months. It found that: ^[23]

- Around 2 in 100 of people who were treated for six months had severe bleeding (haemorrhage)
- Around 5 in 100 of people who had a DVT died as a result of it
- For every 100 people treated for a year, 7 of them would have another DVT or pulmonary embolism
- For every 100 people treated for a year who had a recurrent DVT or pulmonary embolism, fewer than 1 died

DVT is less likely to come back if it happened after you had an operation. ^[24] In one study looking at how often people got a second DVT: ^[25]

- There was a less than 1 in 100 chance of having a DVT each year for people who'd had their first DVT after an operation
- There was a 7 in 100 chance of having a DVT each year for people who'd had their first DVT without an obvious cause.

Following DVT, you can get swelling, open sores (ulcers), and permanent damage to tissue around the blocked vein . Doctors call this **post-thrombotic syndrome**. You are more likely to get this if the clot is above your knee. Wearing special support stockings will reduce your chance of this happening.

In some people, DVT may clear up on its own, without treatment. Some people may never even know they had DVT. Still, if you are worried that you might have DVT, you should see your doctor at once.

Treatments:

Wearing special elastic stockings

In this section

If you have had DVT, wearing special elastic stockings may halve your risk of getting swelling, open sores (ulcers), or permanent damage to the tissues around where your clot was. Doctors call these problems **post-thrombotic syndrome**. The stockings go up to your knee or your thigh.

One large summary of the research (a systematic review) looked at whether wearing special stockings helped with post-thrombotic syndrome. ^[26] The summary found that:

- 2 in 10 people who wore elastic stockings after having DVT had post-thrombotic syndrome
- Between 4 in 10 and 5 in 10 people who didn't wear elastic stockings after having DVT had post-thrombotic syndrome.

Another big summary of the research showed that people who wore special stockings were less likely to get post-thrombotic syndrome up to six years after their DVT. More than 1 in 2 people who didn't wear stockings had post-thrombotic syndrome, compared with 1 in 4 people who did wear stockings. But the study didn't show much difference in the chances of having another DVT. ^[27]

The special stockings are called compression stockings. They help to keep the blood flowing smoothly through the veins in your legs. Your doctor will advise you to wear one on your affected leg for a long period of time after you've had DVT. This will probably be for at least two years. You can buy them at your pharmacy, where you can get them properly fitted to your legs.

We don't know whether one type of stocking, thigh length or knee length, works better than the other. There is not enough high-quality research to provide a clear answer. ^[28]

It is important that you are properly fitted for these stockings. If they aren't the right fit, they can cause problems with your blood flow. And they might increase your risk of getting another clot.

Heparin

In this section

Heparin prevents the clot in your leg from getting bigger. It also reduces your risk of getting another clot. It's a type of drug called an **anticoagulant**, and it works by stopping your blood clotting too much.

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If you have been diagnosed with DVT heparin, or a similar drug called fondaparinux, may be the first treatment you are given.^[29] Heparin works fast. You will probably have it for five to seven days.

There are both older and newer types of heparin, and they have different chemical make-ups.

- The older type is called standard or unfractionated heparin. If you have this treatment, you will probably be given the drug through a drip (an intravenous infusion or IV) in hospital. Some brand names are Monoparin and Multiparin.
- The newer type is called low molecular weight heparin, or LMWH. The brand names are Fragmin, Clexane, Innohep, and Zibor. You have it by injection, once or twice a day. You will probably have the treatment for five to seven days.

You will most likely have the newer type of heparin, as it works best and is also easier to give.

One big summary of the research (a **systematic review**) looked at whether people had clots again after having treatment with one of the two types of heparin.^[30] Fewer people who had the newer type of heparin (LMWH) had another blood clot within three months to six months than those who took the older type (unfractionated heparin). And fewer people died from a blood clot.

As heparin works to prevent your blood from clotting too much, there is a risk that it will cause serious bleeding (**haemorrhaging**). This can be dangerous.

