Patient information from the BMJ Group

Lyme disease

In this section

Lyme disease

Lyme disease is an infection you can get from being bitten by tiny creatures called ticks. Lyme disease can be serious. But with the right treatment most people recover completely.

We've brought together the best research about Lyme disease 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 Lyme disease?

Lyme disease is an infection you can get from being bitten by tiny creatures called ticks. The disease is caused by bacteria that are carried by some ticks. When the tick bites you, the bacteria can get into your body.

There are different kinds of ticks. The ones that can give you Lyme disease are called **deer ticks** because they often live on deer. The infection can spread to people because deer ticks also bite humans. Dogs and other pets can get infected too.

This is a nymph deer tick. It's about the size of a poppy seed.

Ticks look a bit like tiny spiders. They go through three different stages of growth, called **larva**, **nymph**, and **adult**. At each stage of their growth they feed on the blood of different animals, including small animals like squirrels, mice, and some birds. Most cases of Lyme

disease happen in the late spring and summer when the young nymph ticks are active and people are spending more time outdoors. [1]

If a tick bites you it can be worrying. But this doesn't mean you'll definitely get Lyme disease. Not all ticks carry the bacteria that cause Lyme disease. [2] The chance of a tick being infected with these bacteria depends on which part of the country you are in.

Also, the tick has to feed from your skin for a long time for it to pass on the bacteria. [2] Doctors think that a tick has to stay feeding on your skin for at least 18 hours to 24 hours for there to be a risk of it passing on the bacteria.

The sooner you spot and remove a tick, the less risk there is that it can pass on the bacteria that causes Lyme disease. [2] For more information, see How to remove ticks .

If you are bitten by a tick, it's a good idea to check for the early symptoms of Lyme disease . A rash is often the first and most obvious sign of infection. You may also get flu-like symptoms, such as fever.

Ticks are found in many parts of the UK. Most people who get Lyme disease pick up the infection in forests, heathland, or moorland where deer are common. These areas include: [3]

- the New Forest (Hampshire)
- Salisbury Plain
- Exmoor (Devon)
- the South Downs
- parts of Wiltshire, Berkshire, and Thetford Forest
- the Lake District
- the Yorkshire moors
- the Scottish Highlands and Islands.

People who are most at risk of getting Lyme disease include: [4]

- People who go walking in or who camp near long grass
- People who live in areas where there are lots of deer
- Farmers

- Forestry workers
- Workers in contact with deer
- Other workers in woodland and moorland.

People who visit these areas for pleasure are also at risk from ticks. This may be because they don't know about the risk from ticks, and so they don't take precautions, such as wearing long-sleeved tops and long trousers tucked into their socks when going into areas that may be home to ticks. [5] [6] For more precautions, see How to prevent tick bites .

There's no evidence that you can catch Lyme disease from another person, a pet, or other insect bites. [7] And there's no evidence that you can catch the disease from food, water, or the air. [7]

What are the symptoms of Lyme disease?

The most common symptom of Lyme disease is a pink or red rash.

The rash spreads from the part of the body where you have been bitten by an infected tick. But not everyone gets this rash.

Early symptoms

The first symptom of Lyme disease is usually a pink or red rash.

The rash is often the first and most obvious sign of infection. It is pink or red and usually appears about one or two weeks after being bitten by an infected tick. [3] The rash can clear in the middle, making it look like a 'bull's eye'. It can become very large (about the size of a dinner plate) and it may spread for months if it isn't treated.

Not everyone who is infected gets a rash. [5]

Early on in the infection, you may also get one or more flu-like symptoms, such as: [5] [2] [8]

- Tiredness
- Headaches

- Fever or chills
- Muscle pains.

If you get any of these symptoms and you think you may have been bitten by a tick, see your doctor. If you have been infected with Lyme disease, then it's best to start treatment as soon as possible.

