

Ticks and Lyme Disease



For more information about Lyme disease, visit <http://www.cdc.gov/Lyme>

How to prevent tick bites when working outdoors

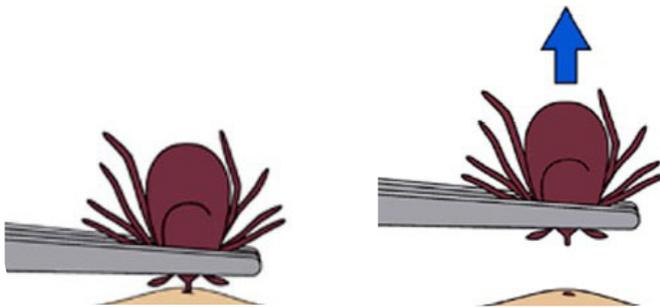
Ticks can spread disease, including Lyme disease. Protect yourself:

- Use insect repellent that contains 20 - 30% DEET.
- Wear clothing that has been treated with permethrin.
- Take a shower as soon as you can after working outdoors.
- Look for ticks on your body. Ticks can hide under the armpits, behind the knees, in the hair, and in the groin.
- Put your clothes in the dryer on high heat for 60 minutes to kill any remaining ticks.

How to remove a tick

1. If a tick is attached to you, use fine-tipped tweezers to grasp the tick at the surface of your skin.
2. Pull the tick straight up and out. Don't twist or jerk the tick—this can cause the mouth parts to break off and stay in the skin. If this happens, remove the mouth parts with tweezers if you can. If not, leave them alone and let your skin heal.
3. Clean the bite and your hands with rubbing alcohol, an iodine scrub, or soap and water.
4. You may get a small bump or redness that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease.

Note: Do not put hot matches, nail polish, or petroleum jelly on the tick to try to make it pull away from your skin.



If you remove a tick quickly (within 24 hours) you can greatly reduce your chances of getting Lyme disease.



Facial paralysis.



Bull's eye rash on the back.



Arthritic knee.



The bite of a blacklegged tick can transmit the bacteria that cause Lyme disease.

When to see your doctor

See a doctor if you develop a fever, a rash, severe fatigue, facial paralysis, or joint pain within 30 days of being bitten by a tick. Be sure to tell your doctor about your tick bite. If you have these symptoms and work where Lyme disease is common, it is important to get treatment right away.

If you do not get treatment, you may later experience severe arthritis and problems with your nerves, spinal cord, brain, or heart.

Antibiotics are used to treat Lyme disease

Your doctor will prescribe specific antibiotics, typically for 2-3 weeks. Most patients recover during this time. You may feel tired while you are recovering, even though the infection is cured.

If you wait longer to seek treatment or take the wrong medicine, you may have symptoms that are more difficult to treat.

Looking ahead to recovery

Take your antibiotics as recommended. Allow yourself plenty of rest. It may take time to feel better, just as it takes time to recover from other illnesses.

Some people wonder if there is a test to confirm that they are cured. This is not possible. Your body remembers an infection long after it has been cured. Additional blood tests might be positive for months or years. Don't let this alarm you. It doesn't mean you are still infected.

Finally, practice prevention against tick bites. You can get Lyme disease again if you are bitten by another infected tick.

Additional information

1. <http://www.cdc.gov/Lyme>
2. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America
<http://cid.oxfordjournals.org/content/43/9/1089.full>
3. Tick Management Handbook (Connecticut Agricultural Experiment Station, New Haven)
http://www.ct.gov/caes/lib/caes/documents/special_features/tickhandbook.pdf

For more information please contact Centers for Disease Control and Prevention

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Preventing Tick Bites

While it is a good idea to take preventive measures against ticks year-round, be extra vigilant in warmer months (April-September) when ticks are most active.

Avoid Direct Contact with Ticks

- Avoid wooded and bushy areas with high grass and leaf litter.
- Walk in the center of trails.