In the summary of research that we found, people who had the newer type of heparin had bleeding less often.^[30] However, a later good-quality study of 700 people (a **randomised controlled trial**) didn't find any difference between the two types of heparin. It said people taking the older sort were no more likely to have another clot, and no more likely to get bleeding. So it may be that there's not a great deal of difference between the two treatments.^[31]

If you do start bleeding, your doctors will stop the treatment. They also might give you a drug to help stop the effects of heparin.^[32]

Heparin doesn't have any serious side effects when it is taken for a short period. Rarely, some people will develop an **allergy** to heparin. This can cause a rash or more clotting. This is more likely if you are given the older type of heparin (unfractionated heparin), or if you are aged over 40. Heparin can also cause unusually high levels of potassium to build up in the blood. This is more likely if you have diabetes, kidney failure, or are taking certain drugs for heart failure.^[33]

You may be able to have heparin injections at home. It's usual to start injections of the newer type of heparin (called LMWH) at hospital, often in the accident and emergency department or at an outpatient clinic. If you are well enough, you may be able to inject

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yourself at home rather than having to go back to hospital. This will probably be more convenient for you.

One summary of the research (a systematic review) looked at six studies.^[34] But the studies weren't of good quality, so it's hard to know how much to rely on the results. The summary found that:

- People who were treated at home were less likely to get another clot than the people treated in hospital
- People said they preferred being able to treat themselves at home.

You may have heparin injections once a day or twice a day. You may find it more convenient to have your heparin injections once a day instead of twice a day.

We found two summaries of the research that looked at whether having injections once a day worked as well as having injections twice a day. Having injections once a day with the newer type of heparin (called LMWH) worked just as well as having injections twice a day at preventing further blood clots.^[35] ^[36]

Warfarin

In this section

Warfarin is a type of drug called an **anticoagulant**. These are medicines that help treat and prevent blood clots. If you have deep vein thrombosis, the first anticoagulant you take may be [heparin](#), which is given through injections or drips (also called [intravenous infusions](#) or IVs). You will then also probably take warfarin (brand name Marevan) to lower your chance of getting more clots.

Your doctor will probably advise you to take warfarin tablets for between six weeks and 12 months. Exactly how long will depend on your chances of having another blood clot. This depends on things such as:

- Your age
- Whether you smoke
- Whether you have other conditions that make another clot more likely.

There hasn't been much research on warfarin, but doctors generally agree that it works.^[37]

One good-quality study (a [randomised controlled trial](#)) showed that people who took warfarin for three months had no more risk of another clot than people who took it for six

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months. However, it's best that your doctor weighs up the risks and benefits for you individually.^[38]

You will probably take both warfarin and heparin at first. One good-quality study (a randomised controlled trial) looked at how well these medicines prevented blood clots from spreading.^[39]

- Only 25 in 100 clots in the calf spread above the knee when people had both heparin for five days and warfarin for three months.
- But 33 in 100 clots in the calf spread when people had only heparin.

Drugs such as warfarin interfere with the way that blood cells stick together to form clots. If the dose of warfarin you are taking is too high, there is a risk you might start bleeding (haemorrhaging). This can be dangerous. If you do have bleeding, your doctor may stop the treatment or give you other medicines to stop the bleeding.

You'll need regular blood tests to make certain that you're taking the right amount of the drug. This test is called an INR (short for international normalised ratio). It can be done by your doctor or a nurse. Your dose of warfarin may be adjusted, depending on the results of the INR.

If you are a woman, you shouldn't take warfarin and similar tablets if you are or could be pregnant. There is a chance these drugs could harm your baby.^[40] If you are pregnant and have DVT, you will be seen by a doctor who specialises in this area. They will discuss the right treatment for you.

When you no longer need warfarin tablets, your doctor will probably advise you to just stop taking them. There hasn't been much research on whether you should reduce the dose slowly or just stop. One study showed that people who stopped their warfarin suddenly were no more likely to have DVT again than those who reduced their dose slowly, over one month.^[41]

Newer anticoagulants

In this section

Anticoagulants are drugs that help treat and prevent blood clots. Until fairly recently, most people with deep vein thrombosis took the anticoagulant [heparin](#) for five to seven days, as well as tablets of another anticoagulant called [warfarin](#) for at least six weeks to prevent more clots. Newer anticoagulants provide an alternative to these treatments for some people, with good-quality studies showing that they seem to work as well as the older drugs.^[42] ^[29]

Newer anticoagulants include dabigatran (brand name Pradaxa), apixaban (Eliquis), and rivaroxaban (Xarelto).

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Only rivaroxaban is currently licensed to treat deep vein thrombosis in the UK. You will probably take two doses a day for three weeks, then one dose a day for three months or longer. ^[29]

These newer anticoagulants have the advantage of not requiring regular blood tests in order to make dose adjustments, which makes them more convenient than warfarin. Like all drugs that prevent blood clots, the newer anticoagulants can cause heavy bleeding (haemorrhage), although some studies suggest the risk may be lower with rivaroxaban than warfarin. ^[42] However, different drugs suit different people. You should discuss with your doctor which drug is the best and safest for you.

