

LYME DISEASE

Case definition

The Lyme disease case definition can be found in the [NS Surveillance Guidelines](#) found here: <https://novascotia.ca/dhw/populationhealth/surveillanceguidelines/lyme.pdf>

Causative agent

A spirochete, *Borrelia burgdorferi* (*B. burgdorferi*).

Source

The *Ixodes scapularis*, commonly known as the blacklegged tick (BLT) or deer tick, and the *I. pacificus* tick, also known as Western BLT, are the vectors that can spread Lyme disease. Deer and wild rodents are the reservoirs for these ticks. Adult blacklegged ticks normally feed on deer while nymphs primarily feed on small rodents such as mice and squirrels. *I. scapularis* have been found throughout Nova Scotia. *I. pacificus* is primarily found in British Columbia.

BLT survive best in areas that provide a moist habitat, such as wooded or forested areas, urban parks, and gardens, because the trees provide shade, and leaves provide protective ground cover.

Migrating birds can also carry BLT into other areas of Nova Scotia. Nova Scotia has a suitable climate for tick populations. Climate change contributes to the expansion of tick populations in Canada. As temperatures increase, prevalence, activity and tick species are also expected to increase. In addition, as environments become more suitable tick habitats, tick survival increases, reservoir hosts may be more abundant and tick activity period is lengthened.

Transmission

Tick-borne; transmission of *B. burgdorferi* occurs after the infected nymphal, larval, or adult BLT has been attached for at least 24-36 hours.

- There is a risk of being bitten by an infected BLT throughout Nova Scotia. When travelling outside NS, the risk of Lyme disease increases in areas that are known to have established populations of BLT or Western BLT that carry the bacteria that can cause Lyme disease.
- Patients with active disease should not donate blood because spirochetemia occurs in early Lyme disease.
- Other ticks in Nova Scotia, such as the common dog tick, cannot transmit Lyme disease.

Communicability

There is no evidence of natural person-to-person transmission. Rare cases of congenital transmission have been documented but epidemiological studies have not shown any links between maternal Lyme disease and adverse outcomes of pregnancy.

Incubation Period

The incubation period is 3-30 days with a mean of 11 days, during which most people will develop a characteristic rash, erythema migrans (EM)* (see below).

Symptoms

The clinical information presented below is not intended to describe the complete range of signs and symptoms that may be used in a clinical diagnosis of Lyme disease. Symptoms of early or late disseminated Lyme disease are described in the [2020 Clinical Practice Guidelines](#) by the Infectious Diseases Society of America.

Early Lyme disease includes the following when an alternative explanation is not found:

Early localized Lyme disease symptoms are most commonly characterized by a red rash (EM) that spreads from the site of the tick bite as described below. Other symptoms can occur including fatigue, headache, fever, swollen lymph nodes, joint and/or muscle pain. EM rash occurs in approximately 70 – 80% of infected people.

Diagnosis of EM requires careful examination by a physician to eliminate alternative types of skin rashes. Note that it is recommended that physicians treat patients with EM without serological testing as specific antibodies are often not detectable in early Lyme disease.

*EM: a round or oval expanding erythematous area of the skin, often greater than 5 cm in diameter and enlarging slowly over one to two weeks (range 3-30 days) after infection and persists for up to eight weeks. Some lesions are homogeneously erythematous, whereas others have prominent central clearing or a distinctive target-like appearance. On the lower extremities, the lesion may be partially purpuric. Signs of acute or chronic inflammation are not prominent in early stages. There is usually little to no pain, itching, swelling, scaling, exudation or crusting, erosion or ulceration, except that some inflammation associated with the tick bite itself may be present at the very centre of the lesion.

Note: An erythematous skin lesion present while a tick vector is still attached or that has developed within 48 hours of detachment is most likely a tick bite hypersensitivity reaction (i.e., a non-infectious process), rather than EM. Tick bite hypersensitivity reactions are usually less than 5 cm in largest diameter, sometimes have an urticarial appearance and typically begin to disappear within 24-48 hours.

Depending on the local epidemiology, individuals with early Lyme disease may also have a co-infection from other tick borne illnesses such as Anaplasmosis, Babesiosis and Powassan virus.

If untreated, the bacteria causing Lyme disease can disseminate through the bloodstream and lymphatic system to other body sites.

