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Your Health Connection

Annual Reportable Disease Surveillance Report

The Communicable Disease team at the Simcoe Muskoka District Health Unit (SMDHU) performs ongoing surveillance of infectious diseases. We depend on disease reporting from health care practitioners, laboratory results, and our active surveillance activities to generate a continually monitored database to detect disease clusters and outbreaks. This surveillance report provides health care practitioners with a snapshot of pertinent diseases in Simcoe Muskoka to improve clinical decision making, patient care, and detection of unusual clusters. **This year's *In Focus* section provides an epidemiological and clinical profile of Lyme disease in Simcoe Muskoka, including testing and diagnosis, as well as prophylaxis and treatment recommendations.**

Incidence of Most Relevant Reportable Diseases in Simcoe Muskoka, 2016

Data Source: Integrated Public Health Information System, Extracted July 2017

Moderate (1-2 Standard Deviation (SD)) increase (↑) or decrease (↓), and significant (>2 SD's) increase (↑↑) or decrease (↓↓) compared to the historical average.	January-December 2016^		5 Year Mean* Jan-Dec, 2011-2015		Comments
	# of Cases	*Rate per 100,000 Population*	# of Cases	*Rate per 100,000 Population*	
Sexually Transmitted Infections and Bloodborne Infections					
Chlamydia ↑↑	**1437**	**258.2**	**1222**	**228.2**	**Increasing rate since 2012 locally and provincially. Local percent positivity (7.1%) has remained relatively stable over time. Highest rate in females aged 15-24 years**
Hepatitis C	198	35.6	172	32.2	Important to order viral load and refer to GI specialist for treatment options
Gonorrhea	118	21.2	83	15.6	Significant local and provincial increase since fall 2013. The percent of local tests testing positive (0.6%) has tripled since 2012. Mainly affecting 20-34 year olds. 15% of cases are men who have sex with men (MSM)
Syphilis ↑	**10**	**1.8**	**7**	**1.3**	**SMDHU rate is less than 1/5 of Ontario rate. Infectious syphilis is increasing provincially; 55% of cases are MSM; 13% are HIV+**
HIV/AIDS	9	1.6	12	2.2	Highest incidence in urban centres (Toronto, Ottawa). SMDHU ~ 1/3 of provincial rate. MSM is highest risk factor
Hepatitis B (acute)	1	0.2	2	0.4	
Respiratory Diseases					
Influenza ↑	**690**	**124.1**	**475**	**88.7**	**Slight increase in case count from previous seasons. Flu A (H3 subtype) predominant**
Pertussis	7	1.3	20	3.8	Studies have shown that for the Tdap vaccine given between 14-16 years of age and in adulthood, immunity/protection wanes from 70% in the 1st year to about 30 to 40% in the 4th year after immunization
Invasive Group A Streptococcal	28	5.0	25	4.7	
Mumps	1	0.2	2	0.3	
Legionellosis	5	0.9	5	0.9	
Tuberculosis (active) ↓↓	0	0.0	3	0.5	SMDHU rate is typically less than 1/4 of Ontario rate. Concentrated in risk populations in urban centres (Toronto, Ottawa)
Meningococcal disease, invasive	1	0.2	1	0.2	

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	# of Cases	*Rate per 100,000 Population*	# of Cases	*Rate per 100,000 Population*	
Gastro-Intestinal diseases					
Campylobacter	134	24.1	116	21.7	SMDHU rate approaching provincial rate (24.7 cases per 100,000)
Salmonellosis ↑↑	**152**	**27.3**	**108**	**20.1**	**One local food premise outbreak in 2016 accounts for roughly 1/3 of local cases in that year**
Giardiasis ↓	38	6.8	51	9.6	
Amebiasis, Cryptosporidiosis, Cyclosporidiosis, Shigellosis, and Yersiniosis ↑↑	**54**	**9.7**	**31**	**5.9**	**Small local increases in amebiasis, shigellosis and yersiniosis, consistent with provincial trends**
Verotoxigenic E.coli	6	1.1	6	1.0	
Hepatitis A	1	0.2	2	0.4	Low level of endemicity in Canada
Listeriosis	4	0.7	3	0.5	
Vector-Borne and Zoonotic Diseases					
West Nile virus	1	0.2	2	0.3	Well-established in Ontario; decreasing reported cases locally and provincially since 2012
Lyme Disease (confirmed + probable)	5	0.9	3	0.5	Increasing human cases across Ontario; One of the 2016 cases may have been acquired locally. Surveillance has recently identified Awenda Provincial Park as an area with an increased risk of exposure to blacklegged ticks. See "In Focus" section below for further information.
Rare Diseases					
Diphtheria, Polio, Rubella, Tetanus	0	0.0	0	0.1	SMDHU: 1 case each of Rubella and Tetanus reported in 2013
Haemophilus influenzae b	0	0.0	0	0.0	Fluctuates year to year
Malaria	2	0.4	1	0.3	Imported cases
Measles	0	0.0	0	0.0	
Rabies	No non-imported human cases in Ontario in 20+ yrs. Animals with highest incidence in Ontario are: bats, skunks, foxes and livestock. Cats and dogs can also become infected with rabies				