Further informations:

Long-distance travel and DVT

Deep vein thrombosis (DVT) is more likely if you can't or don't move about for long periods. This may be why some research has found that people are more at risk of DVT if they go on a long-distance journey, such as a long flight.

If you've had DVT before, or if you are at higher risk of getting it (for example, if you are older or have [varicose veins](#)), you should discuss with your doctor ways to prevent it before you book your travel. (For more about the risk of DVT, see [What is deep vein thrombosis?](#))

You might need to take drugs to reduce your risk of blood clots. Or you might need to wear special elastic stockings called compression stockings. These stockings help the blood to keep flowing up through your legs and back to your heart, instead of staying in your lower legs and causing clots. Your pharmacist can measure you to ensure you buy the right size of stockings.

Whether or not you are at high risk, you can do exercises and other things that may help prevent DVT. We can't say for sure whether these things work as there hasn't been much research on them.

Here are some of the things experts recommend when travelling. ^[13]

- Don't take sleeping tablets.
- Don't drink a lot of alcohol.
- Try to exercise your legs while seated. Bend and straighten your legs, feet, and toes while sitting down, every half hour. Make a circle pattern with each foot in turn.
- Press the balls of your feet down hard against the floor or a footrest to increase the blood flow in your legs.

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- Avoid sitting still for long periods. Take short walks around the cabin of your aeroplane or train compartment. If you are in a car or coach, be sure to take a short walk whenever you stop for a break.

Even if you are not at high risk, you might want to think about wearing compression stockings. Some, but not all, research has shown that these stockings reduce the risk of getting DVT on long-haul flights. ^[14] But the stockings are not suitable for everyone, so ask your doctor about them first.

You should get medical help quickly if you get any of the symptoms of DVT. The main symptom is a swollen, painful leg. To learn more, see [What are the symptoms of deep vein thrombosis?](#) If you get DVT because of sitting still on a long-distance journey, you might not notice any pain or swelling right after the trip. It can take hours or even a day or so for you to get any symptoms.

Glossary:

veins

Veins are blood vessels that carry blood back to your heart after your blood has delivered oxygen and food to the tissues.

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.

pulmonary embolism

A pulmonary embolism can give you chest pain, make you feel breathless and uncomfortable or make you breathe rapidly. A pulmonary embolism is dangerous and can kill you if it is not treated.

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.

Crohn's disease

Crohn's disease causes inflammation in your bowel. It usually affects your small intestine, but can happen anywhere in your digestive tract. It causes diarrhoea and bloody stools.

ulcerative colitis

Ulcerative colitis is a disease that affects the wall of your large intestine. Ulcerative colitis causes you to have diarrhoea and get blood in your stools. Ulcerative colitis is an autoimmune disease. This means that you get it when your body attacks part of itself.

steroids

Steroids are a type of chemical. Your body naturally produces steroids, which play a part in many of its processes. For example, steroids are involved in how your immune system, reproductive system and metabolism work. Steroids can also be given as medicines and are used for a number of different conditions: including asthma, rheumatoid arthritis and eczema. Corticosteroids are not the same as the steroids used by some body builders and athletes. Those steroids are called 'anabolic steroids'.

hormone replacement therapy

Hormone replacement therapy (also called HRT) is given to women after the menopause to replace the oestrogen (the main female hormone) that is no longer made by their ovaries. It can be given either as oestrogen alone or as a combination of oestrogen and progesterone (another female hormone). It is useful to treat menopausal symptoms such as hot flushes, and to prevent brittle bone disease (osteoporosis). But there are concerns that it may increase the risk of breast cancer, heart attacks and strokes.

ultrasound

Ultrasound is a tool doctors use to create images of the inside of your body. An ultrasound machine sends out high-frequency sound waves, which are directed at an area of your body. The waves reflect off parts of your body to create a picture. Ultrasound is often used to see a developing baby inside a woman's womb.

X-ray

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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.

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.

ulcer

An ulcer is an open sore. Ulcers can happen in many parts of your body, such as in your stomach, and the skin of your legs, mouth, or genitals.

intravenous infusion

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

haemorrhage

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

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.

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.

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