Disseminated Lyme disease includes any of the following when an alternative explanation is not found:

- **Multiple erythema migrans:** EM lesions, similar to the single EM lesion described above, but in multiple locations on the body and may be smaller (< 5cm).
- **Neurological** – Early neurological Lyme disease: acute peripheral nervous system involvement, including radiculopathy, cranial neuropathy and mononeuropathy multiplex (multifocal involvement of anatomically unrelated nerves), and CNS involvement, including lymphocytic meningitis and, rarely, encephalomyelitis (parenchymal inflammation of brain and/ or spinal cord with focal abnormalities). Late neurologic Lyme disease may present as encephalomyelitis, peripheral neuropathy or encephalopathy.
- **Musculoskeletal** – Lyme arthritis is a monoarticular or oligoarticular form of arthritis most commonly involving the knee, but other large joints or the temporomandibular joint may be involved. Large effusions that are out of proportion to the pain are typical. Lyme arthritis is often intermittent if untreated, with episodes of joint inflammation spontaneously resolving after a few weeks to a few months. Persistent swelling of the same joint for 12 months or more is not a usual presentation.
- **Cardiac** – Cardiac involvement associated with Lyme disease includes intermittent atrioventricular heart block often involving the atrioventricular node (although heart block may occur at multiple levels) and sometimes associated with myocarditis. Carditis can occur in the early stages of the disease.

Post-treatment Lyme disease syndrome:

Following treatment some patients may have residual non-specific complaints termed, post-treatment Lyme disease syndrome (PTLDS). The cause of this syndrome is not clear but at present there are no data to suggest prolonged antibiotic treatment courses in these patients is beneficial.

Diagnostic testing, Treatment and Chemoprophylaxis

Information specific to diagnostic testing and treatment for Lyme disease can be found in the [Guidelines for Primary Care and Emergency Medicine Providers in the Management of Lyme Disease, Human Granulocytic Anaplasmosis, Babesiosis and Powassan virus Infection in Nova Scotia produced by the Infections Diseases Expert Group \(IDEG\)](https://novascotia.ca/dhw/cdpc/documents/statement-management-ld-hga-b-pvi.pdf) <https://novascotia.ca/dhw/cdpc/documents/statement-management-ld-hga-b-pvi.pdf>.

Primary care providers as well as Pharmacists are able to prescribe prophylactic treatment for the purpose of preventing Lyme disease for individuals bitten by a BLT using the criteria outlined in the IDEG Management Guidelines. Chemoprophylaxis can be given within 72 hours of the removal of an identified high risk tick bite, which is defined as:

- The tick is identified as a BLT.
- The tick was attached for > 36 hours or appears engorged.
- The tick bite occurred in an at risk area (Nova Scotia is considered an at risk area).

Routine use of prophylactic antimicrobials following a tick bite is not recommended. Prophylaxis is recommended for a subset of individuals if appropriate criteria are met as described above.

PUBLIC HEALTH MANAGEMENT & RESPONSE

Public Health Case management

This disease is notifiable. No Public Health follow-up is required for individual case management. If contacted, Public Health should educate the client and/or family about Lyme disease and prevention measures, providing access to fact sheets, brochures and websites, as indicated. The following CCDR article, [“Review of methods to prevent and reduce the risk of Lyme disease”](#) may assist with this discussion.

The reinfection case definition found in the [NS Surveillance Guidelines](#) is used for public health surveillance purposes ONLY and should not be used to guide clinical decision making. Clinical reinfection is diagnosed based on new symptoms of Lyme disease rather than persistently positive serology, given that serology may remain positive. Clinicians should consult a medical microbiologist prior to ordering repeat serologic testing.

Education

Key messages

- Blacklegged ticks are found throughout Nova Scotia, therefore the province is considered a high incidence area for Lyme disease.
- Nova Scotians are encouraged to spend time outdoors, be active and remember to protect themselves against tick bites, which is the best way to prevent Lyme disease.
- Use personal insect repellent with ingredients proven to be effective by [Health Canada](https://www.canada.ca/en/health-canada/services/about-pesticides/insect-repellents.html#a3). <https://www.canada.ca/en/health-canada/services/about-pesticides/insect-repellents.html#a3>. Follow directions on the product label carefully.
- Cover skin when walking, working, or playing in areas where ticks are found.
- Wear enclosed shoes, tucking shirt in pants and pant legs in socks.
- Walk on well-traveled paths, avoiding high grass and vegetation.
- Check yourself, your children and pets after walking in grassy or wooded areas. When possible, take a bath or shower within two hours of coming indoors. This makes it easier to find ticks and washes away loose ones. Check clothing and inspect skin including in and around ears, arm pits, inside belly button, groin, around the waist, and especially in hair and scalp area.
- Remove ticks as soon as you find them. [To safety remove the tick](#), carefully grasp the head of the tick as close to the skin as possible with clean tweezers and slowly pull the tick straight out. Try not to twist or crush the tick. Clean your hands with soap and water or alcohol-based sanitizer. Wash the area where the tick was attached to the skin with soap and water and disinfect with rubbing alcohol or hydrogen peroxide.
- To have a tick identified please visit [eTick.ca](#) for more information.
- Review common signs and symptoms of Lyme disease.
- See a health care provider if symptoms of Lyme disease develop after exposure to the BLT.
- Use simple landscaping techniques to reduce the number of blacklegged ticks around your home. Please see the Nova Scotia Department of Health and Wellness website for detailed information at www.novascotia.ca/dhw/cdpc/lyme.asp.

Exclusion

No exclusion is required.

Contact Tracing

No contact tracing is required.

REFERENCES

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