

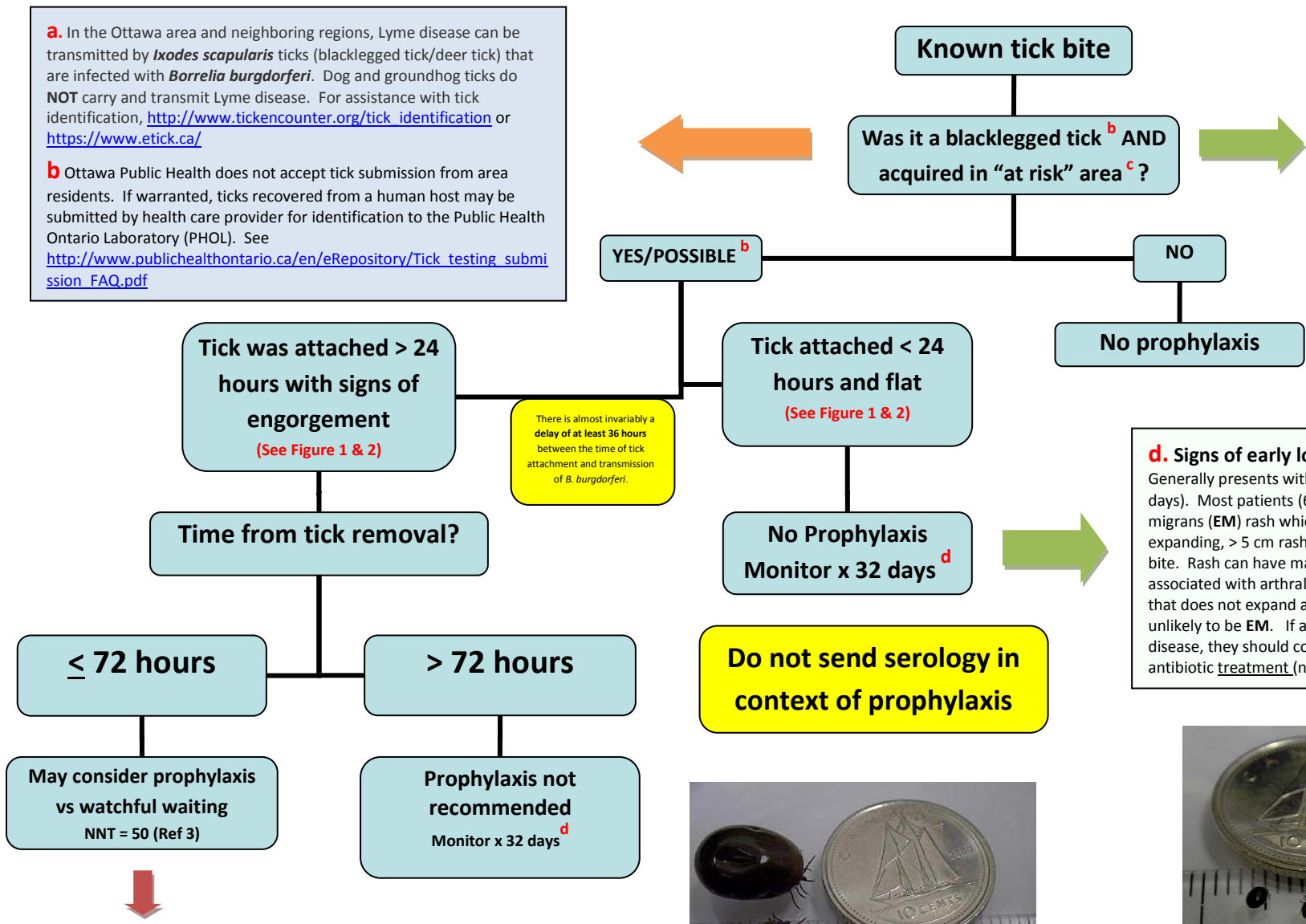
a. In the Ottawa area and neighboring regions, Lyme disease can be transmitted by *Ixodes scapularis* ticks (blacklegged tick/deer tick) that are infected with *Borrelia burgdorferi*. Dog and groundhog ticks do **NOT** carry and transmit Lyme disease. For assistance with tick identification, http://www.tickencounter.org/tick_identification or <https://www.etick.ca/>

b Ottawa Public Health does not accept tick submission from area residents. If warranted, ticks recovered from a human host may be submitted by health care provider for identification to the Public Health Ontario Laboratory (PHOL). See http://www.publichealthontario.ca/en/eRepository/Tick_testing_submission_FAQ.pdf

