PROPHYLAXIS OF LYME DISEASE IN PEDIATRIC PATIENTS

a. Lyme disease is known to be transmitted by ***Ixodes scapularis*** ticks (blacklegged tick/deer tick) that carry the Lyme bacteria (***Borrelia burgdorferi***). Dog and groundhog ticks do NOT carry and transmit Lyme disease. Lyme disease can be transmitted by both the nymphal or adult stages. For assistance with tick identification, see Reference 15.

Ticks are submitted only for surveillance purposes and **not** for diagnosis and management of Lyme disease. Ottawa Public Health no longer accepts tick submission from area residents. If warranted, ticks recovered from a human host may be submitted by health care provider or health unit for identification to the Public Health Ontario Laboratory (PHOL). For more information see Reference 8.

Known tick bite

Was it a blacklegged/ deer tick? [a, b]

YES/POSSIBLE

NO

No prophylaxis

Tick was engorged (attached ≥ 24 hours) (See Figure 1 & 2)

Tick was not engorged (attached < 24 hours) (See Figure 1 & 2)

Time from tick removal?

No Prophylaxis Monitor x 30 days [c]

≤ 72 hours

> 72 hours or unknown

Prophylaxis recommended

Prophylaxis not recommended Monitor x 30 days [c]

Do not send serology in the context of prophylaxis

Prophylaxis for Lyme disease for children of any age:

≥ 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 [c].

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b. ***Ottawa and neighboring regions continue as "at risk" areas for Lyme disease caused by Borrelia burgdorferi after exposure to a feeding blacklegged tick.***

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

See reference 6, 10, 11 and 14

C. Signs of Early Lyme disease:

Generally presents within 7-14 days of tick bite, (range 3-30 days). 60-80% of patients 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 ("bull's eye appearance"). Secondary lesions may also occur. This may be associated with arthralgia, myalgia, headaches, fatigue and fever. If a person develops evidence of early Lyme disease, they should consult a physician and receive appropriate antibiotic treatment (not prophylaxis).

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.

APPROACH TO THE PEDIATRIC PATIENT WITH SUSPECTED EARLY LYME DISEASE

b. Ottawa and neighboring regions continue as "at risk" areas for Lyme disease caused by Borrelia burgdorferi after exposure to a feeding blacklegged tick.

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
See reference 6, 10, 11 and 14

Early Lyme disease

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For rashes < 5 cm appearing within 72 hours of tick bite, – this is most likely tick saliva hypersensitivity reaction (Not Lyme Disease and no treatment required.)

Time from tick detachment
Or potential contact with ticks through outdoor activities in "at risk areas" [b]

> 30 days

Possible Early Disseminated Lyme Disease

Skin:	Multiple EM lesions
Neuro:	Facial palsy, meningitis, meningo-radiculoneuritis
Cardiac:	AV block, myopericarditis
Joints:	Arthritis

Possible Late Lyme Disease

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

Can occur months/years after known or potential exposure. Treat as clinically indicated.
For cases of Disseminated/Late Lyme Disease, consider referral to ID clinic at CHEO

≥ 3 – 30 days

MD must notify Ottawa Public Health
613-580-2424 ext 24224

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.

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

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

No serology required

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 often negative 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.**

