



Louisiana Office of Public Health
Infectious Disease Epidemiology
Section
Phone: 1-800-256-2748
www.oph.dhh.state.la.us

Lyme Disease

What is Lyme disease?

Lyme disease is caused by the bacterium *Borrelia burgdorferi* and is transmitted to humans by the bite of infected blacklegged ticks.

Symptoms of Lyme disease

Typical symptoms include fever, headache, fatigue and a characteristic skin rash called erythema migrans. If left untreated, infection can spread to joints, the heart and the nervous system. Lyme disease is diagnosed based on symptoms, physical findings (e.g., rash), and the possibility of exposure to infected ticks; laboratory testing is helpful in the later stages of disease.

The Lyme disease bacterium can infect several parts of the body, producing different symptoms at different times. Not all patients with Lyme disease will have all symptoms, and many of the symptoms can occur with other diseases as well. If you believe you may have Lyme disease, it is important that you consult your health care provider for proper diagnosis.

The first sign of infection is usually a circular rash called erythema migrans or EM. This rash occurs in approximately 70-80% of infected persons and begins at the site of a tick bite after a delay of 3-30 days. A distinctive feature of the rash is that it gradually expands over a period of several days, reaching up to 12 inches (30 cm) across. The center of the rash may clear as it enlarges, resulting in a bull's-eye appearance. It may be warm but is not usually painful. Some patients develop additional EM lesions in other areas of the body after several days. Patients also experience symptoms of fatigue, chills, fever, headache, muscle and joint aches and swollen lymph nodes. In some cases, these may be the only symptoms of infection.

Untreated, the infection may spread to other parts of the body within a few days to weeks, producing an array of discrete symptoms. These include loss of muscle tone on one or both sides of the face (called facial or "Bell's palsy"), severe headaches and neck stiffness due to meningitis, shooting pains that may interfere with sleep, heart palpitations and dizziness due to changes in heartbeat, and pain that moves from joint to joint. Many of these symptoms will resolve, even without treatment.

After several months, approximately 60% of patients with untreated infection will begin to have intermittent bouts of

arthritis, with severe joint pain and swelling. Large joints are most often affected, particularly the knees. In addition, up to 5% of untreated patients may develop chronic neurological complaints months to years after infection. These include shooting pains, numbness or tingling in the hands or feet, and problems with concentration and short term memory.

Laboratory Testing

Several forms of laboratory testing for Lyme disease are available, some of which have not been adequately validated. Most recommended tests are blood tests that measure antibodies made in response to the infection. These tests may be falsely negative in patients with early disease, but they are quite reliable for diagnosing later stages of disease.

CDC recommends a two-step process when testing blood for evidence of Lyme disease. Both steps can be done using the same blood sample.

1) The first step uses an ELISA or IFA test. These tests are designed to be very "sensitive," meaning that almost everyone with Lyme disease, and some people who don't have Lyme disease, will test positive. If the ELISA or IFA is negative, it is highly unlikely that the person has Lyme disease, and no further testing is recommended. If the ELISA or IFA is positive or indeterminate (sometimes called "equivocal"), a second step should be performed to confirm the results.

2) The second step uses a Western blot test. Used appropriately, this test is designed to be "specific," meaning that it will usually be positive only if a person has been truly infected. If the Western blot is negative, it suggests that the first test was a false positive, which can occur for several reasons. Sometimes two types of Western blot are performed, "IgM" and "IgG." Patients who are positive by IgM but not IgG should have the test repeated a few weeks later if they remain ill. If they are still positive only by IgM and have been ill longer than one month, this is likely a false positive.

CDC does not recommend testing blood by Western blot without first testing it by ELISA or IFA. Doing so increases the potential for false positive results. Such results may lead to patients being treated for Lyme disease when they don't have it and not getting appropriate treatment for the true cause of their illness. For detailed recommendations for test performance and interpretation of serologic tests for Lyme disease, click here.

Other Types of Laboratory Testing

Some laboratories offer Lyme disease testing using assays whose accuracy and clinical usefulness have not been adequately established. These tests include urine antigen tests, immunofluorescent staining for cell wall-deficient forms of *Borrelia burgdorferi* and lymphocyte transformation tests. In general, CDC does not recommend these tests.

Patients are encouraged to ask their physicians whether their testing for Lyme disease was performed using validated methods and whether results were interpreted using appropriate guidelines.

