LYME DISEASE UPDATE 2018

Summary:

- Lyme disease is transmitted through the bite of an infected blacklegged tick.
- Ontario has seen an increase in the over-all numbers and range of blacklegged ticks in recent years.
- In 2017, there were 3 confirmed cases of Lyme disease reported in Grey Bruce. None of these were acquired locally but this is an increase from previous years. There are no confirmed cases in 2018, as per this date.
- Prevention and control programs for Lyme disease at the Grey Bruce Health Unit focus on surveillance and communication.
- Passive surveillance involves sourcing ticks from the public (human host) and participating veterinary clinics (animal host) for identification purposes. Throughout 2017, a total of 178 locally-acquired ticks were reported to Grey Bruce Health Unit, of which 117 ticks (65%) were identified as blacklegged. Only blacklegged ticks from human hosts are tested for *Borrelia burgdorferi*, the bacteria that causes Lyme disease. One tick tested positive in 2017.
- In 2018, a total of 39 ticks were locally acquired to date, of which 21 ticks (53.8%) were identified as blacklegged. Of those, 2 ticks tested positive for *B. burgdorferi*; collected on the Northern Bruce Peninsula and Saugeen Shores.
- Tick submissions from human hosts began to increase significantly in 2017. This could be attributed to greater public awareness and reporting and the increases in human-tick encounters as the result of the expanding range of the blacklegged tick due to climate change.
- Communication and education efforts targeted both healthcare professionals and the general public through appropriate messaging on awareness of Lyme disease, characteristics of blacklegged ticks, prevention of tick bites, tick removal, tick submission process and signs, symptoms, testing and treatment of the disease.
**Background:**

Lyme disease is a zoonotic, tick-borne disease caused by spiral-shaped bacteria called *Borrelia burgdorferi*. The bacteria is transmitted to humans through the bite of an infected tick, *Ixodes scapularis*, the primary *B. burgdorferi* vector in eastern Canada and Ontario. This tick is commonly known as a deer tick or blacklegged tick. Deer and small mammals such as rodents serve as important hosts to the tick.

Human infection does not occur until an infected tick has been attached for at least 24 hours. The risk of transmission increases the longer the tick has been attached. There is no evidence of person-to-person spread. Increased risk is associated with living in or traveling to Lyme disease endemic areas. The **blacklegged tick life cycle is depicted** in Appendix I.

**Clinical Presentation:**

Lyme disease, clinically described as Lyme borreliosis, is generally divided into three stages in which infected persons may experience any of the following symptoms:

- **Early localized disease:** Erythema Migrans (EM) or “bull’s eye” rash at the site of a recent tick bite, fever, headache, muscle pain, neck stiffness, fatigue and joint pain;
- **Early disseminated disease:** Multiple EM in approximately 15% of people occurs several weeks after infective tick bite, cranial nerve palsies, lymphocytic meningitis, conjunctivitis, arthralgia, myalgia, headache, fatigue, carditis (heart block); and
- **Late disease:** May develop in people with early infection that was undetected or not adequately treated. Involves the heart, nervous system and joints; arrhythmias, heart block and sometimes myopericarditis; recurrent arthritis affecting large joints (i.e., knees); peripheral neuropathy; central nervous system manifestations – meningitis; encephalopathy (i.e., behavior changes, sleep disturbance, headaches); and fatigue.

Most cases of Lyme disease could be effectively treated with two to four weeks of antibiotics.

**Epidemiology:**

Lyme disease has been found in the USA, Canada, Europe, the former Soviet Union, China and Japan. Epidemiologic data for Ontario indicate that infection occurs primarily during summer, with a peak in June and July, but may occur throughout the year, depending on seasonal abundance of the tick locally.
Between 2007 and 2011, an average of 100 cases (confirmed and probable) of Lyme disease were reported per year in Ontario. In 2015, there were 358 confirmed cases of Lyme disease reported in Ontario, which represents a sharp increase from previous years. This can be attributed to increased public awareness and reporting, the consequent increases in human-tick encounters and the expanding range of the blacklegged tick. Climate change is a driving force behind the recent expansion of the blacklegged tick population in Ontario.

