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.

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**Known tick bite**

**Was it a blacklegged/deer tick?**

- **YES/POSSIBLE**
  - **Tick was engorged** (attached > 24 hours) (See Figure 1 & 2)
    - **Time from tick removal?**
      - < 72 hours: Prophylaxis recommended
      - > 72 hours or unknown: Prophylaxis not recommended Monitor x 30 days
  - **Tick was not engorged** (attached < 24 hours) (See Figure 1 & 2)
    - **No Prophylaxis Monitor x 30 days**

- **NO**
  - **No prophylaxis**

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**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

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**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).

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**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**

**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.

- 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.)
- For rashes ≥ 5 cm appearing within 72 hours of tick bite, consider empiric therapy.

**Time from tick detachment**
Or potential contact with ticks through outdoor activities in “at risk areas”

- > 30 days
- ≥ 3 – 30 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.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage</th>
<th>Max dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>50 mg/kg/day PO</td>
<td>500 mg</td>
<td>14 days</td>
</tr>
<tr>
<td></td>
<td>div TID</td>
<td>PO TID</td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td>4.4 mg/kg/day PO</td>
<td>100 mg po</td>
<td>10 days</td>
</tr>
<tr>
<td></td>
<td>div BID</td>
<td>po BID</td>
<td></td>
</tr>
</tbody>
</table>

**No serology required**

**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

**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.

**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.

**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 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

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

**Reference:**
1 & 4
While low, there is a probability of encountering blacklegged ticks almost anywhere in the province, provided the habitat is suitable for blacklegged ticks (e.g., wooded or brushy areas).

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 (INSPQ) 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
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: