

## Lyme Disease Fact Sheet

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- What is Lyme disease?
- How do people get Lyme disease?
- What are ticks?
- What are the symptoms of Lyme disease?
- How is Lyme disease diagnosed?
- What is the treatment for Lyme disease?
- What precautions should you take to avoid Lyme disease?
- How prevalent is human Lyme disease in Canada?
- What is the Government of Canada doing to address Lyme disease?

### What is Lyme disease?

Lyme disease is an illness caused by the bacterium, *Borrelia burgdorferi*, which can be spread through the bite of certain types of ticks. Lyme disease in humans can have serious symptoms but can be effectively treated. Cases of Lyme disease have been reported in parts of Europe, Asia, and throughout much of North America.

### How do people get Lyme disease?

The bacterium that causes Lyme disease is normally carried in mice, squirrels, birds and other small animals. This bacterium is transmitted to ticks when they feed on these infected animals and then to humans through the bites of the infected ticks. In British Columbia, the western blacklegged tick transmits Lyme disease while in other parts of Canada, the disease is spread by the blacklegged tick, sometimes called the deer tick. Lyme disease is not transmitted directly from person-to-person by means such as touching or kissing. Although dogs and cats can contract Lyme disease, there is no evidence that they can transmit the infection directly to humans. Pets can, however, carry infected ticks into your home or yard. Deer hunting may increase exposure to ticks due to the need to track through high grass and brush areas. However, Lyme disease cannot be contracted from eating deer.

### What are ticks?

Though closely related to insects, ticks are actually a type of mite. Ticks vary in size and colour; blacklegged ticks are very small. Before feeding, adult females are approximately 3-5 mm in length and red and dark brown in colour; following a blood-meal, females can be as large as a grape. In the pre-adult stages, young ticks are smaller and lighter in colour, when unfed. Ticks are usually picked up when brushing against vegetation and once on bare skin they attach by their mouth parts.

There are established populations of the tick that transmits Lyme disease in Canada. Though *western blacklegged ticks* are widely distributed in British Columbia, populations are largest in the lower mainland, on Vancouver Island and in the Fraser Valley. Established populations of *blacklegged ticks*, on the other hand, have been found in southern and eastern Ontario, southeastern Manitoba and parts of Nova Scotia.

Research has shown that blacklegged ticks can be found in all areas of Canada, even where tick populations have not been previously identified. It is presumed that these ticks are introduced into these areas by migratory birds. About 10% of these ticks are infected with the Lyme disease agent. While it is possible to be bitten by an infected tick anywhere in Canada, the chances of this occurring are considered low in areas where populations are not established.

### What are the symptoms of Lyme disease?

The symptoms of Lyme disease are often described in three stages, although not all patients have symptoms of each stage. The first sign of infection is usually a circular rash called erythema migrans or EM. This rash occurs in about 70-80% of infected persons and begins at the site of the tick bite after a delay of three days to one month. Patients often also experience symptoms such as:

- fatigue
- chills
- fever

headache  
muscle and joint pain  
swollen lymph nodes.

If the infection goes untreated, the second stage of the disease can last up to several months with possible symptoms including:

central and peripheral nervous system disorders  
multiple skin rashes  
arthritis and arthritic symptoms  
heart palpitations  
Extreme fatigue and general weakness

If the infection continues to go untreated, the third stage of the disease can last months to years with possible symptoms including, chronic arthritis and neurological symptoms. If contracted during pregnancy, adverse effects on the fetus, including stillbirth, can occur.

Fatalities from Lyme disease are rare. However, undiagnosed Lyme disease may develop into chronic disease that may be difficult to treat.

### **How is Lyme disease diagnosed?**

The diagnosis of Lyme disease should be made after evaluation of a patient's symptoms and the risk of exposure to infected ticks. Blood tests may be administered in conjunction with clinical diagnosis to demonstrate the presence of antibodies to the bacteria.

It should be stressed that the results of blood tests cannot be interpreted in the absence of appropriate clinical information (i.e., symptoms of infection). The Public Health Agency of Canada recommends the two-tiered approach for blood testing (i.e., screening blood samples with one test and continued testing only on samples that test positive for Lyme disease) and cautions against the use of invalidated tests or interpretation of results without appropriate guidelines. Blood tests may be negative in patients with early Lyme disease or in patients who have had antibiotic treatment. However, the accuracy of blood tests becomes more reliable as the infection progresses.