Your doctor will ask about your symptoms and check how likely it is that you have been near animals infected with ticks. People often don't realise they have been bitten by a tick, so sometimes it can be difficult to diagnose, especially if you don't have the rash.

Later symptoms

If you have no obvious symptoms, you may not realise you have an infection. After a few weeks or months, the infection can spread to other parts of your body, including your nerves and joints.

If your doctor thinks you have the later stages of Lyme disease, you may need blood tests or other tests to check that you have Lyme disease. [6]

Nerve problems

You may get **facial palsy**. [3] This means you lose control of some muscles in your face. It usually clears up, even without treatment.

You may get pain, numbness, and difficulties with movement in some parts of your body. Doctors call it **radiculopathy**. It's caused by inflamed nerves and can last for months if you don't get treatment. The pain goes away quickly once you are treated.

A few people with Lyme disease get **meningitis**. In meningitis, the linings covering your brain and spinal column become inflamed. But the meningitis you get with Lyme disease is a mild form of the disease. It isn't dangerous and doesn't lead to any serious long-term problems. Lyme meningitis isn't common. One study found that about 1 in 100 children who get Lyme disease get meningitis. [2]

Problems with joints

If the infection affects your joints it can be painful. It's most likely to affect your knee joints. [8] In a small number of people, this pain doesn't go away, and the joints become swollen and inflamed. Doctors call this **Lyme arthritis**.

Other problems

Lyme disease can cause problems with your heart and your liver. But these problems are rare. [5] [8]

How common is Lyme disease?

It's not easy to say how common Lyme disease is in the UK.

In 2011, there were 959 recorded cases of Lyme disease in England and Wales. But the actual number of cases may have been as high as 3,000, as not all cases are recorded. [9] Two-thirds of the 2011 cases were among people living in the south of England.

It's most common in parts of southern England, including the Lake District, the Yorkshire moors, Exmoor, the New Forest, the South Downs, parts of Wiltshire and Berkshire, Thetford Forest, and the Scottish Highlands.

What treatments work for Lyme disease?

If you have Lyme disease, you should be treated as soon as possible with antibiotics. Antibiotics are drugs that kill the bacteria that cause Lyme disease. If your symptoms don't clear up, you may need more antibiotic treatment.

Key points on treatments for Lyme disease

- If you think you might have been bitten by a tick, it's important to look out for the early symptoms of Lyme disease. A rash is often the first and most obvious sign of infection.
- If you take antibiotics soon after the infection starts, then you are very likely to make a complete recovery.
- Antibiotics are also used to treat later symptoms, such as arthritis.
- Antibiotics can have side effects but they are usually mild.
- You probably won't be prescribed antibiotics unless your doctor is sure you have Lyme disease.
- There are things you can do to avoid getting bitten by ticks, such as wearing long-sleeved tops and long trousers tucked into your socks if you go into areas that may be home to ticks. See How to prevent tick bites .

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 Lyme disease

Treatments that work

- Antibiotics to prevent Lyme disease

- Antibiotics for early Lyme disease

Treatments that are likely to work

- Antibiotics for Lyme arthritis
- Antibiotics for Lyme disease affecting the nerves

What will happen to me?

If Lyme disease is diagnosed and treated early then you are very likely to recover completely.

Many people who aren't treated make a good recovery. But if you are treated early, it relieves your symptoms, and it also protects you against Lyme disease appearing at a later stage, which can be more serious.

Studies show that Lyme disease is easy to treat in children. In one study of more than 200 children, most of them recovered within days or weeks if they had treatment. [2]

A very small number of people who don't get treatment early go on to get long-term nerve damage. [7] This can affect the way you move your body and give you other unpleasant symptoms. For example, you may find it difficult to reach out for something or walk properly.

About 1 in 10 people who get arthritis as a symptom (swollen and painful joints) have continuing symptoms for months or even years after they've been treated. [5] But the condition settles down in time.