Repel Ticks with DEET or Permethrin

- Use repellents that contain 20% or more DEET (N, N-diethyl-m-toluamide) on the exposed skin for protection that lasts up to several hours. Always follow product instructions. Parents should apply this product to their children, avoiding hands, eyes, and mouth.
- Use products that contain permethrin on clothing. Treat clothing and gear, such as boots, pants, socks and tents. It remains protective through several washings. Pre-treated clothing is available and remains protective for up to 70 washings.
- Other repellents registered by the Environmental Protection Agency (EPA) may be found at <http://cfpub.epa.gov/oppref/insect/>. (<http://cfpub.epa.gov/oppref/insect/>) 
(<http://www.cdc.gov/Other/disclaimer.html>)

Find and Remove Ticks from Your Body

- Bathe or shower as soon as possible after coming indoors (preferably within two hours) to wash off and more easily find ticks that are crawling on you.
- Conduct a full-body tick check using a hand-held or full-length mirror to view all parts of your body upon return from tick-infested areas. Parents should check their children for ticks under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist, and especially in their hair.
- Examine gear and pets. Ticks can ride into the home on clothing and pets, then attach to a person later, so carefully examine pets, coats, and day packs. Tumble clothes in a dryer on high heat for an hour to kill remaining ticks.

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[National Center for Emerging and Zoonotic Infectious Diseases \(NCEZID\)](#)

[Division of Vector-Borne Diseases \(DVBD\)](#)

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Signs and Symptoms of Lyme Disease

If you had a tick bite, live in an area known for Lyme disease or have recently traveled to an area where it occurs (</lyme/stats/index.html>), and observe any of these symptoms, you should seek medical attention!

Early localized stage (3-30 days post-tick bite)

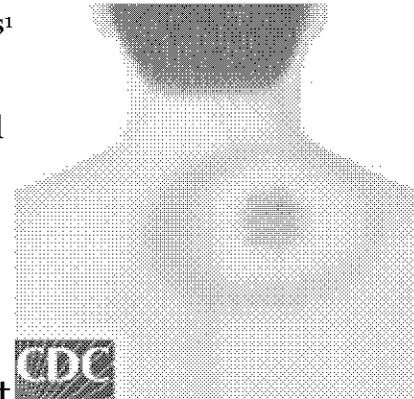
- Red, expanding rash called erythema migrans (EM)
- Fatigue, chills, fever, headache, muscle and joint aches, and swollen lymph nodes

Some people may get these general symptoms in addition to an EM rash, but in others, these general symptoms may be the only evidence of infection.

Some people get a small bump or redness at the site of a tick bite that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease. However, ticks can spread other organisms (</ticks/diseases/index.html>) that may cause a different type of rash. (</ticks/symptoms.html>) For example, Southern Tick-associated Rash Illness (STARI) (</ncidod/dvbid/stari/>) causes a rash with a very similar appearance.

Erythema migrans (EM) or "bull's-eye" rash

- Rash occurs in approximately 70-80% of infected persons¹ and begins at the site of a tick bite after a delay of 3-30 days (average is about 7 days).
- Rash gradually expands over a period of several days, and can reach up to 12 inches (30 cm) across. Parts of the rash may clear as it enlarges, resulting in a "bull's-eye" appearance.
- Rash usually feels warm to the touch but is rarely itchy or painful.
- EM lesions may appear on any area of the body.



Early disseminated stage (days to weeks post-tick bite)

Untreated, the infection may spread from the site of the bite to other parts of the body, producing an array of specific symptoms that may come and go, including:

- Additional EM lesions in other areas of the body
- Facial or Bell's palsy (loss of muscle tone on one or both sides of the face)
- Severe headaches and neck stiffness due to meningitis (inflammation of the spinal cord)
- Pain and swelling in the large joints (such as knees)
- Shooting pains that may interfere with sleep
- Heart palpitations and dizziness due to changes in heartbeat

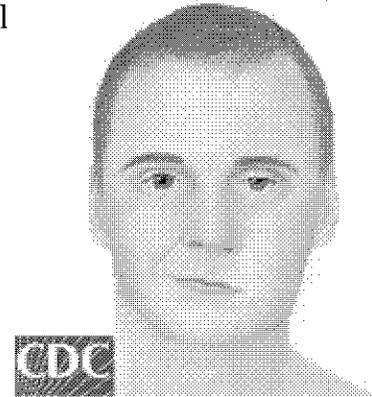
Many of these symptoms will resolve over a period of weeks to months, even without treatment². However, lack of treatment can result in additional complications, described below.