Testing Ticks

Patients who have removed a tick often wonder if they should have it tested. In general, the identification and testing of individual ticks is not useful for deciding if a person should get antibiotics following a tick bite. Nevertheless, some state or local health departments offer tick identification and testing as a community service or for research purposes. Check with your health department; the phone number is usually found in the government pages of the telephone book.

Treatment of Lyme disease

Most cases of Lyme disease can be cured with antibiotics, especially if treatment is begun early in the course of illness. However, a small percentage of patients with Lyme disease have symptoms that last months to years after treatment with antibiotics. These symptoms can include muscle and joint pains, arthritis, cognitive defects, sleep disturbance, or fatigue. The cause of these symptoms is not known. There is some evidence that they result from an autoimmune response, in which a person's immune system continues to respond even after the infection has been cleared.

The National Institutes of Health (NIH) has funded several studies on the treatment of Lyme disease. These studies have shown that most patients can be cured with a few weeks of antibiotics taken by mouth. Antibiotics commonly used for oral treatment include doxycycline, amoxicillin, or cefuroxime axetil. Patients with certain neurological or cardiac forms of illness may require intravenous treatment with drugs such as ceftriaxone or penicillin.

Patients treated with antibiotics in the early stages of the infection usually recover rapidly and completely. A few patients, particularly those diagnosed with later stages of disease, may have persistent or recurrent symptoms. These patients may benefit from a second 4-week course of therapy. Longer courses of antibiotic treatment have not been shown to be beneficial and have been linked to serious complications, including death.

Treatment during pregnancy

Studies of women infected during pregnancy have found that there are no negative effects on the fetus if the mother receives appropriate antibiotic treatment for her Lyme disease. In general, treatment for pregnant women is similar to that for non-pregnant persons, although certain antibiotics are not used because they may affect the fetus. If in doubt, discuss treatment options with your health care provider

Do viable *B. burgdorferi* persist in tissues despite antibiotic treatment?

There is no convincing evidence in North America for the persistence of *B. burgdorferi* in the skin of humans after treatment with antibiotic regimens known to be active against *B. burgdorferi* in vitro.

Antibiotic therapy has not proven to be useful and is not recommended for patients with chronic (≥ 6 months) subjective symptoms after administration of recommended treatment regimens for Lyme disease

Ticks Transmit Lyme Disease

The Lyme disease bacterium, *Borrelia burgdorferi*, normally lives in mice, squirrels and other small animals. It is transmitted among these animals - and to humans - through the bites of certain species of ticks.

In the northeastern and north-central United States, the blacklegged tick (or deer tick, *Ixodes scapularis*) transmits Lyme disease. In the Pacific coastal United States, the disease is spread by the western blacklegged tick (*Ixodes pacificus*). Other tick species found in the United States have not been shown to transmit *Borrelia burgdorferi*. Blacklegged ticks live for two years and have three feeding stages: larvae, nymph, and adult. When a young tick feeds on an infected animal, the tick takes the bacterium into its body along with the blood meal.

The bacterium then lives in the gut of the tick. If the tick feeds again, it can transmit the bacterium to its new host. Usually the new host is another small rodent, but sometimes the new host is a human.

Most cases of human illness occur in the late spring and summer when the tiny nymphs are most active and human outdoor activity is greatest.

Although adult ticks often feed on deer, these animals do not become infected. Deer are nevertheless important in transporting ticks and maintaining tick populations.

Other Modes of Transmission

Person-to-Person

There is no evidence that Lyme disease is transmitted from person-to-person. For example, a person cannot get infected from touching, kissing or having sex with a person who has Lyme disease.

During Pregnancy & While Breastfeeding

Lyme disease acquired during pregnancy may lead to infection of the placenta and possible stillbirth, however, no negative effects on the fetus have been found when the mother receives appropriate antibiotic treatment. There are no reports of Lyme disease transmission from breast milk.

From Blood

Although no cases of Lyme disease have been linked to blood transfusion, scientists have found that the Lyme

disease bacteria can live in blood that is stored for donation. Individuals being treated for Lyme disease with an antibiotic should not donate blood. Individuals who have completed antibiotic treatment for Lyme disease may be considered as potential blood donors.

From Pets

Although dogs and cats can get Lyme disease, there is no evidence that they spread the disease directly to their owners. However, pets can bring infected ticks into your home or yard. Consider protecting your pet, and possibly yourself, through the use of tick control products for animals.

Other Transmission

You will not get Lyme disease from eating venison or squirrel meat, but in keeping with general food safety principles meat should always be cooked thoroughly. Note that hunting and dressing deer or squirrels may bring you into close contact with infected ticks.