^ All disease counts are reported by calendar year except influenza, which are reported by flu season (September to August).

* Outbreak years are excluded from historical average calculations.

For more information on infectious disease statistics in Simcoe Muskoka and Ontario, please visit: www.simcoemuskokahealthstats.org

Please continue to report all confirmed or suspected cases of reportable diseases to the SMDHU via phone: 705-721-7520 ext. 8809 (After hours: 1-888-225-7851), or fax: 705-733-7738. For more information and resources on infectious diseases, please go to our Health Professionals Portal at www.smdhu.org/hpportal

SMDHU's Weekly Influenza News and Report is released weekly throughout the flu season: www.smdhu.org/WeeklyFluNews

Sign up to receive electronic copies of SMDHU's HealthFAX: http://smdhu.org/eHealthFAX

In Focus: Lyme Disease

Highlights

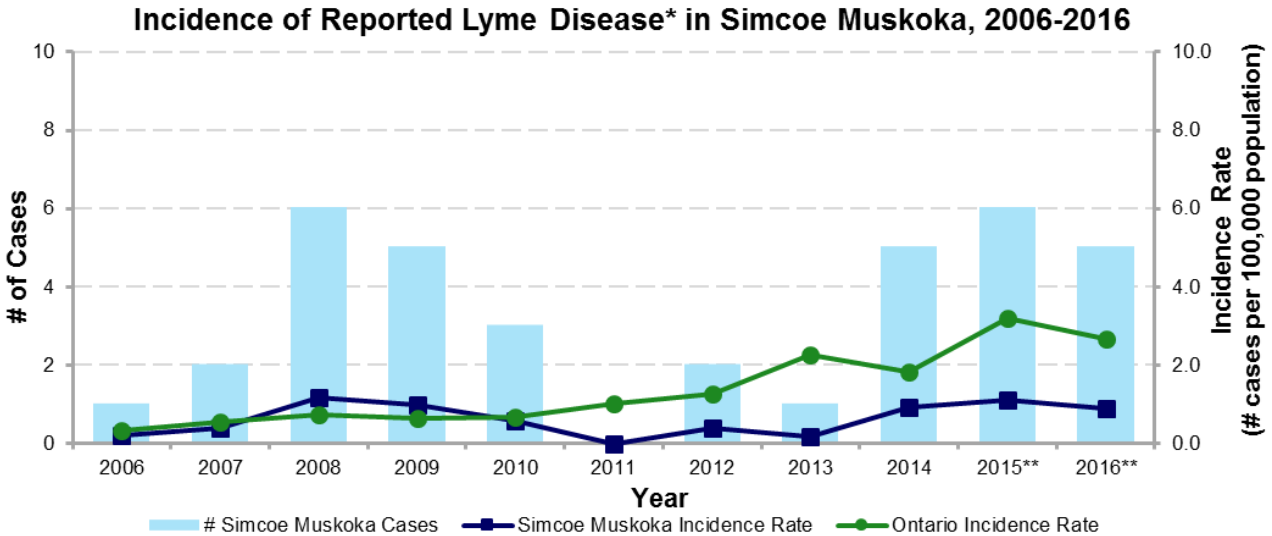
- Lyme disease incidence remains low in Simcoe Muskoka but has increased across Ontario over the past ten years, likely due to increased awareness of Lyme disease among clinicians and the general public, and from the expanding geographical range of the blacklegged tick.
- The majority of SMDHU cases are linked to travel-related exposures outside of Simcoe Muskoka.
- It is anticipated that Simcoe Muskoka will be included in Public Health Ontario's "Lyme disease Map: Estimated Risk Areas in 2018. The estimated risk area will include Awenda Provincial Park and communities within a 20 kilometer radius surrounding it. This will include parts of the townships of Tay, Tiny, the towns of Midland and Penetanguishene as well as Beausoleil First Nation territory.
- Blacklegged ticks are present in other areas of Simcoe Muskoka and over the years, a few have tested positive for *Borrelia burgdorferi*, the bacteria that causes Lyme disease.