Bell's (facial) palsy

Loss of muscle tone on one or both sides of the face is called facial or “Bell’s” palsy.

Late disseminated stage (months-to-years post-tick bite)

Approximately 60% of patients with untreated infection may begin to have intermittent bouts of arthritis, with severe joint pain and swelling. Large joints are most often affected, particularly the knees³. Arthritis caused by Lyme disease manifests differently than other causes of arthritis and must be distinguished from arthralgias (pain, but not swelling, in joints).



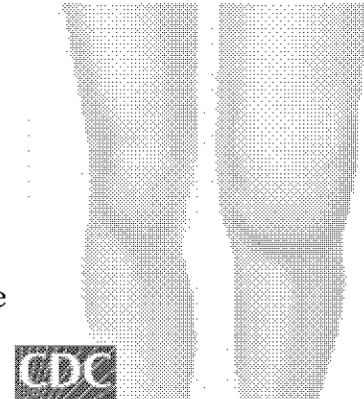
Up to 5% of untreated patients may develop chronic neurological complaints months to years after infection⁴. These include shooting pains, numbness or tingling in the hands or feet, and problems with short-term memory.

Arthritis

Pain and swelling in the large joints (such as knees) can occur.

Lingering symptoms after treatment (post-treatment Lyme disease syndrome)

Approximately 10-20% of patients with Lyme disease have symptoms that last months to years after treatment with antibiotics⁵. These symptoms can include muscle and joint pains, cognitive defects, sleep disturbance, or fatigue. The cause of these symptoms is not known, but there is no evidence that these symptoms are due to ongoing infection with *B. burgdorferi*. This condition is referred to as Post-treatment Lyme disease syndrome



(PTLDS) (</lyme/postLDS/index.html>). There is some evidence that PTLDS is caused by an autoimmune response, in which a person's immune system continues to respond, doing damage to the body's tissues, even after the infection has been cleared. Studies have shown that continuing antibiotic therapy (</lyme/diagnosis/treatment/Treatment/>) is not helpful and can be harmful for persons with PTLDS.

References

1. Correspondence. The Presenting Manifestations of Lyme Disease and the Outcomes of Treatment. *N Engl J Med* 2003; 348:2472-2474, June 12, 2003.
2. Allen C. Steere, Jenifer Coburn, Lisa Glickstein. The emergence of Lyme disease. *J. Clin. Invest.* 2004; 113(8):1093.
3. Steere, AC, Schoen, RT, Taylor, E. The clinical evolution of Lyme arthritis. *Ann. Intern. Med.* 1987. 107:725-731.
4. Auwaerter PG, Aucott J, Dumler JS. Lyme borreliosis (Lyme disease): molecular and cellular pathobiology and prospects for prevention, diagnosis and treatment. *Expert Rev Mol Med.* 2004 Jan 19;6(2):1-22.
5. Marques, A. Chronic Lyme disease: a review. *Infect Dis Clin North Am* 2008; 22:341-60.

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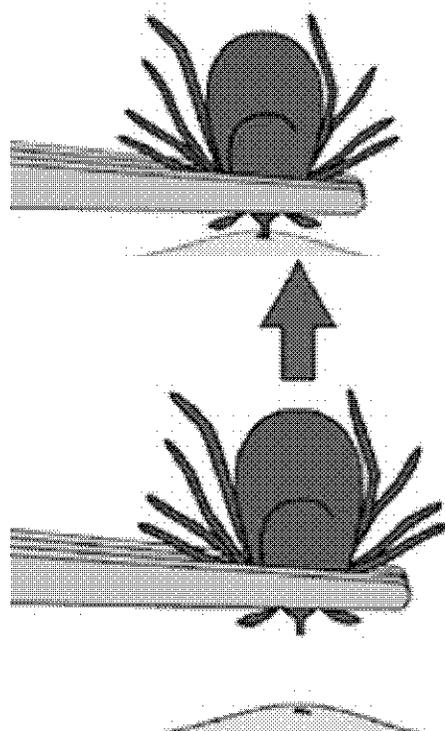
Tick Removal

If you find a tick attached to your skin, there's no need to panic. There are several tick removal devices on the market, but a plain set of fine-tipped tweezers will remove a tick quite effectively.