There is no credible evidence that Lyme disease can be transmitted through air, food, water, or from the bites of mosquitoes, flies, fleas, or lice.

Prevention of Lyme disease

Steps to prevent Lyme disease include using insect repellent, removing ticks promptly, landscaping and integrated pest management. The ticks that transmit Lyme disease can occasionally transmit other tick-borne diseases as well.

1-Use These Simple Measures to Prevent Tick Bites.

Avoid Areas With a Lot of Ticks

Ticks prefer wooded and bushy areas with high grass and a lot of leaf litter. These are areas to avoid.

Take extra precautions in May, June and July. This is when ticks that transmit Lyme disease are most active.

If you do enter a tick area, walk in the center of the trail to avoid contact with overgrown grass, brush and leaf litter.

Ask your local health department and park or extension service about tick infested areas to avoid.

Keep Ticks off Your Skin

- Use insect repellent with 20% - 30% DEET on exposed skin and clothing to prevent tick bites. Effective repellents are found in drug, grocery and discount stores. For details about the proper use of repellents visit our West Nile Virus website.

- Permethrin is another type of repellent. It can be purchased at outdoor equipment stores that carry camping or hunting gear. Permethrin kills ticks on contact! One application to pants, socks, and shoes typically stays effective through several washings. Permethrin should not be applied directly to skin. For details on permethrin visit the National Pesticide Information Center.

Wear long pants, long sleeves, and long socks to keep ticks off your skin. Light-colored clothing will help you spot ticks more easily. Tucking pant legs into socks or boots and tucking shirts into pants help keep ticks on the outside of clothing. If you'll be outside for an extended period of time, tape the area where your pants and socks meet to prevent ticks from crawling under your clothes.

Check Your Skin and Clothes for Ticks Every Day!

Remove ticks from your clothes before going indoors. To kill ticks that you may have missed, wash your clothes with hot water and dry them using high heat for at least one hour.

Perform daily tick checks after being outdoors, even in your own yard. Inspect all parts of your body carefully including your armpits, scalp, and groin. Remove ticks immediately using fine-tipped tweezers.

If a tick is attached to your skin for less than 24 hours, your chance of getting Lyme disease is extremely small. But just to be safe, monitor your health closely after a tick bite and be alert for any signs and symptoms of tick-borne illness.

2-Control Ticks Around Your Home and in Your Community.

Apply Pesticides to Control Ticks

A pesticide designed to kill ticks is sometimes called an acaricide. Acaricides can be very effective in reducing tick populations. If properly timed, a single application at the end of May or beginning of June can reduce tick populations by 68-100%.

The Environmental Protection Agency and your state determine the availability of pesticides. Check with local health officials about the best time to apply acaricide in your area, as well as any rules and regulations related to pesticide application on residential properties. Or contact a professional pesticide company to apply pesticides at your home.

Create a Tick-Safe Zone

Use landscaping techniques to create a tick-safe zone around homes, parks, and recreational areas. Ticks that transmit Lyme disease thrive in humid wooded areas. They die quickly in sunny and dry environments. Here are some simple landscaping techniques to help reduce tick populations.

Remove leaf litter and clear tall grasses and brush around homes and at the edges of lawns.

Place wood chips or gravel between lawns and wooded areas to restrict tick migration to recreational areas.

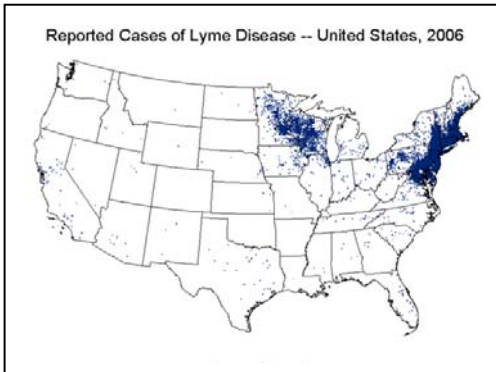
Mow the lawn and clear brush and leaf litter frequently.

3-Ask your doctor if taking antibiotics after a tick bite is right for you.

Although this is not routinely recommended, it may be beneficial for some persons in areas where Lyme disease is common. Health care providers must determine whether the

advantages of prescribing antibiotics after tick bite outweigh the disadvantages.

Where you in an area where Lyme disease is common:



Was the tick attached for at least one full day?
Has it been less than three days since you removed the tick
or since it fell off of you?