

Diseases, Disorders and Injuries

Lyme Disease

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What is Lyme disease?

Lyme disease is an illness caused by bacteria called *Borrelia burgdorferi*. This bacterium is carried by certain ticks and spreads to the host when the tick bites. The bacterium is normally found in small animals, such as mice, squirrels, chipmunks, shrews, etc.

Lyme disease in humans can have a range of effects from rashes and flu-like symptoms to more serious symptoms, including arthritic, cardiac, and neurological effects. It can often be effectively treated, especially if detected in the early stages.

Lyme disease is an occupational concern for people who work outdoors. Any person who spends time outdoors is also at risk.

In Canada, Lyme disease is the most frequently reported "vector-borne" disease. A vector is the term for any insect or arthropod that carries and transmits a disease pathogen (virus, bacteria, etc.).

How is Lyme disease transmitted?

Ticks can become infected with *Borrelia burgdorferi* by feeding on infected wild animals, and then can spread the bacteria through their saliva when they feed on blood from the host. Ticks cannot fly - they wait for an animal or person to pass near them, and when the animal or person makes contact, the ticks attach themselves to the skin to feed.

Ticks are typically found:

- In natural wooded areas
- In areas with shrubs, leaf litter, wood piles, or tall grass
- Near animals that ticks feed on, such as rodents, birds, and deer
- In temperatures at 4°C and higher

In North America, Lyme disease is transmitted (spread) mainly by two species of ticks:

- Blacklegged tick (sometimes called the deer tick), *Ixodes scapularis*
- Western blacklegged tick, *Ixodes pacificus*

The Public Health Agency of Canada (PHAC) states that there is no evidence that Lyme disease can spread from person-to-person. Pets, especially dogs, can get Lyme disease, but there is no evidence that pets can spread the infection directly to humans. They may, however, carry infected ticks into the home or yard, which may increase the chance of transmission.

What are the signs and symptoms of Lyme disease?

Tick bites are usually painless, and most people do not know they have been bitten. Signs and symptoms of Lyme disease vary greatly from person to person, and may appear anywhere between 3 to 30 days after a person has been bitten.

Symptoms often include:

- Fatigue
- Fever or chills
- Headache
- Muscle and joint pain
- Swollen lymph nodes
- Skin rash

One sign of infection can be an expanding rash, sometimes referred to as a "bull's eye" rash because it may have rings spreading from the bite site (known as erythema migrans (EM rash)). It is important to note that rashes without the bull's eye may occur, and that rashes do not appear in every case of Lyme disease infection.

Later symptoms of Lyme disease can appear days to months after a bite and include:

- Severe headaches
- Additional EM skin rashes
- Neurological disorders (dizziness, mental confusion or inability to think clearly, memory loss, inflammation of the brain and spinal cord, nerve pain, numbness or tingling in the hands or feet)
- Nervous system disorders, including facial paralysis or Bell's palsy (loss of muscle tone or droop on one or both sides of the face)
- Muscle, joint, tendon, and bone aches
- Arthritis with severe joint pain and swelling, particularly the knees and, less commonly, in other joints, such as the ankle, elbow, and wrists

If untreated, a condition called late disseminated Lyme disease may occur. PHAC reports symptoms include recurring arthritis (muscle and joint pain), nervous system and/or neurological problems. Symptoms can also include numbness and/or paralysis (inability to move parts of the body). Deaths from Lyme disease are rare but may occur.

Lyme disease can be difficult to recognize, and it has been confused with other diseases. It is important for people to consult with their doctor if they feel it is possible that they have Lyme disease.

PHAC provides more information on [Lyme Disease](#).

Can Lyme disease be treated?

In most cases, yes. Antibiotics can effectively treat Lyme disease, especially when treatment begins early. Cases that reach the later stages of the disease, however, can be difficult to treat, and some symptoms can persist.

PHAC reports that removing the tick within 24-36 hours usually prevents infection.

How do I know if I have a tick bite?

Many people who develop the disease do not remember seeing ticks or being bitten. Tick bites commonly occur from May to September in North America, although blacklegged ticks can be active most of the year. Ticks sometimes move around on the body, but they usually attach themselves to the skin and stay in one place. Before feeding, ticks look like small, brown scabs or freckles. After feeding, ticks may swell considerably and could be as big as a raisin or a small grape.

Follow the link for more information about [blacklegged \(deer\) ticks](#) (including photographs) from the Government of Canada.

If you think you have been bitten by a tick, or if you are showing symptoms, contact your employer and a healthcare professional. Your employer may also be required to notify the [government department responsible for health and safety](#), or the workers' [compensation board](#).

Are some locations more at risk than others?

Yes and no. There are areas in which the bacteria are endemic, meaning the disease is established and present more or less continually in that community.

In Canada, blacklegged and western blacklegged tick populations have been confirmed or are growing in the following areas:

- Coastal and southern British Columbia
- Southern Manitoba
- Western, southern, and southwestern Ontario
- Southern Quebec
- Mid and Southern New Brunswick and Grand Manan Island
- Nova Scotia

However, it is important to note that ticks (including those infected with the *Borrelia burgdorferi* bacteria) can be spread by birds, particularly songbirds that feed on the forest floor. Because these birds are migratory, there is the potential for new populations of the bacteria to spread across the country. This fact means that you do not have to be in an endemic or high-risk area to be at risk of contracting ticks and the disease.