** 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

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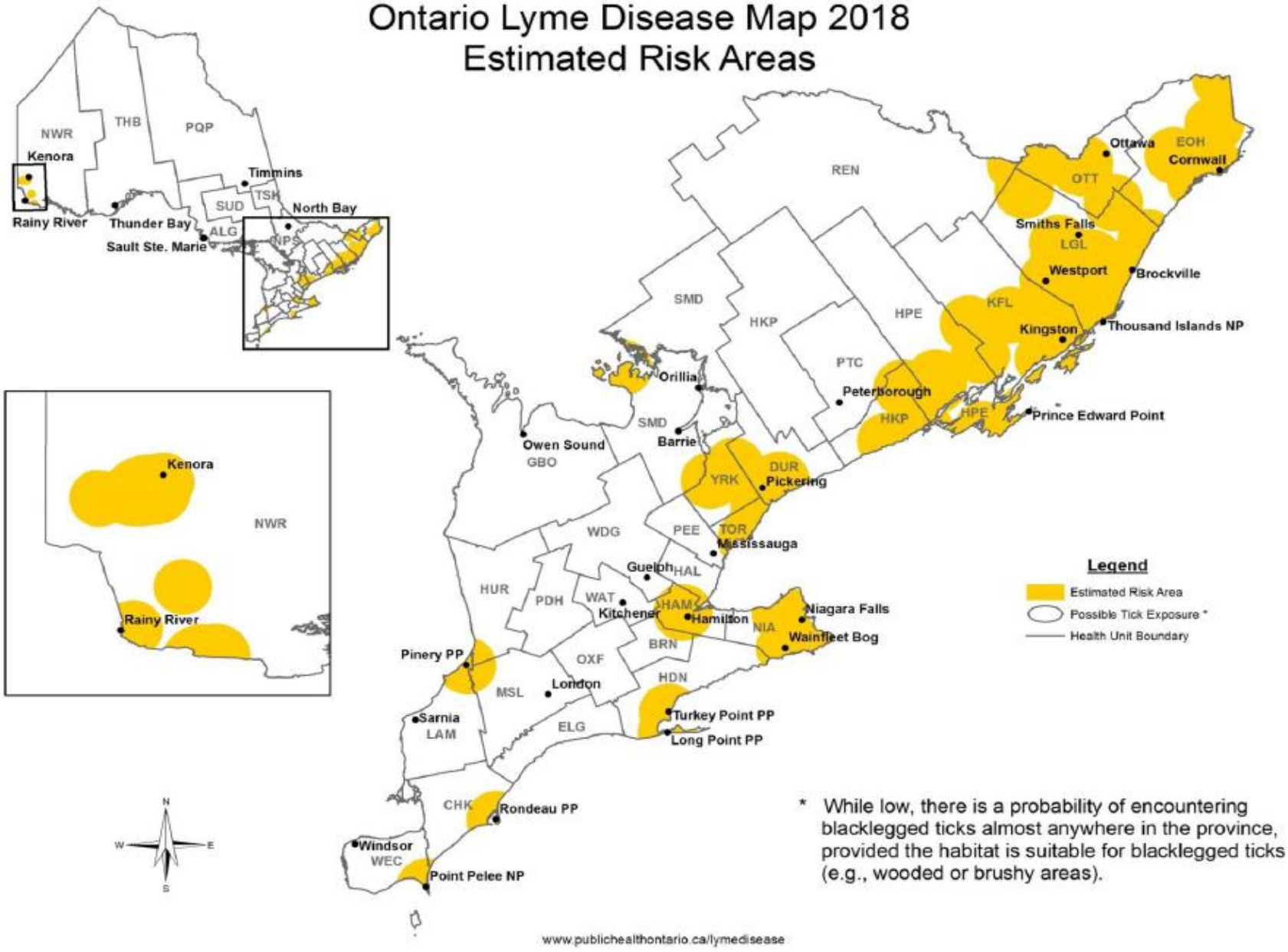
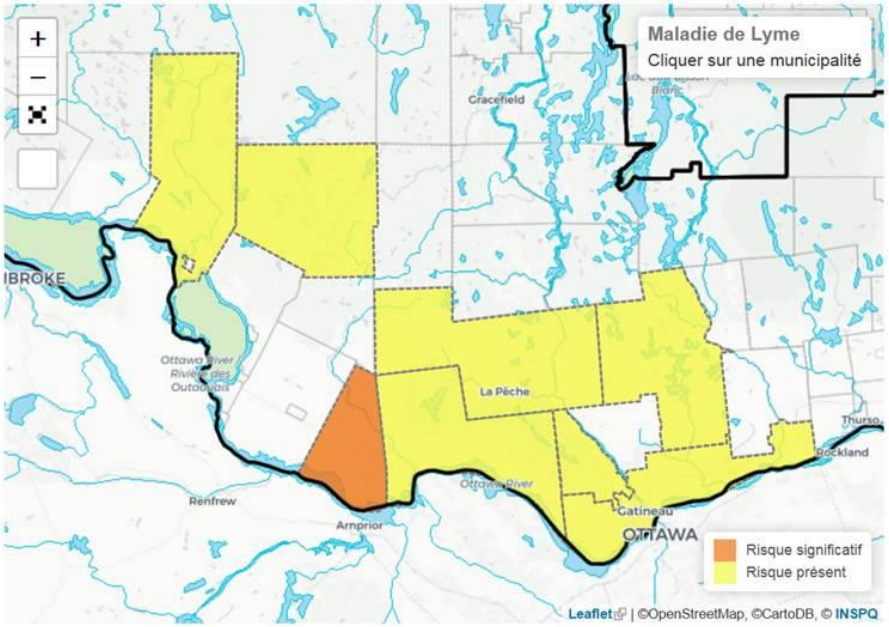


