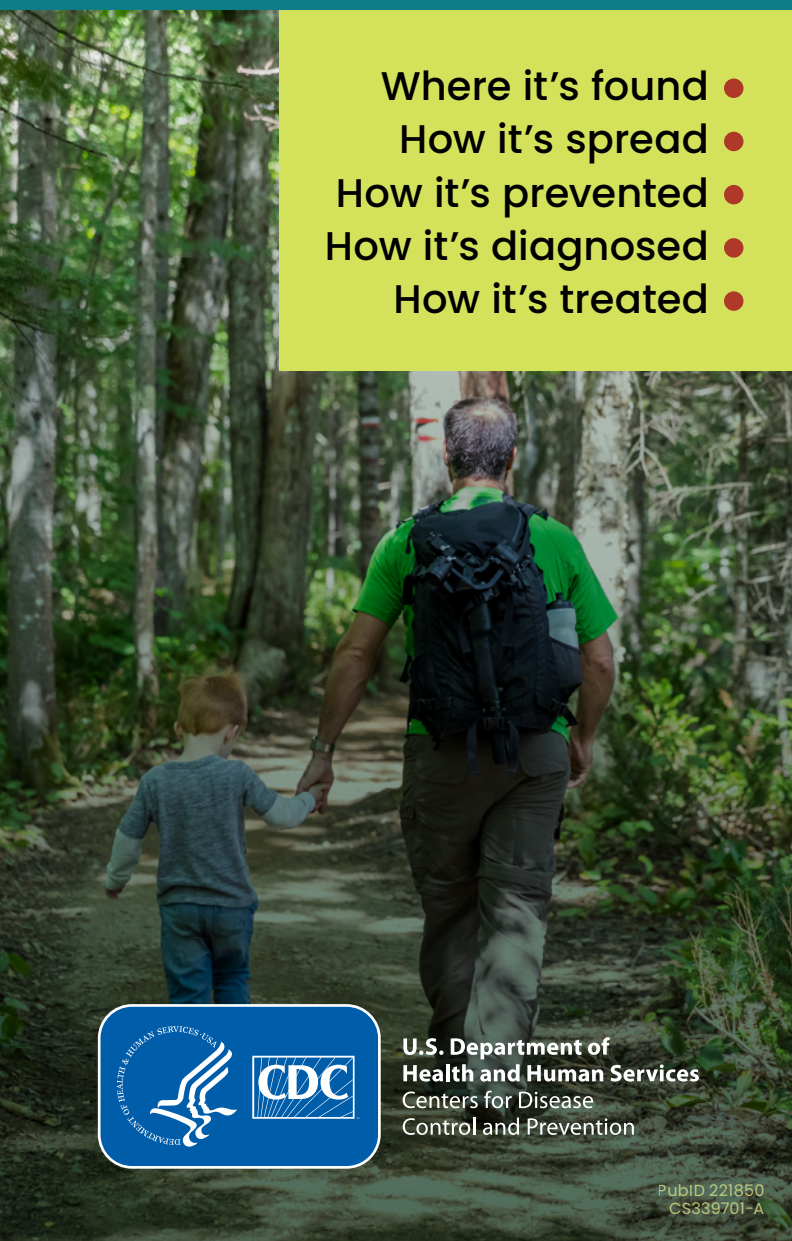
LYME DISEASE:

WHAT YOU NEED TO KNOW

- Where it's found
- How it's spread
- How it's prevented
- How it's diagnosed
- How it's treated



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

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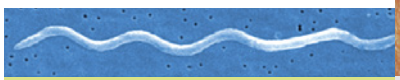
LYME DISEASE

Lyme disease is caused by bacteria called *Borrelia burgdorferi*, and rarely, *Borrelia mayonii*. The bacteria are spread to people through the bites of infected blacklegged ticks.



Under a microscope, the Lyme disease bacteria are corkscrew shaped.

Ticks can attach to any part of the human body but prefer hard-to-see areas such as the groin, armpits, and scalp. In most cases, the tick must be attached and fill with blood before Lyme disease bacteria can be transmitted.

EMBEDDED NYMPHAL TICK
PHOTO COURTESY OF DURLAND FISH.

Where People Most Commonly Get Lyme Disease

People can only get Lyme disease from ticks that carry the bacteria. In high-risk areas, about 10–50% of blacklegged ticks carry the bacteria. These high-risk areas include:

- Eastern states, primarily New England and the mid-Atlantic.
- The Great Lakes Region and Northern Midwestern states, especially Wisconsin and Minnesota.
- West Coast, particularly parts of northern California and, less commonly, Oregon and Washington.

Transmission

Ticks need to be attached for more than 24 hours and begin filling with blood before they can transmit (spread) Lyme disease bacteria. Most people are infected through the bites of immature ticks called nymphs. Nymphs are tiny (less than 2 mm) and difficult to see. They most commonly bite during spring and summer.

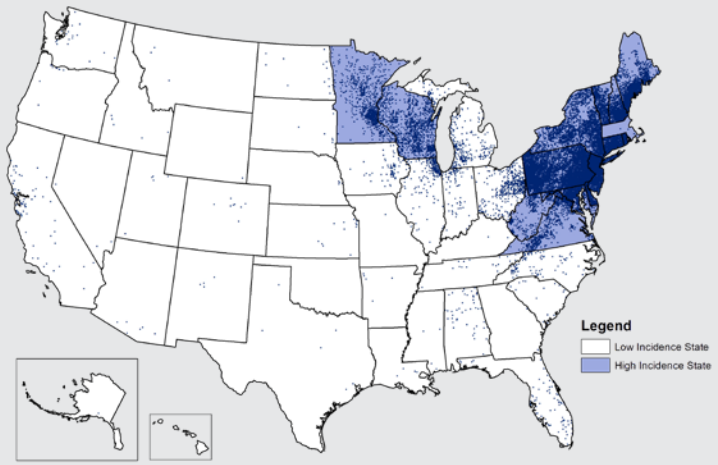
Blacklegged ticks don't just have black legs! They are a different species than other common ticks, like the dog tick. In their larval and nymphal stages, blacklegged ticks are no bigger than a pinhead. Adults are larger, about the size of a sesame seed. (Left to right: larva, nymph, adult male, adult female)

Adult ticks can also transmit Lyme disease bacteria. They are more likely to be found and removed because they are bigger than nymphs. They most commonly bite during the fall.

There is no evidence that Lyme disease is transmitted from person-to-person through touching, kissing, or having sex with a person who has Lyme disease. Untreated Lyme disease during pregnancy can lead to infection of the placenta. Spread from mother to fetus is possible, but rare. Fortunately, with appropriate antibiotic treatment, there is no increased risk of adverse birth outcomes. If you are pregnant and suspect you may have Lyme disease, contact your healthcare provider. There are no reports of Lyme disease transmission through breast milk or blood transfusion.

Reported Cases of Lyme Disease — United States, 2019

1 DOT PLACED RANDOMLY WITHIN COUNTY OF RESIDENCE
FOR EACH CONFIRMED CASE

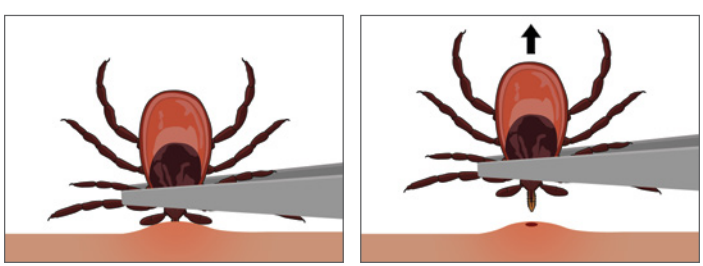


Although Lyme disease cases have been reported in nearly every state, this does not mean there is risk of infection in every state. Cases are reported based on where a person lives, not where they were infected. Some people become infected while traveling out of state.

This map does not reflect every case of Lyme disease diagnosed in 2019. Surveillance data are subject to each state's ability to capture and classify cases, which may vary between states, and from year to year. Due to the coronavirus disease 2019 (COVID-19) pandemic, 2019 and 2020 data from some jurisdictions may be incomplete. For more information, visit www.cdc.gov/lyme/datasurveillance.

Tick Removal

Grasp the tick firmly and as close to the skin as possible. With a steady motion, pull the tick's body away from the skin. Do not be alarmed if the tick's mouthparts remain in the skin. Cleanse the area with rubbing alcohol or soap and water.



Signs and symptoms

Early diagnosis and proper antibiotic treatment of Lyme disease is important and can help prevent more serious forms of the disease. Contact your healthcare provider if you notice an expanding rash or other possible symptoms.