Action Items for Healthcare Practitioners

- Diagnosis and treatment should be based primarily on clinical assessment and history of possible exposure to blacklegged ticks (see Public Health Ontario's 2017 Lyme disease estimated risk areas map), particularly for early localized Lyme disease. Laboratory testing should only be used to supplement clinical findings.
- Consider the possibility of Lyme disease in your clinical practice.

Local Incidence

Case counts of Lyme disease in Simcoe Muskoka remain low with six cases or less being reported each year since 2006. In 2016, five cases of Lyme disease were reported in Simcoe Muskoka. The reported incidence in Simcoe Muskoka remains lower than the incidence observed across Ontario, which has increased in recent years. Cases are both male (53%) and female (47%) and range in age from one to 75 years.



Data Source: Integrated Public Health Information System (iPHIS), extracted May 2017. Reportable Disease Information System (RDIS) and iPHIS data posted on PublicHealthOntario.ca e-portal. Population Estimates, Intellihealth, extracted August 2016

* Confirmed + Probable Cases
**Note that the confirmed case definition changed in 2015 to include those with travel to a 'risk area' as well as an endemic area for Lyme disease along with clinical and/or lab evidence. There are more risk areas in Ontario than endemic areas. This change makes the case definition more sensitive and may increase the number of cases.

Testing and Diagnosis

- Diagnosis and treatment should be based primarily on clinical assessment and history of possible exposure to blacklegged ticks (see Public Health Ontario's 2017 risk areas map), **particularly for early localized Lyme disease**. Laboratory testing should only be used to supplement clinical findings.
- A two-step protocol is used for serologic testing of Lyme disease in Ontario:
  1. The C6-peptide 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.
- The two-step protocol is consistent with recommendations of the Public Health Agency of Canada, U.S. Centers for Disease Control and Prevention, and IDSA, to obtain the best balance between sensitivity and specificity.
- Serology results may be negative in early stage Lyme disease before antibody development or in some patients previously treated with antibiotics who may lack a detectable serologic response at the time of testing (see Table 1).
- If the patient has a history of tick exposure in Europe: provide travel history and request testing for European Lyme disease. A Western blot specific for the *Borrelia* species that occurs in Europe will be used as the confirmatory test, however the turnaround time is longer (21 days) as the test is only done at the National Microbiology Laboratory.
- There are private, unaccredited laboratories in the United States that perform non-validated Lyme tests that may provide more positive tests. However, the rate of false positives is much higher and therefore should not be utilized in the assessment.

Table 1. Performance Characteristics of Serological Assay in Patients with Lyme Disease (Adapted from Aguero-Rosenfeld[2])

Test	Percent 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

Percent reactivity refers to the frequency at which the different serological assays will show as positive depending on the state of the LD infection

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Technical report: Update on Lyme disease prevention and control. Second edition. Toronto, ON: Queen's Printer for Ontario; 2016.

Prophylaxis and Treatment

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 trial.[3] 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 *Ixodes 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 infection of ticks is >20%. In Ontario, as per the corresponding local public health information, these areas include:
    a. Rouge Park and Morningside Park 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.

Note that the risk areas on the PHO risk map do not necessarily have a rate of infection >20%. Niagara Region has a current rate of infection of 18.8%.

Doxycycline is contraindicated for pregnant and breastfeeding women and for children less than eight years of age. In these cases, the patient and their provider should make an informed choice between a single dose of doxycycline and no prophylaxis. There is effective antibiotic treatment for early localized Lyme disease (see Table 2). Should prophylaxis not be indicated based on the above criteria, the health care provider should watch for signs and symptoms of Lyme disease and treat early.