How to remove a tick

1. Use fine-tipped tweezers to grasp the tick as close to the skin's surface as possible.
2. Pull upward with steady, even pressure. Don't twist or jerk the tick; this can cause the mouth-parts to break off and remain in the skin. If this happens, remove the mouth-parts with tweezers. If you are unable to remove the mouth easily with clean tweezers, leave it alone and let the skin heal.
3. After removing the tick, thoroughly clean the bite area and your hands with rubbing alcohol, an iodine scrub, or soap and water.

 Avoid folklore remedies such as "painting" the tick with nail polish or petroleum jelly, or using heat to make the tick detach from the skin. Your goal is to remove the tick as quickly as possible--not waiting for it to detach.



Follow-up

If you develop a rash or fever within several weeks of removing a tick, see your doctor. Be sure to tell the doctor about your recent tick bite, when the bite occurred, and where you most likely acquired the tick.

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Lyme disease transmission

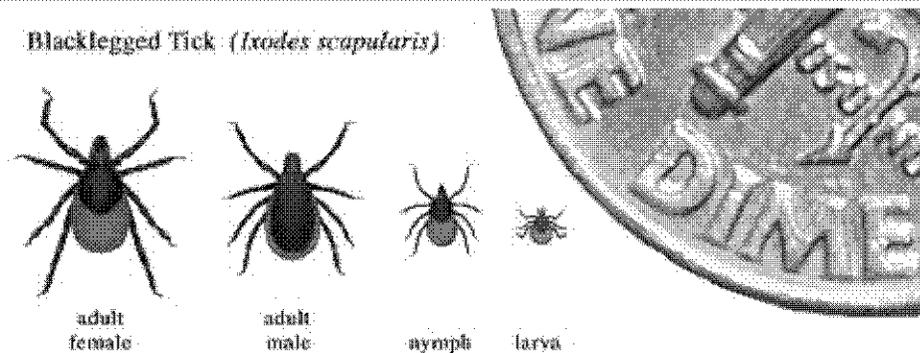
The Lyme disease bacterium, *Borrelia burgdorferi*, is spread through the bite of infected ticks. The blacklegged tick (or deer tick, *Ixodes scapularis*) spreads the disease in the northeastern, mid-Atlantic, and north-central United States, and the western blacklegged tick (*Ixodes pacificus*) spreads the disease on the Pacific Coast.

Ticks can attach to any part of the human body but are often found in hard-to-see areas such as the groin, armpits, and scalp. In most cases, the tick must be attached for 36-48 hours or more before the Lyme disease bacterium can be transmitted.

Most humans are infected through the bites of immature ticks called nymphs. Nymphs are tiny (less than 2 mm) and difficult to see; they feed during the spring and summer months. Adult ticks can also transmit Lyme disease bacteria, but they are much larger and may be more likely to be discovered and removed before they have had time to transmit the bacteria. Adult *Ixodes* ticks are most active during the cooler months of the year.

All about blacklegged ticks

Blacklegged Tick (*Ixodes scapularis*)



Relative sizes of several ticks at different life stages. In general, adult ticks are approximately the size of a sesame seed and nymphal ticks are approximately the size of a poppy seed.

Are there other ways to get Lyme disease?

- 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.
- 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.
- 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. Information on the current criteria for blood donation is

available on the Red Cross website at <http://www.redcross.org/donate/give/>.
(<http://www.redcross.org/donate/give/>)  (<http://www.cdc.gov/Other/disclaimer.html>)

- 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.
- 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.
- Ticks **not** known to transmit Lyme disease include Lone star ticks (*Amblyomma americanum*), the American dog tick (*Dermacentor variabilis*), the Rocky Mountain wood tick (*Dermacentor andersoni*), and the brown dog tick (*Rhipicephalus sanguineus*).

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