### **What is the treatment for Lyme disease?**

Although Lyme disease can have serious symptoms, several antibiotics are available to treat the illness. Lyme disease is more effectively treated if diagnosed early in the course of illness. Most cases of Lyme disease can be cured with a 2-4 weeks of treatment with doxycycline, amoxicillin, or ceftriaxone. Persons with certain neurological or cardiac forms of illness may require intravenous treatment with penicillin or ceftriaxone. Patients diagnosed in the later stages of the disease can have persistent or recurrent symptoms requiring a longer course of antibiotic treatment. Treatment failure has been reported, requiring patients be retreated; the risk of treatment failure is greater in patients with long-term Lyme infection.

### **What precautions should you take to avoid Lyme disease?**

In areas where ticks are found, individuals should know about the risk of Lyme disease and should take precautions to protect themselves.

- Find out from your local public health office if there are ticks in your area, especially blacklegged ticks.
- Wear protective clothing to limit the access of ticks to your skin. This clothing should include enclosed shoes, long-sleeved shirts that fit tightly around the wrist and are tucked into pants, and long-legged pants tucked into socks or boots. Light coloured clothing helps to be able to spot ticks.
- Insect repellents containing DEET are safe and can effectively repel ticks. Repellents can be applied to clothing as well as exposed skin but should not be applied to skin underneath clothing (note: DEET may damage some materials). Always read and follow label directions.
- Check for ticks on clothing and skin after being in tick-infested areas. A daily total-body inspection and prompt removal of attached ticks (i.e., within 18 to 24 hours) can reduce the risk of infection.



- Blacklegged ticks are very small, particularly at the nymphal stage, be sure to look carefully. Do not forget to check children and pets as well.
- Carefully remove attached ticks using tweezers. Grasp the tick's head and mouth parts as close to the skin as possible and pull slowly until the tick is removed. Do not twist or rotate the tick and try not to damage the tick (i.e., squash or crush it) during removal.
  - After removing ticks, wash the site of attachment with soap and water or disinfect it with alcohol or household antiseptic. Note the day of the tick bite and try to save the tick in an empty pill vial or doubled zip-lock bag.
  - Contact a doctor immediately if you develop symptoms of Lyme disease, especially when you have been in an area where blacklegged ticks are found. If you have saved the tick, take it with you to the doctor's office.

### **How prevalent is human Lyme disease in Canada?**

Lyme disease is not a nationally reportable disease in Canada. The Public Health Agency of Canada surveys the provinces and territories to assess the number of cases and distribution of Lyme disease in Canada. This survey would not be expected to capture all of the cases of Lyme disease that occur in Canada, particularly cases of early Lyme disease. The data collected indicates considerable variation in reported human cases from year to year, which makes it difficult to identify specific trends.

The risk for exposure to the disease is highest in a small number of regions where the ticks that transmit Lyme disease are known to be established including parts of southern and eastern Ontario, southeastern Manitoba and Nova Scotia as well as much of southern British Columbia. Surveillance data indicates a small number of blacklegged ticks are introduced into widely separated areas of Canada by migratory birds, posing some risk that individuals in other areas may also be exposed to infected ticks.

Although rarer than Lyme disease, there are other infections that can also be contracted from blacklegged ticks. These include *Anaplasma phagocytophilum*, the agent of human granulocytic anaplasmosis; *Babesia microti*, the agent of human babesiosis and Powassan encephalitis virus. The precautions outlined above will also help to protect individuals from these infections.

### **What is the Government of Canada doing to address Lyme disease?**

The Canadian Institutes of Health Research (CIHR) is currently funding a health research project on Lyme disease. Funding of \$820,000 over five years has been provided to study the properties of the tick. This health research project will lead to further understanding of the pathogen causing Lyme disease.

Public Health Agency of Canada scientists continue to collaborate in studying the occurrence of tick populations in Canada. These studies have demonstrated the low-risk of encountering ticks infected with the Lyme disease agent in most of Canada. Many of these findings have been published and reported at scientific meetings to help increase awareness of the potential for Lyme disease to occur in Canada.

In addition, Public Health Agency of Canada scientists are currently researching the potential impacts of climate change on the distribution of the ticks that carry Lyme disease. This research will contribute to our understanding of the occurrence of the disease.