

Lyme Disease and West Nile Virus Update 2018

Attention: Physicians, Emergency Departments, Infection Control Practitioners, Walk-In Clinics/Urgent Care Clinics, Nurse Practitioners, Neighbouring Health Units

Date: May 31, 2018

In 2017, 12 cases (confirmed and probable) of Lyme disease and 7 confirmed cases of West Nile Virus were reported in the Simcoe Muskoka District Health Unit (SMDHU) catchment area. **Only 2 of the 12 Lyme disease cases were determined to be locally-acquired.** This is a significant increase for both diseases from the previous year, but is similar to what occurred provincially. For Lyme disease specifically, locally and provincially there was a >100% increase in cases from 2016 to 2017. Public Health Ontario has updated its annual [2018 PHO Lyme disease risk areas map⁴](#) (Appendix A) and should be referenced when assessing for tick exposures. **Based on active environmental surveillance of blacklegged ticks in 2017, Simcoe Muskoka now has two designated Lyme risk areas:**

- **Northwest Simcoe** (impacting Town of Midland, Town of Penetanguishene, Township of Tiny, Township of Tay and Beausoleil First Nation); **and**
- **Southeast Bradford West Gwillimbury Township.**

The risk areas are determined by standard provincial active tick surveillance methods. The exact prevalence of *Borrelia burgdorferi* carriage in blacklegged ticks in those two risk areas is not known, but is estimated to be well below 20% at this time. The rate will likely increase in the next few years. Note that active surveillance does not occur in most of Simcoe Muskoka, and blacklegged ticks have been found throughout Simcoe Muskoka, even in non-risk areas through passive surveillance where health professionals and residents have submitted ticks for identification and testing.

Lyme Disease

The following are helpful resources regarding Lyme disease:

- [Public Health Ontario Lyme Disease Website⁶](#)
- [Infectious Disease Society of America \(IDSA\) Lyme Disease Guidelines, 2006¹](#)
- [National Institute for Health and Care Excellence \(NICE\) Lyme Disease Guideline, 2018²](#)
- [Clinical Aspects of Lyme Disease in the Canada Communicable Disease Report \(CCDR\) May 28, 2014³](#)

A provincial algorithm for the diagnosis and treatment of early localized Lyme disease will be released later this summer by Health Quality Ontario.

Please be advised of the following information regarding testing, prophylaxis and treatment of Lyme disease and tick submissions processes:

Lyme Disease Laboratory Testing:

- A two-tier protocol is used for serologic testing of Lyme disease in Ontario:
 1. As of November 2017, Public Health Ontario changed their testing assay to a [VIsE1/pepC10](#) Borrelia (Lyme) IgM/IgG ELISA. The ELISA is sensitive for detecting IgG/IgM antibodies to Borrelia genospecies that develop within a few weeks of onset of erythema migrans.
 2. A Western immunoblot assay that is highly specific for *B. burgdorferi* antibodies is used as a confirmatory test for reactive or indeterminate ELISA specimens only.

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- The two-tier protocol is consistent with recommendations of the Canadian Public Health Laboratory Network, U.S. Centers for Disease Control and Prevention, and IDSA, to obtain the best balance between sensitivity and specificity.
- Diagnosis and treatment should be based primarily on clinical assessment and history of possible exposure to blacklegged ticks (see [2018 PHO Lyme disease risk areas map⁴](#), also attached below (Appendix A)), particularly for early localized Lyme disease. Laboratory testing should only be used to supplement clinical findings.
- Serological testing may not yield positive results during early localized Lyme disease. Therefore, management should not be based on serological testing results during this phase.
- Antibiotic treatment in early disease may reduce seroconversion; testing should not be used to monitor treatment outcome.
- Following exposure to *Borrelia burgdorferi*, immunoglobulin M (IgM) antibodies are detected within two to four weeks and IgG anti-bodies within four to six weeks
- For possible cases related to out of country travel, European Lyme testing needs to be specifically requested on the PHO General Test Requisition with relevant clinical information and travel history of the patient provided. Specimens are forwarded to the National Microbiology Lab (NML) in Winnipeg for European Lyme testing as the VlsE1/pepC10 Borrelia (Lyme) IgM/IgG ELISA has not been currently validated to detect antibodies for European Lyme disease. The turnaround time is approximately 21 days.

