Patient with known/suspected blacklegged tick bite

(lxodes scapularis)

Asymptomatic patient

Tick attached >24 hours

No risk of Lyme disease transmission

Yes / unsure

History of travel (see Box 1)

No

Yes

Time since tick was removed

>3 days

Watch for signs and symptoms 30 days post-exposure

<3 days

Consider post exposure prophylaxis where appropriate (Box 2)

Symptomatic patient

Suspect Lyme disease based on symptoms and exposure history (See Box 1 for Lyme Risk Areas)

Early localized disease (<30 days)

• Erythema migrans (EM) rash (Box 3)
• Low-grade fever, fatigue, headache, arthralgia (may be intermittent)

Early disseminated disease (<3 months)

• Multiple EM rashes
• Low-grade fever, fatigue, headache, arthralgia (may be intermittent)
• Neurological (e.g. aseptic meningitis, cranial neuropathies – especially CN VII/Bell’s Palsy)
• Cardiac (e.g. 2/3° AV block)

Late disseminated disease (≥3 months)

• Oligoarticular arthritis (esp. large joints)
• Neurological (e.g. encephalopathy, polyradiculoneuropathy)
• Retinitis (rare)

• Diagnosis based on clinical suspicion
• Laboratory testing of limited value in early localized disease
• See Box 4 for treatment
• Consider serology if diagnosis uncertain. If initial tests are negative AND symptoms persist, may repeat in 4 weeks

Order serologic testing (Box 5)

• Work up differential diagnosis
• Consider initiating treatment if clinical suspicion high
• Consultation with infectious disease specialist, and/or other specialists, as appropriate, strongly recommended

Box 1: Lyme Risk Areas

• Peel Region does not contain endemic areas for Lyme disease and no populations of blacklegged ticks have been identified.
• Individuals in Peel without a travel history may be exposed to infected ticks transported on birds and other animals.
• Only blacklegged ticks carry Lyme disease in Ontario
• Ontario: www.publichealthontario.ca/en/eRepository/Lyme_disease_risk_areas_map.pdf
• Canada: http://www.phac-aspc.gc.ca/id-mi/assets/images/tickinfo_map/lg-eng.jpg
• USA: Highly endemic in northeastern and north-central states
• Europe: Endemic from southern Scandinavia to northern Mediterranean; highest incidence in central and Eastern Europe.

Potential European exposure must be specified on lab requisitions.

Box 2. Post exposure prophylaxis for Lyme disease after a recognized blacklegged tick bite

Adults: Doxycycline 200mg PO x 1 dose

Children ≥8 years: Doxycycline 4 mg/kg, up to a maximum dose of 200mg
Doxycycline is contraindicated in pregnancy and for children <8 years
No further testing/treatment required following post-exposure prophylaxis

Last edited September 2017
Box 3. Erythema migrans (EM)

- Rash is present in most cases (60-85%)
- Begins as red macule/papule at site of tick bite
- Rapidly enlarging to diameter >5 cm
- Often develops central clearing (Figure 1); some studies noted uncharacteristic variants of EM in 25-30% of cases, e.g. oval or irregular shape, no central clearing (Figure 2), dusky or bluish centre

![Figure 1.](image1.png)

Box 4. IDSA Guidelines for treatment of early localized Lyme disease

See complete IDSA guidelines for treatment of disseminated and late disease. (Available online at idsociety.org/Lyme/) Consultation with ID is strongly recommended.

<table>
<thead>
<tr>
<th>Adults</th>
<th>Children ≥8 years</th>
<th>Children &lt;8 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Doxycycline 100mg PO BID x 14-21 days (contraindicated in pregnancy)</td>
<td>• Doxycycline 4mg/kg/day divided BID (maximum of 100mg per dose) x 14-21 days</td>
<td>• Amoxicillin 50mg/kg/day, PO, divided TID (max 1.5g/day) for 14-21 days</td>
</tr>
<tr>
<td>Alternatives: Amoxicillin 500mg PO TID x 14-21 days</td>
<td>Alternatives: Amoxicillin or cefuroxime as below</td>
<td>Alternative: Cefuroxime 30mg/kg/day, PO, divided BID (maximum 1g/day) for 14-21 days</td>
</tr>
</tbody>
</table>

Box 5. Laboratory testing for Lyme disease

- Do not base management on a pending laboratory tick submission.
- Testing is not indicated for asymptomatic patients
- Limited value in early disease
- IgM usually within 2 weeks, IgG in most patients within 1 month
- Antibiotic treatment in early disease may reduce seroconversion
- Public Health Ontario Laboratory (PHOL) conducts two-tiered serologic testing to maximize sensitivity and specificity
- Specify on PHOL requisition, specify the following:
  - Timing of exposure
  - Travel history/location of exposure
  - If suspicious of European-acquired Lyme disease, specify European travel on the requisition (a different assay is used)
- PHOL requisition is available at https://www.publichealthontario.ca/en/eRepository/General_testfillable_requisition.pdf

<table>
<thead>
<tr>
<th>PHOL requisition is available at</th>
<th>Forms for tick submissions can be found at:</th>
</tr>
</thead>
</table>

Box 6: Tick surveillance and submission

- Tick testing is most helpful for public health surveillance in identifying risk areas.
- Lyme disease is transmitted by both adult and immature ticks (called a nymph). Nymphs are very small (less than 2mm) and can easily go unrecognized.
- Peel Public Health accepts ticks for submission; contact our vector borne disease team at 905-799-7700; 905-584-2216 (in Caledon) or send us an email: peelregion.ca/scripts/mailto.pl?mailto=healthline
- Forms for tick submissions can be found at: https://www.publichealthontario.ca/en/eRepository/Surveillance_Form_for_Tick_Identification.pdf

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