



## Deer Ticks and Lyme Disease



Lyme disease is a potentially serious bacterial infection transmitted to humans (and pets) by deer ticks (also called blacklegged ticks). These ticks, like all ticks, are blood feeders, i.e., they need a meal of blood to survive and reproduce. Although they love to feed on deer (hence their name) and other wild animals (especially white-footed mice and chipmunks), human blood will do just fine, as will blood from our dogs and cats. They also feed on birds and reptiles.

Unfortunately, the deer tick population is increasing in our area of Massachusetts, not only out in the woods (where they are very prevalent) but also in our yards, gardens, golf courses, and orchards. Not all deer ticks carry the Lyme disease bacteria, but some do. (They need to pick up the bacteria from an infected host animal, typically a white-footed mouse or chipmunk.) As a result, everyone in Stow, not just hikers on our many, wonderful SCT trails, needs to be informed about the hazards of deer ticks, how best to avoid being “bitten,” and what to do if you, a member of your family, or your pet has been bitten.

Set forth below is an introduction to the subject of Lyme disease and deer ticks, with accompanying links to websites containing additional information. Please educate yourself, and then pass this information on to your family, friends, and neighbors.

You should also **talk to your doctor** about what to do if bitten by a tick, even if you remove it promptly. Some doctors will have you come in to receive a prophylactic dose of an antibiotic. Others will have you watch carefully for any symptoms before coming in.

While we do not want to discourage or frighten anyone from hiking on SCT trails, it would be quite unwise to blithely head off into the woods these days without taking the simple protections noted below that can significantly reduce your risk of contracting Lyme disease. So, be educated, take precautions, use common sense, and continue to enjoy Stow’s fabulous outdoor recreational opportunities!

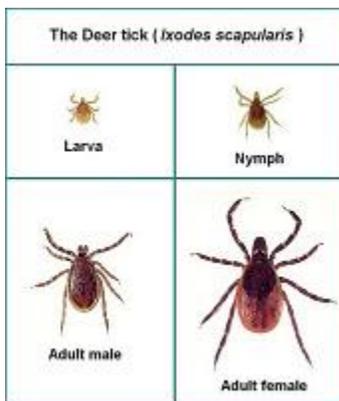


**What do deer ticks look like?** See the photo below from the American Lyme Disease Foundation website. As you can see, deer ticks are quite small, and this one in the photo is an “adult.” Before becoming adults, they go through a smaller “nymph” stage. An adult deer tick is the size of a sesame seed, while a deer tick “nymph” is the size of a poppy seed. Deer tick nymphs and adults have eight legs, six of which extend backwards. The two front legs extend forwards.



Both adults and nymphs can carry the Lyme disease bacteria and can feed on humans and pets. While a higher percentage of adult deer ticks carry the bacteria, the nymphs cause a much higher percentage of the Lyme disease cases in humans simply because they are so much harder to spot.

Here (enlarged) are the relative sizes of deer ticks in each stage of their life cycle:



**How would deer ticks get on me, and how can I spot them if they do?** Deer ticks are blind at all phases of their life cycle. So, how do they find a blood meal? Both nymph and adult deer ticks hang out near the tips of low-lying vegetation and shrubs. (They are not normally found on trees.) They can also be found in grass and in leaf-litter on the ground. Deer ticks do not fly, jump, or drop from trees. Sitting in wait at the tips of grass and brush, they use their curved front legs to grab on to passing animals and people. **They are very good at this.** Once they are on you, they are quite mobile and can crawl up pant legs and sleeves, and all over your body, before choosing a choice location for a meal. It is also quite easy for them to crawl from your dog to your sofa to you. They can also ride into your house on wood from your wood pile.

Tick bites are usually painless and, consequently, most people will be unaware that they have an attached tick without a careful check.

You have to examine yourself very carefully to spot a deer tick crawling or feeding on you. They can feed on almost any part of the body and are often found in hard-to-see areas such as the groin, armpits, and scalp. You will need a hand-held mirror (or a close friend) to examine all those parts of your (naked) body that you cannot see directly. The best practice is to examine yourself carefully from head to toe

each time you have spent time out in the woods or your yard. Deer ticks are easy to miss. That's why it's important to try to keep them off your skin altogether by wearing proper protective clothing and applying DEET to bare skin. (More on this below.)