Table 1 **PERFORMANCE CHARACTERISTICS OF SEROLOGICAL ASSAY IN PATIENTS WITH LD (ADAPTED FROM AGUERO-ROSENFELD¹)**

Test	% Reactivity in patients with			
	EM, acute	EM, convalescent *	Neurological involvement	Arthritis
Whole-cell ELISA	33-49	75-86	79 (IgG only)	100 (IgG only)
IgM WB	43-44	75-84	80	16
IgG WB	0-13	15-21	64-72	96-100
Two-tier testing	29-40	29-78	87	97

* Sera obtained after antibiotic treatment

% Reactivity in the above table refers to the frequency at which the different serological assays will show as positive depending of the stage of the LD infection

Prophylaxis

The efficacy for doxycycline prophylaxis is 87%, but there is a wide 95% confidence interval (25%–98%), reflecting the small number of patients in the [2001 randomized controlled trial⁵](#). A single 200 mg dose of oral doxycycline may be offered as per IDSA guidelines to adult patients and to children eight years of age and older, when all of the following conditions are met:

1. Adult or nymph of *I. scapularis* (blacklegged) tick was attached for more than 24 hours; AND
2. Prophylaxis can be started within 72 hours from the time that the tick was removed; AND



3. Person was exposed in an area* where ecologic information indicates that the rate of *Borrelia burgdorferi* carriage of ticks is >20%. Note: the SMDHU risk areas do not currently have a known rate of infection >20%. In Ontario, as per the corresponding local public health information at this time, the following locations are known to have this rate of *Borrelia burgdorferi* carriage:
 - a. Rouge Park, Morningside Park and Highland Creek in the Greater Toronto area
 - b. Brighton
 - c. Kingston and surrounding areas
 - d. Thousand Islands, Brockville, Perth-Smiths Falls and surrounding areas
 - e. Ottawa and surrounding areas
 - f. Rondeau Provincial Park; AND
4. Doxycycline treatment is not contraindicated.

*The risk areas on the PHO risk map do not necessarily have a rate of infection >20%. Those with a known prevalence that meets the above criteria are listed above.

Doxycycline is contraindicated for pregnant and breast-feeding women and for children less than eight years of age. There is effective antibiotic treatment for early localized Lyme disease. Should prophylaxis not be indicated based on the above criteria, the health care provider should watch for signs and symptoms of Lyme disease and provide treatment.

Treatment

Early Lyme disease: These cases refer to patients with findings including erythema migrans, fever, and/or arthralgia and minimal or no comorbidities. These cases can be managed according to the table below. Note that, the dose of Amoxicillin in some guidelines have been as high as 1g po tid for adults.

Antibiotic Treatment Options for Lyme Early Localized Disease in Patients without Significant Comorbidities based on the IDSA² and NICE³ Guidelines

Medication	Adult Dose and Duration	Pediatric Dose and Duration
Doxycycline <ul style="list-style-type: none"> • preferred primary treatment • not recommended for pregnant women 	100 mg po bid for 21 days	Not recommended for children under 8 years of age. For children aged 9-12 years of age under 45 kg: <ul style="list-style-type: none"> • 5 mg/kg/day in 2 divided doses on day 1 followed by 2.5 mg/kg/day in 1 or 2 divided doses for a total of 21 days • For severe infections, up to 5mg/kg/day for 21 days to max 200mg/day
Amoxicillin	500 mg to 1gm po tid for 21 days	For children 33kg and under: <ul style="list-style-type: none"> • 30 to 50 mg/kg/day in 3 divided doses to max 500 mg/dose for 21 days
Cefuroxime axetil	500 mg po bid for 21 days	30 mg/kg/day in 2 divided doses to max 500 mg/dose for 21 days