C. Ottawa and neighboring regions are considered "at risk" areas for Lyme disease. In a recent surveillance study, almost **30%** of ticks tested were infected with *B. burgdorferi*. Recreational trails, conservation areas/forests and the provincial park within the city of Ottawa had significantly higher tick densities than municipal parks. However, all wooded, bushy, or tall-grassed areas in Ottawa should be considered at risk (See Ref 2)

For other "at risk" areas:

- **In Ontario:** See risk map page 3
- **In Quebec:** North and western areas of Estrie, Monteregie, south-west regions of Mauricie and Centre-du-Quebec, south-west Outaouais regions (ie: Luskville, Pontiac). See risk map page 4
- **In Canada:** See risk map page 4



d. Signs of early localized Lyme disease:
 Generally presents within 7-14 days of tick bite, (range 3-32 days). Most patients (60-80%) present with a classic erythema migrans (EM) rash which consists of a single erythematous, expanding, > 5 cm rash +/- central clearing at the site of the tick bite. Rash can have many appearances (see Ref 8). This may be associated with arthralgia, myalgia, headaches and fever. A rash that does not expand and/or resolves within 24-48 h is highly unlikely to be EM. If a person develops evidence of early Lyme disease, they should consult a physician and receive appropriate antibiotic treatment (not prophylaxis) – See page 2.

Prophylaxis for Lyme disease (No age restriction -see Ref 4)
 ≥ 45 kg: Doxycycline 200 mg PO once
 <45 kg: Doxycycline 4.4 mg/kg/dose PO once (max 200 mg)
 * Monitor closely for early Lyme disease for 30 days



Figure 1. Female blacklegged tick in various stages of feeding, noting change in size and color



Figure 2. Fully engorged, partially fed and unfed nymphs of blacklegged tick.

C. Ottawa and neighboring regions are considered “at risk” areas for Lyme disease. In a surveillance study, almost **30%** of ticks tested were infected with *B. burgdorferi*. Recreational trails, conservation areas/forests and the provincial park within the city of Ottawa had significantly higher tick densities than municipal parks. (See Ref 2)

For other “at risk” areas:

- **In Ontario:** See risk map page 3
- **In Quebec:** North and western areas of Estrie, Monteregie, south-west regions of Mauricie and Centre-du-Quebec, south-west Outaouais regions (ie: Luskville, Pontiac). See risk map page 4
- **In Canada:** See risk map page 4

Suspected early localized Lyme disease

Generally presents within 7-14 days of tick bite, (range 3-32 days). Most patients (60-80%) present with a classic erythema migrans (EM) rash which consists of a single erythematous, expanding, > 5 cm rash +/- central clearing at the site of the tick bite. Rash can have many appearances (see Ref 8). This may be associated with arthralgia, myalgia, headaches and fever. A rash that does not expand and/or resolves within 24-48 h is highly unlikely to be EM. *A tick saliva hypersensitivity reaction is most likely in cases of rashes < 5 cm appearing within 72 hours of the tick bite (Not Lyme Disease and no treatment required)*

Possible Early Disseminated Lyme Disease

Skin: Multiple EM lesions
Neuro: Cranial nerve palsies (especially CN7), meningitis, meningo-radiculoneuritis
Cardiac: AV block, myopericarditis
Joints: Arthritis (often mono/pauciarticular – large joints)

Possible Late Lyme Disease

Joint: Chronic, intermittent arthritis
Neuro: peripheral neuropathy, encephalomyelitis

Can occur months after tick bite.

Consider ID consultation for further patient specific guidance

Time from tick detachment or potential contact with ticks through outdoor activities in “at risk areas”^c

> 32 days

≥ 3 – 32 days

Start empiric therapy
 Treatment of EM results in rapid resolution of skin lesions within several days and almost always prevents development of later stages of Lyme disease

PATIENT EDUCATION

Counsel patients on possible persistent symptoms after adequate treatment of Lyme disease. Some patients may have prolonged, persistent non-specific symptoms such as fatigue, pain or headaches, in the convalescent period which gradually resolves and responds to symptomatic treatment.

MD must notify Ottawa Public Health (OPH)
 613-580-2424 ext 24224
 Online information and reporting form:
<http://www.ottawapublichealth.ca/en/professionals-and-partners/hcp-lyme-disease.aspx>

In general, serology is done in cases of disseminated or late Lyme disease or if tick was acquired in a non “at risk” area.