Table 2. IDSA Guidelines for Treatment of Early Localized Lyme Disease

Patient Group	Treatment Guideline
Adults	▪ **Doxycycline 100 mg PO BID for 14-21 days (contraindicated in pregnancy)** Alternatives: ▪ Amoxicillin 500 mg PO TID for 14-21 days ▪ Cefuroxime 500 mg PO BID for 14-21 days
Children ≥8 years	▪ **Doxycycline 4 mg/kg/day divided BID (max of 100 mg per dose) for 14-21 days** Alternatives: Amoxicillin or cefuroxime as below
Children <8 years	▪ **Amoxicillin 50 mg/kg/day, PO, divided TID (max 1.5g/day) for 14-21 days** Alternative: ▪ Cefuroxime 30 mg/kg/day, PO, divided BID (max. 1 g/day) for 14-21 days

Notes:

See complete IDSA guidelines for treatment of disseminated and late disease – available online: idsociety.org/Lyme/

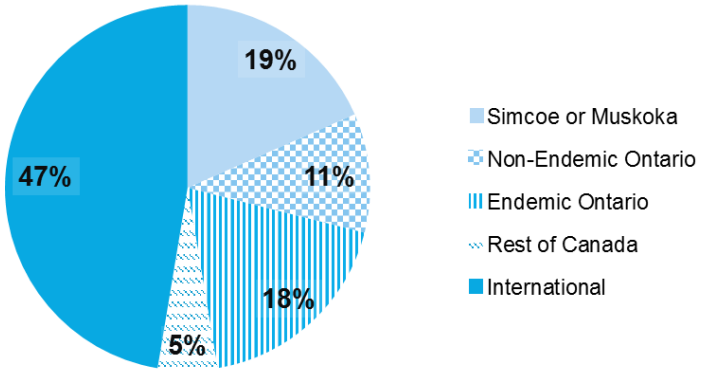
Consultation with ID is strongly recommended.

Source: Region of Peel. Lyme Disease Diagnostic Algorithm for Clinicians. 2016. Available from: https://www.peelregion.ca/health/professionals/pdfs/2017/ld-algorithm.pdf..

Exposures

For cases reported between 2006 and 2016, 35 of the 36 cases (97%) were able to provide one or more exposure locations. The majority of cases in Simcoe Muskoka (71%) are linked to travel, with nearly half of all exposures (47%) listed as international travel. Roughly 20% of reported exposures were in endemic or risk areas of Ontario. For more information on risk areas, please see Public Health Ontario's risk maps. Local exposures in either of Simcoe or Muskoka regions were reported in 7 cases.

Identified Exposure Locations for Lyme Disease* Cases in SMDHU, 2006-2016



Data Source: Integrated Public Health Information System (iPHIS), extracted August 2017
*Confirmed Cases
Notes:
1. Each case may have more than one potential exposure location. It is very challenging to definitively determine exposure locations.
2. This excludes data from cases who reside outside of Simcoe Muskoka
3. Simcoe County and District of Muskoka are combined within 'local' but are not included in"non-endemic Ontario" or "endemic Ontario" categories

Tick Dragging

Active tick surveillance, or "tick dragging," involves dragging a cloth through brushy, wooded areas to assess the establishment of blacklegged tick populations and to determine Lyme disease risk in a community. This occurs twice annually, in the spring and fall, as ticks are more active during this time. In 2017, Awenda Provincial Park was selected as a site to conduct active surveillance. Criteria used to select this location as a drag site included a review of historical tick submission data, consideration of local geography, presence of tick habitat and evidence of positive blacklegged tick results.

Following environmental surveillance findings, Awenda Provincial Park and communities within a 20 kilometer radius from the location where ticks were found will be newly-categorized by PHO as an estimated risk area. This will include parts of the townships of Tay, Tiny, the towns of Midland and Penetanguishene, as well as Beausoleil First Nation territory.