Signs and symptoms of early Lyme disease can include:

- An expanding skin rash, called erythema migrans
- Fatigue
- Chills and fever
- Headache
- Muscle and joint pain
- Swollen lymph nodes

Erythema migrans is often a reddish or purple-colored rash that appears 3–30 days after the bite of an infected tick. It typically appears at the site of the tick bite, is round or oval, and expands gradually over several days. It can appear on any area of the body. The center of the rash sometimes clears as it enlarges, resulting in a "bull's-eye" appearance. The rash may be warm, but it is rarely itchy or painful. Erythema migrans occurs in over 70 percent of people with Lyme disease.

Not all rashes that occur at the site of a tick bite are due to Lyme disease. An allergic reaction to tick saliva can also occur and be confused with an erythema migrans rash. Allergic reactions to tick saliva usually appear within a few hours after the tick bite, usually do not gradually expand in size, and disappear within a few days. A rash similar to erythema migrans has also been described following bites of the lone star tick. The condition has been named southern tick-associated rash illness (STARI), and the cause is unknown but it is not due to Lyme disease.

More severe forms of Lyme disease

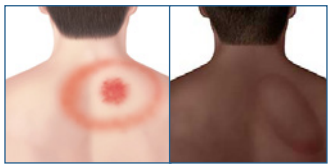
Some signs and symptoms of Lyme disease may not appear until weeks or months after a tick bite:

- Arthritis with severe joint pain and swelling can occur, usually in one or more large joints, especially the knees.
- Nervous system symptoms can include numbness, pain, nerve paralysis (often of the facial muscles, usually on one side), and meningitis (fever, stiff neck, and severe headache).
- Rarely, irregularities of the heart rhythm can occur.

For a small percentage of people, symptoms of fatigue, body aches, or difficulty thinking can last after finishing treatment.

Reinfection

You can get Lyme disease again if you are bitten by another infected tick, so always protect yourself from tick bites.



Erythema migrans (bull's-eye) rash

Lyme arthritis (swollen knee)

Facial palsy (facial droop)

Diagnosis

Healthcare providers should consider the following factors when diagnosing Lyme disease:

- The likelihood that the patient has been exposed to infected blacklegged ticks (see map).
- Patient has signs and symptoms of Lyme disease, such as erythema migrans or arthritis.
- The possibility that other illnesses may be causing similar symptoms.
- Results of laboratory tests, recognizing that a serologic response may take several weeks to develop.

CDC recommends the use of Food and Drug Administration (FDA)-cleared tests for Lyme disease. Most available tests measure antibodies made in response to infection, which can take several weeks to appear in the blood. People who have been infected for longer than 6 weeks will almost always test positive, but people infected for shorter periods may not. Once produced, antibodies normally remain detectable in the blood for months or years after the patient has recovered.

This means that:

- Patients can have a negative blood test result if tested in the first few weeks after infection.
- Healthcare providers should treat patients for Lyme disease promptly if the patient has a history of recent exposure to tick bites and signs and symptoms of early Lyme disease, such as erythema migrans.
- A negative test result in a patient with arthritis or other long-standing symptoms is strong evidence that Lyme disease is not the cause of their illness.
- For people concerned about reinfection, it is difficult to distinguish between an old infection and a new infection using a blood test. Diagnosis of reinfection relies on careful clinical consideration of exposure history and symptoms.

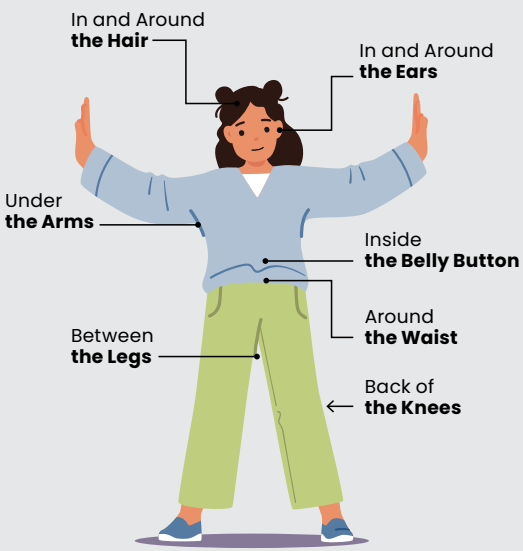
Treatment

People treated with appropriate antibiotics in the early stages of Lyme disease usually recover rapidly and completely. The antibiotics most commonly used to treat Lyme disease include doxycycline, amoxicillin, or cefuroxime axetil. Early diagnosis and proper antibiotic treatment of Lyme disease can help prevent more severe disease.