Tick Submission Process

SMDHU encourages health care providers to submit ticks for identification and testing once they have been removed from a patient. Public Health Ontario provides a [surveillance form \(Appendix B\)](#) that is to be filled out and submitted along with the tick. The identification and bacterial testing of ticks is generally deemed to be not helpful for the clinical management of Lyme disease given that results come later than when clinical decisions need to be made. However tick submission does help to provide surveillance data to inform local risk assessment by clinicians, and to inform risk communication to Simcoe Muskoka residents. It can take a minimum of 10 to 15 business days for tick identification through Public Health Ontario. If a blacklegged tick is identified, it is sent to the National Microbiology Laboratory, where it may take a minimum of six to eight weeks to determine whether the tick is carrying the bacteria that can cause Lyme disease.

Prevention

Ticks that carry Lyme disease live in woodland areas, tall grasses and bushes. Key prevention measures for Lyme disease include the following: use insect repellent containing DEET or Icaridin on clothes and exposed skin, wear light-colored clothing (makes ticks easier to see) and long-sleeved shirts tucked into long pants and tuck pants into socks. **When hiking and walking stay on the center of trails, check clothes and body for ticks (especially groin, naval, armpits, scalp and behind knees and ears) and shower as soon as possible after being outdoors to more easily find and wash off ticks.** Further information for the public is available at:

<http://www.simcoemuskokahealth.org/Topics/Environment/westnilevirusEEEVlyme/lyme.aspx>

West Nile Virus (WNV) Illnesses

The period of greatest risk for human WNV acquisition is from mid-July to the end of August. To better determine the risk of WNV within Simcoe Muskoka and provincially, adult mosquito trapping programs work to identify the presence of WNV within the adult mosquito population. As of May 23, 2018, there has been one probable WNV human case in Ontario however no reports of mosquitoes testing positive for the virus for 2018. It is important to note that although 80% of infected cases are asymptomatic; health care providers are encouraged to remain vigilant for clients presenting with signs and symptoms consistent with WNV.

West Nile Virus Clinical Presentation:

- There are three clinical manifestations of WNV; asymptomatic, non-neurological and neurological. The majority of WNV cases are asymptomatic.
- About 20% of infected persons develop the usually less severe symptom complex known as WNV non-neurological syndrome. This presents with a mild flu-like illness with fever, headache and body aches, occasionally with a skin rash and swollen lymph nodes or other non-specific symptoms that last several days. Other symptoms may include nausea, vomiting, eye pain or photophobia. WNV neurological symptoms can present as encephalitis, acute flaccid paralysis or with a clinical presentation similar to Parkinson's disease. Less than 1% of infected people will develop neurological symptoms.

West Nile Virus Laboratory Testing:

- Serologic testing of clotted or serum blood is the preferred method of testing for WNV. Specimens for West Nile Virus (WNV) IgG and IgM serology are performed using ELISA.
- On the requisition please include mosquito bite history, symptoms, onset date, relevant travel history and history of Japanese virus vaccination or yellow fever vaccination.
- Specimens may also undergo plaque reduction neutralization testing (PRNT) which is highly specific for WNV.
- Indeterminate results for any of the WNV assays may be due to the presence of low-level antibodies or non-specific reactions.
- If considering molecular testing, contact Public Health Ontario Laboratory (PHOL) Customer Service to speak to a microbiologist for approval.



For more information on vector borne diseases of interest in Simcoe Muskoka please visit the Health Professionals Portal at www.smdhu.org/HPPortal