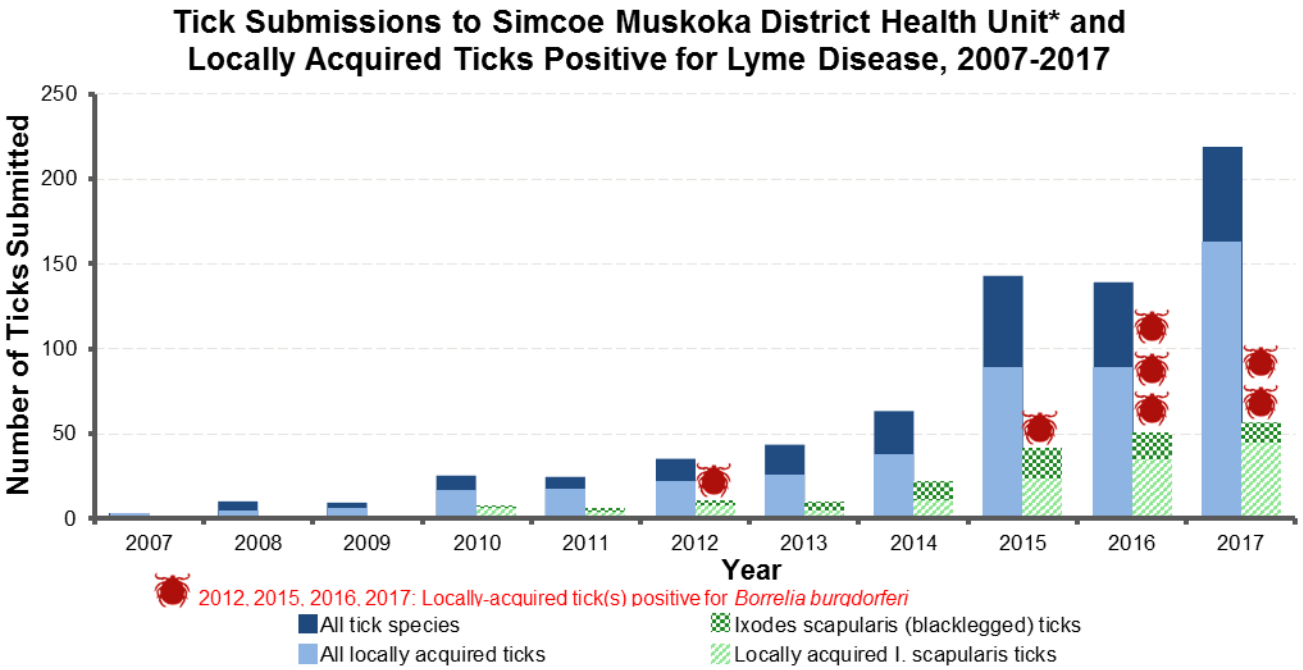
An estimated risk area is a location where potential exposure to tick bites may lead to an increased risk of Lyme. In these areas, there is an increased risk of encountering blacklegged ticks or potentially infected blacklegged ticks. Members of the public should take appropriate precautions to reduce tick bites in an estimated risk area.

At this time, the estimated rate of Borrelia-infected blacklegged ticks is less than 20% (the threshold for consideration of post exposure prophylaxis). Experience from other areas in Ontario indicate that it may take up to a few years for a newly-discovered risk area to reach that level of infectivity. Surveillance will continue for this area.

Tick Submissions

Passive tick surveillance has been ongoing at Simcoe Muskoka District Health Unit since 2007. From 2007 to 2017, a total of 677 ticks were submitted for testing. Less than 50% are locally acquired *Ixodes scapularis* ticks. Only 7 locally-acquired *I. scapularis* ticks have tested positive for *Borrelia burgdorferi* – less than 1% of all ticks submitted.

Blacklegged ticks have been submitted from the communities located within the newly estimated risk area around Awenda Provinicial Park. The majority of these ticks, however, were reportedly acquired from Tiny Township, and 2 of the 7 positive ticks were from this risk area. Note that results from ticks submitted to the Public Health Laboratory may take weeks for tick identification and infection test results, and therefore do not generally play a role in the clinical management of patients who are experiencing symptoms consistent with Lyme disease.



Data Sources: Passive Tick Surveillance Spreadsheet, extracted November 2017
*Ticks are submitted to the health unit by those who have removed it from their (or another person's) body, and are aware to submit it to the health unit for testing. Submitted ticks may originate from anywhere that the submittor has traveled in recent days, and not necessarily from within Simcoe Muskoka. 66% of submitted ticks are acquired in Simcoe Muskoka.

References:

1. Public Health Ontario. Ontario Lyme disease map 2017 – Estimated risk areas. [last accessed 31 August 2017]. Available from: https://www.publichealthontario.ca/en/eRepository/Lyme_disease_risk_areas_map.pdf
2. Aguero-Rosenfeld ME, Wang G, Schwartz I, Wormser GP. Diagnosis of Lyme borreliosis. Clin Microbiol Rev. 2005;18(3):484-509. Available from: http://cmr.asm.org/content/18/3/484.long
3. Nadelman RB, Nowakowski, J, Fish J, Falco, RC, Freeman, K, et al. Prophylaxis with single-dose doxycycline for the prevention of Lyme disease after I*xodes scapularis* tick bite. N Engl J Med. 2001:345(2):79-84. Available from: http://www.nejm.org/doi/pdf/10.1056/NEJM200107123450201