A small number of people who have had the infection also get pain and extreme tiredness that can last for months or even years, even if they've been treated. This is sometimes called **post-Lyme syndrome**. Doctors aren't sure if it is triggered by a previous Lyme infection or if other conditions play a part. [7] [5]

Treatments:

Antibiotics to prevent Lyme disease

In this section

There's good evidence that if you are bitten by a tick, taking antibiotics within three days can lower your chances of getting Lyme disease. [10] [11]

But doctors don't usually recommend taking antibiotics simply because you have been bitten by a tick. [2] [12] This is because the risk of Lyme disease from just one tick bite is very small.

But if you do get Lyme disease, your doctor should treat you promptly with antibiotics and the infection will clear up quickly. [2] [12]

You can talk to your doctor about whether antibiotics are right for you. Your doctor may recommend that you take antibiotics if you were bitten in a location where Lyme disease is common, or if the tick was attached to you for at least a day. [13]

Antibiotics for early Lyme disease

In this section

If you have the early symptoms of Lyme disease, doctors' guidelines say there is a very strong chance that antibiotics will cure it completely. Less than 1 in 10 people need further treatment after taking antibiotics for early Lyme disease. [12]

You usually take the antibiotics as tablets, for two weeks to three weeks. [12] The ones doctors normally prescribe are: [12] [14]

- doxycycline
- amoxicillin (brand name Amoxil)
- cefuroxime (brand name Zinnat).

These drugs do have side effects but they are usually mild. Doxycycline may cause a serious skin reaction to strong light (**photosensitivity**) and you may need to avoid sunlight. You might also feel sick or get diarrhoea. Amoxicillin can cause rashes and nausea.

People who are allergic to penicillin should not take amoxicillin. [12] [15] Children under 12 years old and women who are pregnant or breastfeeding should not take doxycycline. [15]

Antibiotics for Lyme arthritis

In this section

Several good-quality studies (known as randomised controlled trials) have found that antibiotics can help stop Lyme arthritis. [16] [17] [18] [19] [20]

You usually take the antibiotics as tablets. The antibiotics (and their brand names) that doctors usually prescribe for Lyme arthritis are: [12] [14]

- amoxicillin (Amoxil)
- ceftriaxone, given by injection into a vein (Rocephin)

- doxycycline
- cefuroxime (Zinnat).

Your doctor normally prescribes doxycycline or amoxicillin if you don't also have symptoms affecting your nerves (such as facial palsy or headaches). [15] [5] But you will probably be given ceftriaxone if doxycycline or amoxicillin haven't worked. You may also be given ceftriaxone if you have symptoms affecting your nervous system. [12]

Some people who take antibiotics get a fever, headaches, or chills. One study has found this happened to nearly 3 in 10 people given injections of ceftriaxone. [18]

You might also get milder side effects, including: [18] [12] [14]

- Diarrhoea (ceftriaxone, doxycycline)
- A rash (amoxicillin, ceftriaxone, cefuroxime)
- Feeling sick (amoxicillin, cefuroxime, doxycycline)
- Difficulty swallowing (doxycycline).

Children under 8 years old and women who are pregnant or breastfeeding should not take doxycycline. [21]

Antibiotics for Lyme disease affecting the nerves

In this section

If you have later Lyme disease, and it is affecting your nerves, you will normally need to take antibiotics as an injection directly into your veins (an intravenous, or IV, infusion). The antibiotics (and their brand names) are: [12] [14]

- Intravenous ceftriaxone (Rocephin)
- Intravenous cefotaxime
- Intravenous benzylpenicillin (Crystapen).