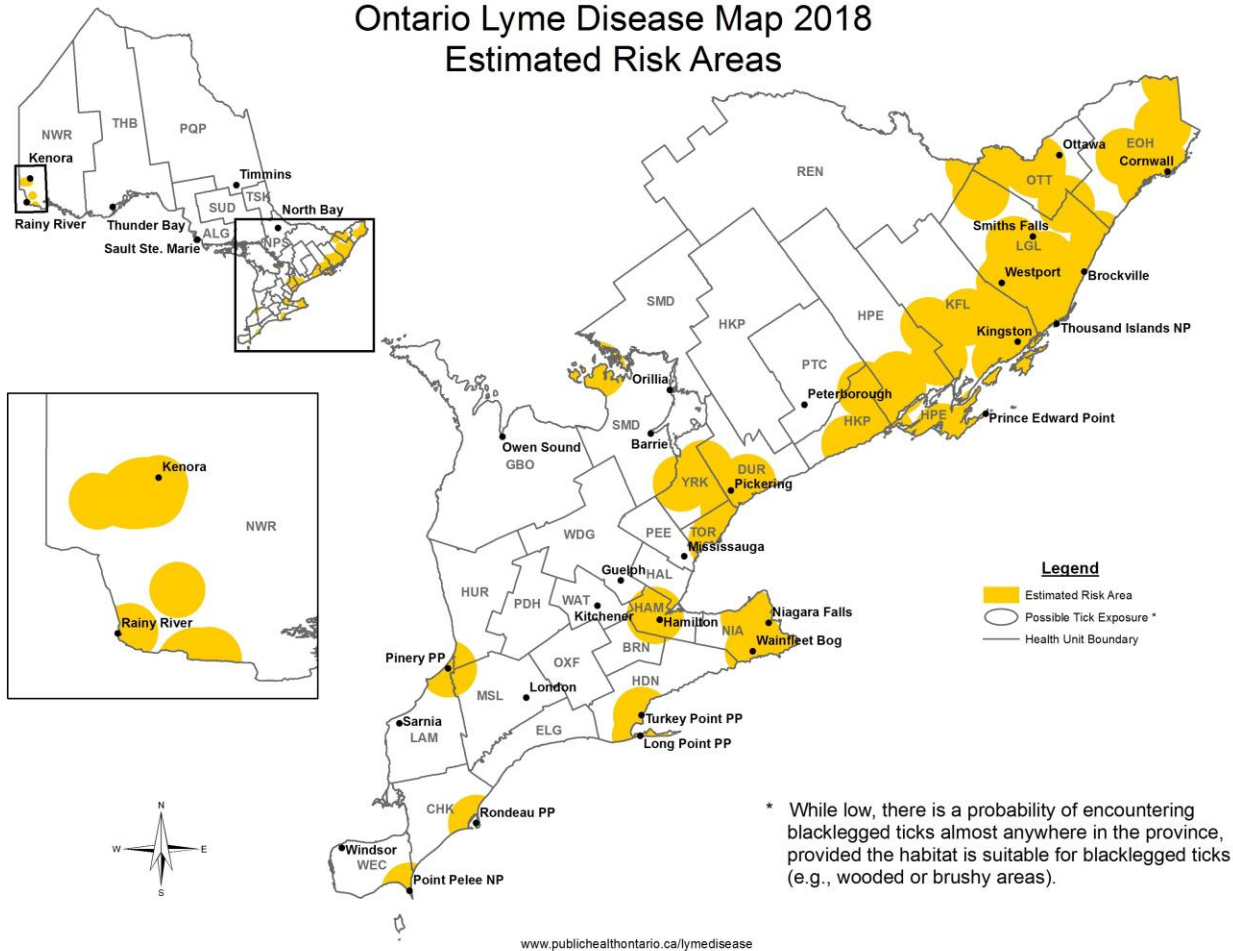
Note: SMDHU has launched its **new interactive Diseases of Public Health Significance (formerly Reportable Diseases) Toolkit** which provides easier access to disease specific testing, treatment recommendations and patient and clinician resources. Available at: <http://www.smdhu.org/reportablediseaselist>