Ticks are also spreading to new areas in Canada due to climate change. Climate change is increasing the number of ticks, the length of time ticks can survive, and the duration of the season.

What tests are available for Lyme disease?

When a person becomes infected, the body creates antibodies to protect itself from the bacteria. Certain blood tests are available to measure these antibodies. However, sometimes a "false negative" test can result if there are not enough antibodies in the blood for the tests to detect accurately. A doctor should also do a complete medical examination and gather information about your recent outdoor activities in order to make a clinical diagnosis for Lyme disease.

Who is at risk?

Anyone who either works outside or has contact with animals that may carry ticks (including domestic animals like dogs, cats, goats, cows, horses, etc.) is susceptible to being bitten by a tick. Many occupations may be at risk, including:

- Construction workers
- Dog walkers
- Forestry workers
- Farm workers
- Groundskeepers
- Landscapers
- Loggers
- Telecommunications line workers
- Veterinarians
- Park or wildlife management

Similarly, any person who spends a lot of time outdoors (hiking, camping, birding, golfing, hunting, fishing, etc.), especially in grassy or wooded areas, may also be at risk.

How can Lyme disease be prevented?

In areas where ticks are found, people should know about the risk of Lyme disease and should take precautions to protect themselves. Be aware of the signs and symptoms of Lyme disease so it can be detected and treated promptly. PHAC states that removing ticks within 24 to 36 hours after the tick bite usually prevents infection.

- Find out from your local public health office if there are ticks in your area, especially *Ixodes* ticks.
- If possible, avoid contact with low bushes and long grasses. For example, if hiking or walking, walk in the centre of the trail.
- Wear protective clothing to prevent ticks from attaching to your skin. Wear closed-toed shoes with a long-sleeved shirt and pants. Your shirt should fit tightly around the wrists and be tucked into your pants, with your socks pulled over your pant legs.
- Use insect repellents containing DEET or Icaridin to repel ticks. Apply to both clothes and skin. Always read the label and follow instructions for use.
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- Wear light coloured clothing to help you to find the ticks more easily.
- Tie back long hair.
- Check for ticks on and under clothing, especially after being in areas where ticks may live.
- Inspecting your skin daily greatly reduces the risk of infection, as ticks may take several hours to two days to attach to the skin and feed. Do a whole-body check, including armpits, in and around hair, navel, groin, and behind the ears and knees. Also, check children and pets, as well as outdoor gear you may bring into the house.
- Wash clothes promptly and put them in the dryer with high heat to help kill any ticks that may remain.
- Shower or bathe after being outdoors to wash away loose ticks.
- Carefully remove ticks found attached to the skin. Use clean, fine-point tweezers to grasp the head and mouth parts of the tick as close to the skin as possible. Pull straight out slowly to remove the whole tick. Try not to squash, twist, or crush the tick since this can help bacteria to get into the body.
 - If the mouthparts of the tick break off or do not come out, PHAC recommends removing them with tweezers or, if you are unable to remove them easily, leave them alone to let the skin heal and consult your healthcare provider.
 - Wash the affected area and your hands with soap and water or disinfect with alcohol hand sanitizer after removing the tick.
 - Keep the tick for testing by placing it in a small sealed container or double zip-lock bags. Write the date on the container or bag. Bring the tick to your doctor if you experience any symptoms or if you think you might be having symptoms. You can also take and submit a photo of the tick to an image-based identification platform.
 - To kill the tick, place it in rubbing alcohol or freeze it for several days. Do not try to squash with your bare fingers.
 - Contact your public health office for details on the tick identification and any testing program that might be available in your area, and how to submit a tick for testing.
- Know the signs and symptoms of Lyme disease.
- Contact a doctor immediately if you have an illness that resembles Lyme disease. If you were able to save the tick, bring it to your medical appointment, as it may help the doctor.

PHAC has also prepared a Lyme disease [tool kit](#), which provides materials to raise awareness and educate.

What can a workplace or home do to reduce the presence of ticks?

- Keep the lawn and yard well-maintained to prevent ticks from living near the home or workplace.
- Keep the grass mowed. Trim trees and shrubs.
- Remove leaf litter, brush, and weeds at the edge of the lawn, and around stonewalls and woodpiles.
- Clean up and seal stonewalls and small openings around the home to help discourage rodents.
- Keep stacked firewood piles and bird feeders away from buildings.
- Keep any pets, particularly dogs, out of the woods and talk to your veterinarian about tick repellents for your pets.
- Move children's swing sets and sandboxes away from the woodland's edge and use a woodchip or mulch foundation.
- Consider using hard landscape items, such as woodchips, mulch, stones, gravel, tile, or metals.
- Create a border or barrier between the lawn, woods, or stonewalls to discourage deer and rodent activity.
- Widen woodland trails.
- Consider a least-toxic pesticide application as a targeted barrier treatment.

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