Doctors normally choose ceftriaxone. [12] The research on these drugs is not always clear and some of it is not very good. But one small study found that ceftriaxone and cefotaxime worked equally well. [22]

Another study says that taking doxycycline as a tablet can work as well as having intravenous ceftriaxone. But we need more research to be sure. [23] But doxycycline is

not recommended for children under 12 years or women who are pregnant or breastfeeding. [24]

Some people who take antibiotics get a fever, headaches, or chills when they take these antibiotics for late-stage Lyme disease. [18]

You may also get milder side effects including: [12] [18] [25]

- Diarrhoea (benzylpenicillin, cefotaxime, ceftriaxone)
- A rash (cefotaxime, ceftriaxone)
- Feeling sick (cefotaxime)
- Stomach pains (cefotaxime)
- Headaches (cefotaxime)
- Dizziness (cefotaxime)
- Problems sleeping (cefotaxime).

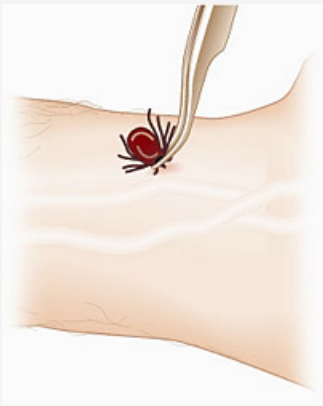
Some people have an allergic reaction to these drugs. [26] This can be dangerous, but this is very rare.

And some people who have taken ceftriaxone have had problems with their gallbladder (an organ near your liver that stores bile).

Further informations:

How to remove ticks

The sooner you remove a tick, the less risk there is of it passing on the bacteria that causes Lyme disease.



Using tweezers, grip the tick close to your skin.

Here's what to do: [7]

- Check your body carefully. Young ticks (called nymphs) are about the size of a poppy seed, so they are difficult to spot. These are the types of ticks most likely to give you an infection. Adult ticks are easier to spot, as they are bigger, and may reach the size of a coffee bean during their feed.
- Grip the tick with fine-tipped tweezers as close to your skin as possible. This makes it less likely you will crush the tick's body, which might release bacteria.
- Pull the tick gently but firmly off your skin.
- Wipe the area with an antiseptic.

How to prevent tick bites

If you live, work, or spend time in a place where there are ticks, there are many things you can do to prevent tick bites.

- Avoid areas where deer are most common.
- Avoid high grass and vegetation.
- Wear long-sleeved tops and long trousers tucked into your socks if you go into areas that may be home to ticks. [8]
- Wear light-coloured clothing. This makes it easier to find and remove ticks.
- Spray your clothes with an insect repellent or a chemical called permethrin. [8] [6]

- If you have been in an area where there are ticks, brush off and wash (if possible) your clothes as soon as you can. This prevents ticks being brought into the house. [5] [7]
- Check your body for ticks every day. Pay close attention to skin folds and hairy areas of your body. [6]
- Check children carefully for ticks. Make sure to check their hair. Young children have a higher risk of getting bites on the head and neck area.
- If you have any pets, then check their fur for ticks. This protects them from infection and prevents ticks being brought into the house.
- If you find a biting tick, remove it straight away. For more information, see How to remove ticks .

Glossary:

bacteria
Bacteria are tiny organisms. There are lots of different types. Some are harmful and can cause disease. But some bacteria live in your body without causing any harm.

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.

arthritis
Arthritis is when your joints become inflamed, making them stiff and painful. There are different kinds of arthritis. Osteoarthritis is the most common type. It happens when the cartilage at the end of your bones becomes damaged and then starts to grow abnormally. Rheumatoid arthritis happens because your immune system attacks the lining of your joints.

antibiotics
These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

allergic reaction
You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

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.

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.

gall bladder
The gall bladder is a small organ below the liver on the right side of the abdomen. Its job is to store bile, a chemical made in the liver that helps to break down food in the intestines. The chemicals in the gall bladder can, under certain circumstances, become solid and form small stones. If a stone gets stuck in the tubes that empty the gall bladder, there can be a backup of fluid, causing the gall bladder to swell and possibly become infected. This condition is called gall bladder disease.

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Last published: Apr 09, 2015