See Reference 10

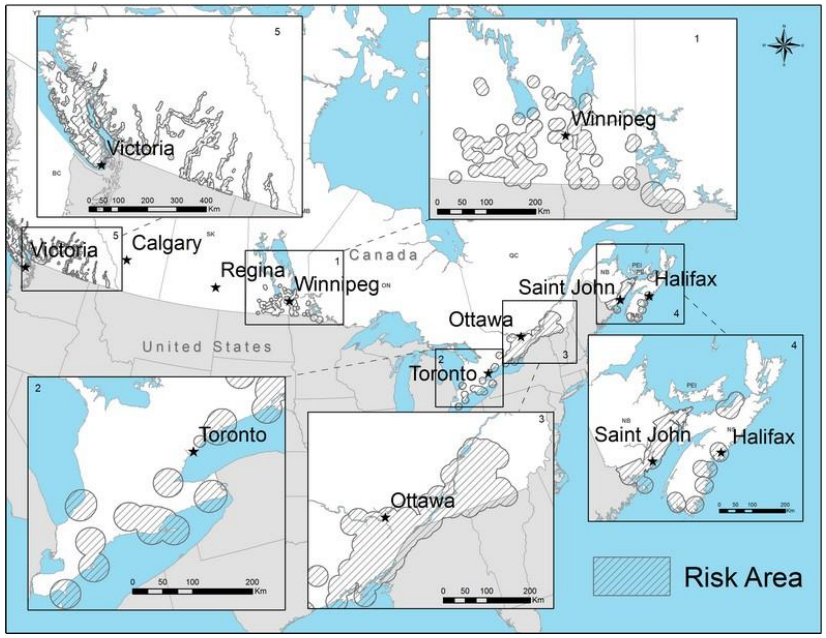
Lyme disease risk areas (Reference 14)

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. Please consult an interactive map from the Institut national de Santé Publique Quebec (INPSQ) for more specific and up to date details on risk areas: https://www.inspq.qc.ca/zoonoses/maladie-de-lyme

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 12 for more pictures).

Quick Clinical Pearls

- The vector and bacteria of Lyme disease is **present** in Ottawa. Transmission of Lyme disease from infected ticks is known to occur here.
- 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.
- The overall risk of acquiring Lyme disease following an *I scapularis* tick bite **in a high-risk area** is approximately 2.2 %.
- If prophylaxis is given, the overall risk of progression to Lyme Disease is 0.2 % (data based on systematic review and meta-analysis of antibiotic prophylaxis) (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*.
- NEW: 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 (> 95%).
- In general, Lyme serology is not warranted in early disease. Lyme serology may be useful in atypical cases and disseminated or late Lyme disease cases.
- Lyme disease is not transmitted by dog (*Dermacentor variabilis*) or groundhog ticks (*Ixodes cookei*).
- **Prevention is key**: Avoid ticks, wear appropriate protective clothing, use insect/tick repellent (DEET), check body daily for ticks, remove attached tick promptly (within 24 hours).

References and Resources:

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. Lantos PM, Charini WA, Medoff G, et al. Final report of the Lyme Disease Review Panel of the Infectious Diseases Society of America. Clin Infect Dis.2010;51(1):1-5
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. 515-522.
5. Onyett, H et al. Lyme disease in Canada: Focus on Children; Paediatr Child Health 2014;19(7):379-83.
6. Gasmi S, Ogden NH, Lindsay LR, et al. Surveillance for Lyme disease in Canada: 2009–2015. Can Commun Dis Rep. 2017;43(10):194-9
7. Lyme disease – Ottawa Public Health: http://www.ottawapublichealth.ca/en/public-health-topics/lyme-disease.aspx (Accessed June 28th 2018)
8. Tick submission: http://www.publichealthontario.ca/en/eRepository/Tick_testing_submission_FAQ.pdf
9. 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 June 28th 2018)
10. Public Health Ontario Lyme Disease Risk Area Map: http://www.publichealthontario.ca/en/eRepository/Lyme_disease_risk_areas_map.pdf (Accessed June 21th 2018)
11. INSPQ Quebec Risk Map (French only): https://www.inspq.qc.ca/sites/default/files/documents/zoonoses/carte-maladie-lyme-juillet2017.pdf (Accessed June 21th 2018)
12. Information for health professionals on Lyme disease: http://healthycanadians.gc.ca/diseases-conditions-maladies-affections/disease-maladie/lyme/professionals-professionnels/index-eng.php (Accessed June 28th 2018).
13. Lyme Disease – Serology: http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/Lyme_Disease_Serology.aspx (Accessed June 28th 2018)
14. Lyme Disease Risk map Canada: https://www.canada.ca/en/public-health/services/diseases/lyme-disease/risk-lyme-disease.html#a3 (Accessed June 28th 2018)
15. For tick identification: http://www.tickencounter.org/tick_identification (Accessed July 5th 2018).