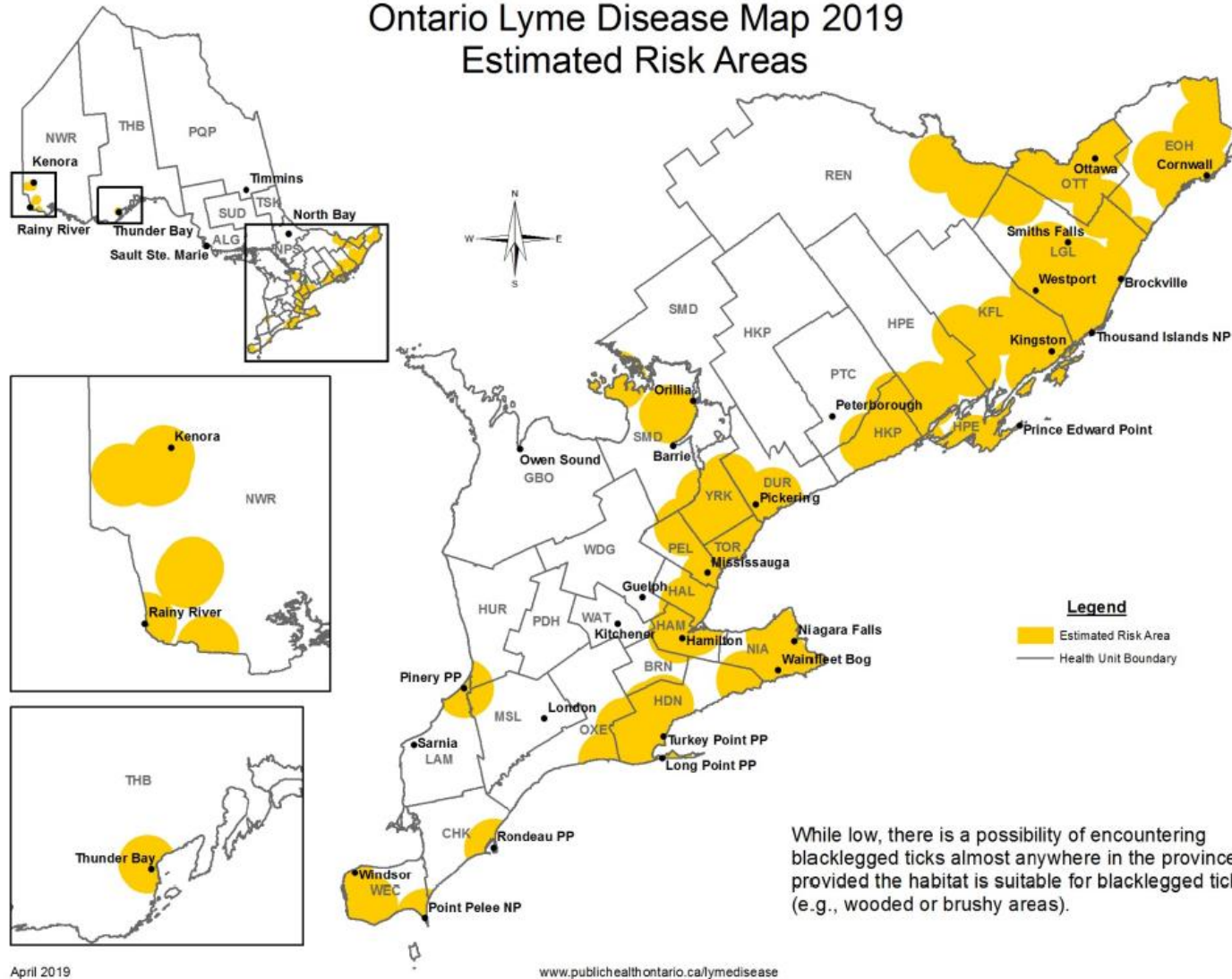
Serologic testing is not sensitive in the first 2-4 weeks after infection and therefore **not useful** in the diagnosis of **Early Lyme Disease**. If tick bite was acquired in Europe – MUST specify on requisition to test for **European Lyme**. Serology follows national and international recommendations involving 2-tier serologic algorithm. Done at Public Health Ontario Laboratory.