**What's the best way to remove a deer tick that is feeding on me?** First, don't panic. Remember, not all deer ticks carry Lyme disease bacteria. And those ticks that are carrying the bacteria do not inject it into you right away. According to the U.S. Centers for Disease Control and Prevention (CDC), in most cases the tick must be attached for 36 to 48 hours or more before the Lyme disease bacterium can be transmitted. Therefore, while there is no need to panic, **prompt removal of an imbedded tick will greatly reduce your chance of infection.**

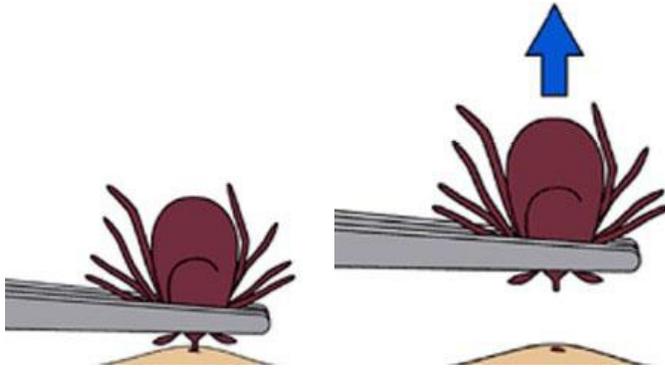
For a deer tick to feed on you, it must insert its mouthparts (often improperly described as the "head") into your skin. The term "tick bite" is somewhat misleading as ticks do not bite, feed, and then depart rapidly like a mosquito. Ticks attach slowly and feed gradually over a period of several to many days. Once a tick has found a suitable place on a human or other animal, it grasps the skin, tilts its body at a 45-60° angle, and begins to cut into the skin with its saw-like mouthparts. See this video from The New York Times: <http://www.nytimes.com/2013/10/30/science/earth/how-does-a-tick-do-its-dirty-work-research-video-offers-a-clue.html>

After a tick's mouthparts penetrate to a sub-layer of the skin rich with blood, they become encased in a "cement" secreted by the tick. The cement serves to hold the mouthparts in place while the tick feeds. This cement also makes it more difficult for you to remove a feeding tick. You cannot brush off an imbedded tick. You need some sort of tick removal device.

There are several tick removal devices on the market, but a set of fine-tipped tweezers can 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. [See the CDC's illustration below.]
2. Pull upward with steady, even pressure. This should remove the tick with the mouthparts intact. Don't twist or jerk the tick; this can cause the mouthparts to break off and remain in the skin. If this happens, remove the mouthparts, as best you can, with tweezers. If you are unable to remove the mouthparts easily with clean tweezers, leave them alone and let the skin heal (slowly) like you would when all of a sliver cannot be removed. Leaving mouthparts behind will not change your chances of getting Lyme disease.



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 to wait for it to detach.

One useful tick removal tool on the market is the TickEase Tick Remover (available online for about \$10). At one end it has a fine-tipped tweezers, while at the other it has a slotted scoop. Some of the tick-removal devices on the market work quite well for removing dog ticks, but they work less well when removing deer ticks, which are much smaller. For both dog and deer ticks, one tool recommended by the Appalachian Mountain Club is the Pro-Tick Remedy Tick Remover (photo below), an ingeniously simple tool, which is widely available online for about \$5 or \$6.



#### After Removing the Tick

- Disinfectant the area with alcohol or other skin disinfectant. A topical antibiotic may also be applied.
- The person who does the removal (you or a friend) should do a thorough hand washing with rubbing alcohol, an iodine scrub, or soap and water.
- You may get a small bump or redness that goes away in 1-2 days. This is not a sign that you have Lyme disease. The bite wound itself may take a few more days to heal.
- Save the tick, in case your doctor wants it to be tested. A live tick can be placed in a crush proof container with a blade of grass to keep it alive. A sealable plastic bag will also work. A small, clear plastic vial is best.
- Make a note of the date you were bitten and the location of the bite on your body, since you will need to monitor this area for at least 30 days. You don't want to forget where this was.
- Contact your doctor to see whether s/he wants you to (a) come in for prophylactic treatment or (b) watch for any signs or symptoms of Lyme disease before coming in.

For more information on removing ticks, see:

- Centers for Disease Control and Prevention: <http://www.cdc.gov/lyme/removal/index.html>
- American Lyme Disease Foundation: <http://www.aldf.com/american-lyme-disease-foundations-educational-videos/>
- Appalachian Mountain Club: <https://www.outdoors.org/articles/amc-outdoors/how-to-remove-a-tick/>



**What signs or symptoms should I be looking for after being bitten?** Look for the following signs or symptoms for at least 30 days if you know you have been bitten by a tick. But because you may not know that you have been bitten, you should also keep an eye out generally for these signs and symptoms. **If you observe any of them, you should seek medical attention right away!**

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

- Red, expanding rash, sometimes in a bulls-eye design, called erythema migrans (EM). [See photos below.] Look carefully for it in bright light, since it can often go unrecognized. The rash usually feels warm to the touch but is rarely itchy or painful. Very early on, a bulls-eye shape is less common than other forms of the rash. The bulls-eye appearance is more characteristic of older rashes. It typically develops as parts of the expanding rash become clear.
- 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. However, in others these general symptoms may be the only evidence of infection with the Lyme disease bacterium.





Spirochetes of the Lyme disease bacterium first multiply locally in the tick-bite site and then disseminate widely within days to weeks through the skin, lymph, or blood to various organ systems, particularly skin, joints, nervous system, or cardiac tissue. Signs and symptoms may be intermittent, migratory, and changing.

It is important to keep looking for these symptoms for at least 30 days after a tick bite. According to the CDC, a 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 (average is about 7 days).

#### *Follow-up*

If you develop any of these signs or symptoms, see your doctor right away. Be sure to tell the doctor about your recent tick bite, when the bite occurred, and where you most likely acquired the tick.

According to the CDC, patients treated with appropriate antibiotics in the early stages of Lyme disease usually recover rapidly and completely. Antibiotics commonly used for oral treatment include doxycycline and amoxicillin.

For more information on signs and symptoms, see:

- CDC: [http://www.cdc.gov/lyme/signs\\_symptoms/index.html](http://www.cdc.gov/lyme/signs_symptoms/index.html)
- Mayo Clinic: <http://www.mayoclinic.com/health/lyme-disease/DS00116/DSECTION=symptoms>



**What steps can I take to reduce my chances of being bitten by deer ticks?** To reduce your risk of being bitten by a deer tick, here are the steps you should take:

#### **1. Avoid Direct Contact with Deer Ticks as much as possible**

- Avoid wooded and bushy areas with high grass and leaf litter.
- Walk in the center of trails to minimize contact with adjacent vegetation. Wide trails are preferable to narrow ones through brush and tall grass.

#### **2. Wear Clothes that will Help Shield you from Ticks**

- Wear long-sleeved pants and shirts.

- Wear light-colored clothes to make it easier to spot ticks.
- Tuck your pants into the top of your socks or boots to create a "tick barrier." (See photo below.) This looks dorky, we know. But you don't have a tick barrier without it. Deer ticks love to crawl up the inside of pant legs.



- Do not wear open-toed shoes or sandals.

### 3. Use a good Tick Repellent

- Products containing **permethrin**, which are sprayed on clothing, are especially recommended for people who will be spending any period of time in possible tick habitat. Permethrin products are marketed under various names and are available in stores that sell outdoor gear. They can also be purchased online. (*Campmore* sells a 24-oz spray bottle for \$15: [http://www.campmor.com/outdoor/gear/Product\\_81336](http://www.campmor.com/outdoor/gear/Product_81336))
- Permethrin should **not** be used on your skin.
- Even when spending a short time in tick habitat, use DEET- or Picaridin-based products on exposed skin. Concentrations up to 30 percent DEET are safe for children (according to reports from the American Academy of Pediatrics). Parents should apply the DEET product to their children, avoiding hands, eyes, and mouth. Do not use DEET for infants under two months of age.
- Follow the manufacturer's directions for all repellent applications.