Tick Bite Prevention

- Use Environmental Protection Agency (EPA)-registered insect repellents containing DEET, picaridin, IR3535, oil of lemon eucalyptus, para-menthane-diol, or 2-undecanone. Always follow product instructions.
- Wear clothing treated with 0.5% permethrin. Re-treat clothing according to label instructions.
- Shower as soon as possible after spending time outdoors.
- Check for ticks daily. Ticks can hide under the armpits, behind the knees, in the hair, and in the groin.
- Tumble clothes in a dryer on high heat for 10 minutes to kill ticks on dry clothing after you come indoors. If the clothes are damp, dry them completely and then dry for 10 minutes on high heat.

Where to Check for Ticks



Lyme Disease Vaccine

There is not currently a vaccine for people to prevent Lyme disease, however clinical trials of new vaccines for Lyme disease are underway.

Post-Exposure Antibiotics

In general, CDC does not recommend antibiotics after tick bites to prevent tickborne diseases. However, in certain circumstances, a single dose of doxycycline after a tick bite in an area where Lyme disease is common may lower risk of Lyme disease. Ask your healthcare provider if antibiotics after a tick bite are appropriate for you.

Tick Bite Prevention for Pets

It is important to use a tick preventive product on your dogs because they are very susceptible to tick bites and tickborne diseases. Talk to your veterinarian about:

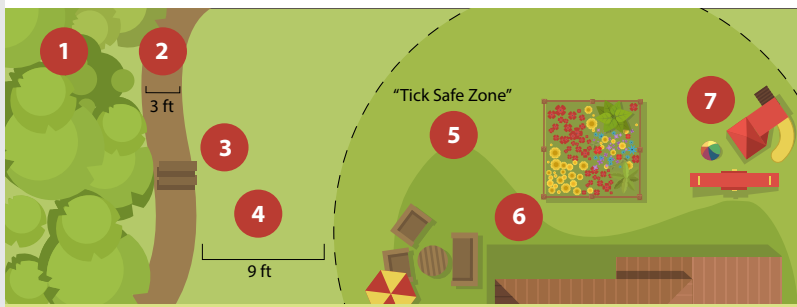
- Lyme disease vaccination for your dog
- The best tick prevention products for your pets
- Tickborne diseases in your area

Reduce the chances that a tick bite will make your dog sick by:

- Checking your pets for ticks daily
- Removing ticks from your pet immediately

Tick Control in the Yard

Landscaping to create tick-safe zones. Blacklegged ticks need high humidity to survive; they die quickly in drier environments. Removing leaf litter and clearing tall grass and brush around houses and at the edges of lawns will reduce the numbers of ticks. Placing wood chips or gravel between lawns or play areas and wooded areas creates a dry barrier that is difficult for ticks to cross. Fences can help keep deer away from homes.



1 **TICK ZONE**
Avoid areas with forest and brush where deer, rodents, and ticks are common.

2 **WOOD CHIP BARRIER**
Use a 3-ft. barrier of wood chips or rock to separate the "tick zone" and rock walls from the lawn.

3 **WOOD PILE**
Keep wood piles on the wood chip barrier, away from the home.

4 **TICK MIGRATION ZONE**
Maintain a 9-ft. barrier of lawn between the wood chips and areas such as patios, gardens, and play sets.

5 **TICK SAFE ZONE**
Enjoy daily living activities such as gardening and outdoor play inside this perimeter.

6 **GARDENS**
Plant deer-resistant crops. If desired, an 8-ft. fence can keep deer out of the yard.

7 **PLAY SETS**
Keep play sets in the "tick safe zone" in sunny areas where ticks have difficulty surviving.

Based on a diagram by K. Stafford, Connecticut Agricultural Experiment Station

For more information please contact:

Telephone: 1-800-CDC-INFO (232-4636) / TTY: 1-888-232-6348
Web: www.cdc.gov/Lyme

Department of Health & Human Services
Centers for Disease Control and Prevention (CDC)
Division of Vector-Borne Diseases
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