Do not send serology in early Lyme disease

Antibiotic	Dosage	Max dose	Duration
Amoxicillin	50 mg/kg/day PO div TID	500 mg PO TID	14 days
Doxycycline*	4.4 mg/kg/day PO div BID	100 mg po BID	10 days

* **Adverse effect:** photosensitivity – recommend sun protection and sunscreen. **For short term use (<21 days)**, visible teeth staining or enamel hypoplasia is unlikely to occur.
 Formulation covered by OHIP+: Doxycycline 100 mg tablets (can be quartered) and suspension (limited availability – verify with pharmacy first prior to ordering). Reference: 1 & 4

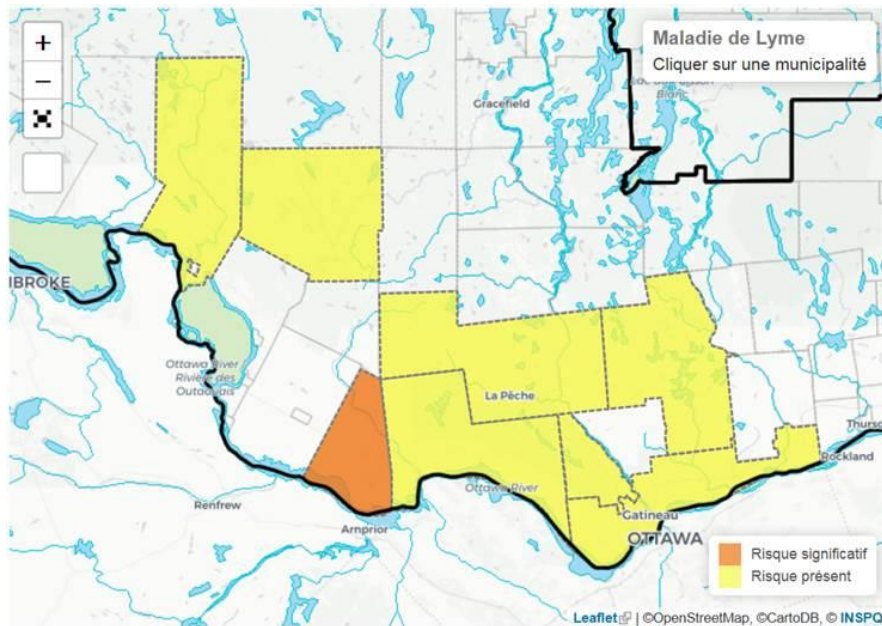
Ontario Lyme Disease Map 2019 Estimated Risk Areas



From Public Health Ontario Lyme disease Risk Area Map: <https://www.publichealthontario.ca/-/media/documents/lyme-disease-risk-area-map-2019> (Accessed May 30th 2019)

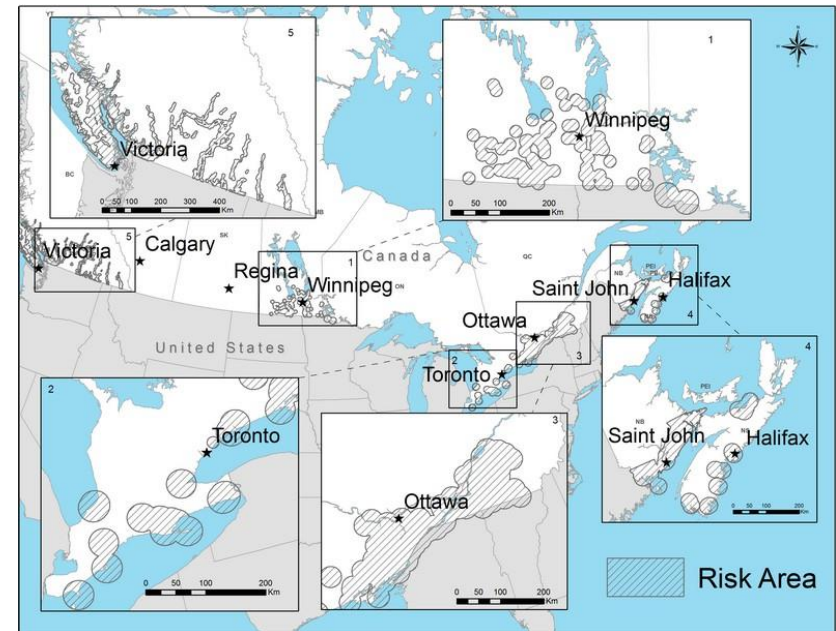
Lyme disease risk areas

Outaouais including Gatineau Park



At this time, most of Gatineau Park is an area where a “risk is present” for Lyme Disease but not significant enough to warrant post-exposure prophylaxis. Risk is considered significant in the area of Bristol/Pontiac (orange area). Please consult an interactive map from the Institut national de Santé Publique Quebec (INSPQ) for more specific and up to date details on risk areas: <https://www.inspq.gc.ca/zooses/maladie-de-lyme>. (Accessed May 15th 2019)

Canada



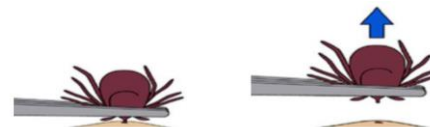
This figure contains 5 insets which display locations where the risk from tick bites and Lyme disease is known to occur, and where risk of tick bites and Lyme disease is possible. Hatched areas are locations where ticks and Lyme disease risk are known and are called "risk areas". From: <https://www.canada.ca/en/public-health/services/diseases/lyme-disease/risk-lyme-disease.html#a3>



Single Erythema Migrans lesion – Bull's eye at the site of a tick bite. (see Ref 8 for more pictures).