### 4. Always Take these CDC-Recommended Steps when you Return from Tick Habitat

- 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 (or using a close friend) 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, and then attach to a person later; so carefully examine pets, coats, and day packs.
- Tumble non-sprayed clothes in a dryer on high heat for at least 10 minutes to kill remaining ticks.
- Remove all imbedded ticks promptly in the manner described above.
- Watch carefully for any signs or symptoms of Lyme disease, since it is easy to miss a tick (especially a nymph), even with a full-body check.

##### 5. Use recommended Landscape Practices to Reduce Tick and Host-Animal Habitat adjacent to your home.

- Keep your lawn mowed short.
- Remove leaves and clear the brush around your house and at the edges of your yard.
- Keep your children’s play-sets or swing-sets in a sunny and dry area of the yard.
- Make a landscape barrier (such as a three-foot wide border of wood chips) between your lawn and the woods.
- Consider placing “tick tubes” around your yard in places where mice may be living. See: <http://www.ticktubes.com/> Mice and chipmunks are the primary carriers of the Lyme disease bacteria in our area, and deer ticks become infected with the bacteria only if they obtain a blood meal from an infected host animal. Because we live in a wooded area, there is no practical way to remove all mice and chipmunks from our yards and the surrounding vegetation. Tick tubes are small cardboard tubes containing permethrin-treated cotton balls. Mice gather the cotton balls for their nest. (Chipmunks don’t do this.) Deer ticks feeding on the mice are then killed by the insecticide. Each mouse nesting in these cotton balls can kill hundreds of deer ticks in a season.

For more information on steps you can take to protect your family and your yard, see:

- Tick Management Handbook (by Conn. Agricultural Experiment Station): <http://www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf>





**Tell me more about Lyme disease?** According to the American Lyme Disease Foundation (ALDF), Lyme disease manifests itself as a multisystem inflammatory disease that affects the skin in its early, localized stage, and spreads to the joints, nervous system and, to a lesser extent, other organ systems in its later stages. Its name stems from the fact that it was first identified in Lyme, Connecticut.

After a person is bitten by an infected tick, symptoms occur in 3 to 30 days. An early sign of Lyme disease is the characteristic expanding rash that often appears as a red ring with a central clearing. This rash is often described as having a "bull's-eye" appearance. Other symptoms may include fever, chills, headache, fatigue, sore throat, a stiff neck, and pain in the muscles or joints.

A year or more after the bite of an infected tick, symptoms of persistent infection in untreated or inadequately treated individuals may include numbness or tingling of the extremities, sensory loss, weakness, diminished reflexes, disturbances in memory, mood or sleep disturbances, cognitive function deficits, and an intermittent chronic arthritis (typically swelling and pain of the large joints, especially the knee). Approximately 50-60% of untreated individuals develop arthritis and about 10% of these will progress to chronic arthritis. Attacks of arthritis may last weeks to months with remissions and relapses over a period of several years.

There is currently no vaccine available that can prevent getting Lyme disease. **However, if diagnosed and treated early with antibiotics, Lyme disease is almost always readily cured.**

Generally, Lyme disease in its later stages can also be treated effectively, but because the rate of disease progression and individual response to treatment varies from one patient to the next, some patients may have symptoms that linger for months or even years following treatment. In rare instances, Lyme disease causes permanent damage.

For more information on Lyme disease, see:

- American Lyme Disease Foundation: <http://www.aldf.com/lyme-disease/>
- Centers for Disease Control: <http://www.cdc.gov/Lyme/>
- UpToDate.com: [http://www.uptodate.com/contents/patient-information-lyme-disease-symptoms-and-diagnosis-beyond-the-basics?source=related\\_link](http://www.uptodate.com/contents/patient-information-lyme-disease-symptoms-and-diagnosis-beyond-the-basics?source=related_link)



## How can I find out more about deer ticks and their life cycle?

For more information about deer ticks and their life cycle, see:

- Minnesota Dept. of Health:  
<http://www.health.state.mn.us/divs/idepc/dtopics/tickborne/twoyrcycle.html>