References

1. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America, 2006 available at <https://academic.oup.com/cid/article-lookup/doi/10.1086/508667>
2. Clinical aspects of Lyme Disease in the Canada Communicable Disease Report (CCDR) May 28, 2014 available at http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/14vol40/dr-rm40-11/assets/pdf/14vol40_11-eng.pdf
3. National Institute for Health and Care Excellence (NICE) Lyme Disease guideline April 2018, United Kingdom available at <https://www.nice.org.uk/guidance/ng95>
4. Ontario Lyme Disease Map 2017 Estimated Risk Areas (Public Health Ontario) available at https://www.publichealthontario.ca/en/eRepository/Lyme_disease_risk_areas_map.pdf
5. Nadelman RB, Nowakowski J, Fish D, et al., for the Tick Bite Study Group. Prophylaxis with single-dose doxycycline for the prevention of Lyme disease after an Ixodes scapularis tick bite. N Engl J Med. 2001 Jul 12;345:79-84. Available at <http://www.nejm.org/doi/pdf/10.1056/NEJM200107123450201>
6. Public Health Ontario Lyme Disease website <https://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/Pages/IDLandingPages/Lyme-Disease.aspx>

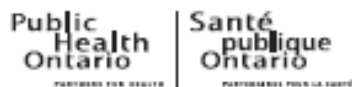


Ontario Lyme Disease Map 2018 Estimated Risk Areas



Available at: https://www.publichealthontario.ca/en/eRepository/Lyme_disease_risk_areas_map.pdf





For laboratory use only	
Date received yyyy / mm / dd	PHOL No.

Surveillance Form for Tick Identification

NOTE: Tick testing will be used for surveillance activities. As per Infectious Disease Society of America (IDSA) guidelines, tick testing should not be used for diagnosis and management of Lyme disease.

ALL Sections of this form must be completed

<p>Submitter</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: right;">Courier code</p> <p>Provide Return Address:</p> <p style="text-align: center;">Name Address City & Province Postal Code</p> </div> <p>Clinician Initial / Surname and OHIP / CPGO Number</p> <p>Tel: _____ Fax: _____</p>	<p>Client Information</p> <table border="1" style="width: 100%;"> <tr> <td>Date of Birth: yyyy / mm / dd</td> <td>Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female</td> </tr> <tr> <td>Last Name: (per health card)</td> <td>First Name: (per health card)</td> </tr> <tr> <td colspan="2">Phone number: (AREA CODE) ###-####</td> </tr> <tr> <td colspan="2">Address: _____</td> </tr> <tr> <td>City: _____</td> <td>Postal code: _____</td> </tr> <tr> <td colspan="2">Submitter lab no. (if applicable):</td> </tr> <tr> <td colspan="2">Public Health Unit Investigation No.:</td> </tr> </table>	Date of Birth: yyyy / mm / dd	Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	Last Name: (per health card)	First Name: (per health card)	Phone number: (AREA CODE) ###-####		Address: _____		City: _____	Postal code: _____	Submitter lab no. (if applicable):		Public Health Unit Investigation No.:	
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Submitter lab no. (if applicable):															
Public Health Unit Investigation No.:															

Tick Information

*The information in fields a) and b) is mandatory and is essential to the tick surveillance program. Failure to provide this information may result in delays and/or rejection of the tick for testing.

- a) *Where was the tick most likely acquired (Be as specific as possible, e.g., town, park, province, or city):
 Province _____ Town _____ Other: _____
- b) Did you travel in the previous two weeks? (Check one)*:
 Yes No travel Unknown
- If yes, which localities were visited? (Be as specific as possible, e.g., town, park, province, or city):
 Please indicate all travel locations:
- c) When was the tick collected or removed?: yyyy / mm / dd _____
- d) Was the tick attached (feeding)
 Yes No Unsure
- e) How long was the tick attached (feeding) _____ (state hours or days)

PHO does not perform tick testing on ticks removed from non-human sources (e.g., dogs).

The personal health information is collected under the authority of the Personal Health Information Protection Act, 2004, s.36 (1)(c)(iii) for the purposes specified in the Ontario Agency for Health Protection and Promotion Act, 2007, s.1 and will be used for surveillance and other public health purposes. If you have questions about the collection of this personal health information please contact the PHOL Manager of Customer Service at 416-235-6556 or toll free 1-877-604-4567.