Facts about Lyme disease in Ottawa

- The vector and bacteria of Lyme disease is **present** in Ottawa. Recent data specific to Ottawa area suggests up to 30% infectivity rate of local *Ixodes scapularis* ticks. (Ref 2)
- Over the years, the prevalence of *B. burgdorferi* in blacklegged (deer) ticks has increased and is currently at a level that warrants post-exposure prophylaxis in certain cases that meet criteria.
- The overall risk of acquiring Lyme disease following an *I scapularis* tick bite **in a high-risk area** is low and estimated to be around **2.2 %**. [95% CI 1.2-3.9%] (Ref 3)
- If a single dose of doxycycline is given as prophylaxis, the overall risk of progression to Lyme Disease is decreased to **0.2 %** [95% CI, 0-1 (Ref 3)
- Transmission < 24 hours of tick attachment is **highly unlikely**. Based on animal models, there is almost invariably a **delay of at least 36 hours** between the time of tick attachment and transmission of *B. burgdorferi*.
- Due to reassuring safety data, doxycycline can be given for short term use (< 21 days) in children of any age. (Ref 4)
- Treatment of early Lyme disease with appropriate antimicrobials is easy and effective.
- **Prevention is key**. Practice regular tick checks following outdoor activity. Wear appropriate light colored clothing (to detect ticks more easily) and long sleeves/protective clothing, pants tucked into socks. Use insect/tick repellent (DEET or icaridin). Remove attached tick promptly



From CDC: https://www.cdc.gov/ticks/removing_a_tick.html

References and additional information:

1. Wormser GP et al. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America. Clin Inf Dis. 2006; 43:1089-134.
2. Kulkarni M, Kryuchkov R, Statculescu A, Thickstun C, Dibernardo A, Lindsay L, Talbot B. Ixodes scapularis tick distribution and infection rates in Ottawa, Ontario, 2017. Can Commun Dis Rep 2018;44(10):237-42.
3. Warschafsky S et al. Efficacy of antibiotic prophylaxis for the prevention of Lyme Disease: an updated systematic review and meta-analysis. J Antimicrob Chemother. 2010; 65: 1137-1144.
4. Kimberlin DW, Brady MT, Long SS from American Academy of Pediatrics (AAP). Lyme Disease. In: Red Book 2018 Report of the Committee on Infectious Diseases. P. 515-523.
5. Gasmí S, Ogden NH, Lindsay LR, et al. Surveillance for Lyme disease in Canada: 2009–2015. Can Commun Dis Rep. 2017;43(10):194-9
6. Lyme disease – Ottawa Public Health: <http://www.ottawapublichealth.ca/en/public-health-topics/lyme-disease.aspx> (Accessed May 30th 2019)
7. Technical report: Update on Lyme disease prevention and control: June 2016. Prepared by Public Health Ontario: https://www.publichealthontario.ca/en/eRepository/Technical_report_update_on_lyme_disease_prevention_and_control.pdf (Accessed May 30th 2019)
8. **For more information on Lyme disease including other international guidelines** – please see: <https://www.canada.ca/en/public-health/services/diseases/lyme-disease/health-professionals-lyme-disease.html> (Accessed May 30th 2019).
9. Lyme Disease – Serology: http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/Lyme_Disease_Serology.aspx (Accessed May 30th 2019)
10. AMMI Canada Position Statement on the Diagnosis and Treatment of People with Persistent Symptoms That Have Been Attributed to Lyme Disease. <https://www.ammi.ca/Content/03.17.19%20AMMI%20Canada%20Position%20Statement%20%28EN%29.pdf> (Accessed May 30th 2019)
11. AMMI Canada: The facts about Lyme disease: What You Need To Know. <https://www.ammi.ca/Content/03.17.19%20-%20Fact%20Sheet%20%28EN%29.pdf> (Accessed May 30th 2019)
12. Lyme Disease in Canada - A Federal Framework: <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/lyme-disease-canada-federal-framework.html>