Lyme Disease
Nationally notifiable since 2009

1.0 National Notification
Confirmed and probable cases of disease should be notified.

2.0 Type of Surveillance
Routine case-by-case notification to the federal level

3.0 Case Classification

3.1 Confirmed case
Clinical evidence of illness with laboratory confirmation by one of the following methods:
- isolation of Borrelia burgdorferi from a clinical specimen as specified by current guidelines1,2.
- detection of B. burgdorferi DNA by PCR testing on synovial fluid, cerebrospinal fluid, EM tissue biopsies or blood and by methods specified by current guidelines1,2.

OR

Clinical evidence of illness with a history of residence in, or visit to, a Lyme disease risk area*, and with laboratory evidence of infection in the form of a positive serologic test using the two-tiered approach which consists of a screening ELISA followed by an immunoblot assay (NB: immunoblots include traditional Western blots1 or newer line blots and both formats target an identical set of B. burgdorferi immunoreactive proteins3) (see section 4.0)

3.2 Probable case
Clinical evidence of illness without a history of residence in, or visit to, a Lyme disease risk area* and with laboratory evidence of infection in the form of a positive serologic test as defined above under confirmed cases (also see section 4.0)

OR

Clinician-observed erythema migrans without laboratory evidence but with history of residence in, or visit to, a Lyme disease risk area*

* A Lyme disease risk area in Canada is defined as a locality in which there is evidence for the occurrence of reproducing populations of known tick vector species (particularly Ixodes scapularis and I. pacificus) and the likely transmission of B. burgdorferi as determined by one of the following methods: i) active field surveillance involving capture of wild rodent reservoirs as well as drag sampling on multiple occasions to ensure that ticks have become established (as evidenced by demonstration of all three feeding stages of the tick over more than one year) and that B. burgdorferi is being transmitted (as evidenced by molecular detection or culture of ticks or rodent samples)4; ii) active field surveillance involving only drag sampling for ticks5; iii) evidence from passive tick surveillance when using field-validated methods of analysis of these data to improve their specificity in detecting tick populations (these may include high numbers of submitted ticks, immature ticks and multiple ticks found feeding on humans or animals); iv) field-validated signals from human case surveillance; or v) field-validated ecological/niche models that predict risk7. Method (i) is recommended to confirm the first occurrence of Lyme disease risk areas in Provinces and Territories where these have not been identified to date. Methods (ii), (iii), (iv) and (v) are recommended only for those Provinces and Territories after the occurrence of
one or more reproducing populations of tick vectors, and B. burgdorferi transmission, has been confirmed using method (i). The known locations of Lyme disease risk areas are available at http://www.healthycanadians.gc.ca/diseases-conditions-maladies-affections/disease-maladie/lyme/risks-risques-eng.php#a3, or through websites of the relevant Provincial and Territorial public health organisations. Information on countries outside Canada where Lyme disease risk occurs can be found at http://www.phac-aspc.gc.ca/tmp-pmv/index-eng.php and http://www.cdc.gov/ticks/diseases/abroad.html.

4.0 Laboratory Comments
Criteria for serologic testing are described by the guidelines of the Canadian Public Health Laboratory Network. Serologic evidence is confirmatory only in patients with objective clinical evidence of disseminated Lyme disease, and a history of residence in, or visit to, a Lyme disease risk area. Serologic testing is not recommended in patients with early localized Lyme disease with exposure from a Lyme disease risk area.

5.0 Clinical Evidence
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 2006 clinical practice guidelines of the Infectious Diseases Society of America. Other symptoms that are, or have been suggested to be, associated with Lyme disease (including those of so-called “chronic” Lyme disease and post Lyme disease syndromes) are considered too non-specific to define cases for surveillance purposes, whether or not they may be caused by B. burgdorferi infection. The following signs and symptoms constitute objective clinical evidence of illness for surveillance purposes for Lyme disease:

**Objective evidence of Lyme disease includes the following when an alternative explanation is not found:**
In simple terms Lyme disease has three stages if left untreated: i) Early Lyme disease characterised by a red rash (>5cm; called erythema migrans or EM) that spreads from the site of the tick rash (as described below); ii) Early disseminated Lyme disease characterised by multiple EM rashes and/or neurological (facial paralysis or meningitis-like) manifestations and/or heart problems (palpitations caused by heart block) which may last several weeks to months; and iii) Late disseminated Lyme disease which is most commonly intermittent arthritis and may last months to over a year. In detail the manifestations are:

**Erythema migrans (EM):** a round or oval expanding erythematous area of the skin greater than 5 cm in diameter and enlarging slowly over a period of several days to weeks. It appears 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. There is usually little 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 erythema migrans. Tick bite hypersensitivity reactions are usually < 5 cm in largest diameter, sometimes have an urticarial appearance and typically begin to disappear within 24-48 hours. Diagnosis of EM requires careful examination by a physician to eliminate alternative types of skin rash. Note that it is recommended that physicians would normally treat patients with EM without recourse to serological testing as specific antibodies are often not detectable in early Lyme disease.

OR

**Objective evidence of disseminated Lyme disease includes any of the following when an alternative explanation is not found:**
• **Multiple erythema migrans**: EM lesions, similar to the single erythema migrans lesions 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 tempo-mandibular 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 myopericarditis. Carditis can occur in the early stages of the disease.

6.0 ICD Code(s)
6.1 ICD-10 Code(s)
A69
A69.2 Lyme Disease (Erythema chronicum migrans due to Borrelia burgdorferi)
6.2 ICD 9 Code(s)

7.0 Type of International Reporting

8.0 Comments
These are definitions for surveillance and epidemiologic purposes only, and they do not represent clinical case definitions.

9.0 References

**Date of Last Revision/Review:** November 2016