**Determination of Risk Areas:**

Risk areas for the disease are determined by standard provincial passive and active tick surveillance methods. While areas of greatest risk for blacklegged ticks are currently along the north shores of Lake Erie, Lake Ontario and the St. Lawrence River, ticks may be found anywhere in Ontario (ticks feed on birds, and as a result, they are found mainly along the migratory and flight routes that birds travel throughout the province). Public Health Ontario updates a Lyme disease risk area map annually; see Appendix II.

The exact prevalence of *B. burgdorferi* carriage in blacklegged ticks in our area is not known, but is estimated to be well below 20% at this time. The rate will likely increase in the next few years.

**Surveillance in Grey Bruce:**

The Grey Bruce Health Unit has engaged in passive surveillance for a number of years where health professionals and residents have submitted ticks for identification and testing. Blacklegged ticks from human hosts are tested for *B. burgdorferi*, the bacteria that cause Lyme disease.

Clients submitting ticks are provided with a pamphlet from Public Health Agency of Canada Enjoy the Outdoors without a Tick. Every client receives a follow-up email (and documented if they decline) with additional information, the identification and recommendation they speak to their healthcare provider if they are concerned about their health. If it is not a blacklegged tick, they are provided information from Centers for Disease Control and Prevention on the species-specific tick that was identified with the recommendation they speak to their healthcare provider if they are concerned about their health.

In 2015, this passive surveillance program was widened to include collection of ticks found on pets and animals recovered from 14 participating veterinary clinics across Grey Bruce. These ticks are only identified for species and are not tested for *B. burgdorferi*. 

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Active surveillance through tick dragging was undertaken in previous years in targeted areas where positive ticks had been identified or deemed likely. The last tick dragging in Grey Bruce was carried out in May 2015. Since that time, Public Health Ontario’s Active Tick Dragging: Standard Operating Procedure (November 2015) regarding active surveillance was adopted and no active surveillance has been carried out in recent years.

2017 Surveillance Summary
A total of 178 locally-acquired ticks were reported in 2017; 40 were sourced from humans with the remaining 138 from veterinary clinics. Of these 178 ticks, 117 (65.7%) were identified as blacklegged. One tick tested positive for B. burgdorferi; see Appendix III.

Three human cases of Lyme disease were identified in Grey Bruce but none were locally acquired.

2018 Surveillance Summary
Between January 1 and July 23 this year, a total of 39 ticks were locally acquired; 13 were sourced from humans with 26 received from participating veterinary clinics. Of these 39 locally-acquired ticks, 21 (53.8%) were identified as blacklegged. Two ticks tested positive for B. burgdorferi collected on the Northern Bruce Peninsula and Saugeen Shores; see Appendix IV.

There have been no confirmed cases of Lyme disease in humans in Grey Bruce in 2018.

The need and feasibility for active surveillance in the fall of 2018 will be determined in collaboration with Public Health Ontario.

Ontario Public Health Standards

Infectious and Communicable Diseases Prevention and Control
Goal:
To reduce the burden of communicable diseases and other infectious diseases of public health importance.
Requirement:

#16 The board of health shall develop a local vector-borne management strategy based on surveillance data and emerging trends in accordance with the Infectious Diseases Protocol, 2018 (or as current).

Infectious Diseases Protocol (2018):
Prevention and Management of Vector-Borne Diseases

1. The board of health shall develop, implement, and review at least annually, an integrated vector-borne diseases management strategy based on local risk assessment and other scientific evidence with respect to effective and efficient prevention and control measures.

2. The board of health shall conduct local West Nile virus risk assessments, on an annual basis, in accordance with the ministry’s West Nile Virus Preparedness and Prevention Plan, or as current.

3. The board of health shall develop an integrated vector-borne management plan comprised of:
   a. Vector surveillance, including surveillance of both mosquito and tick populations;
   b. Non-human host surveillance (when applicable);
   c. Human surveillance;
   d. Public education on personal preventive measures; and
   e. Vector control programs (e.g., larviciding and/or adulticiding) where required.

4. The board of health shall promptly notify Trillium Gift-of-Life of any positive results of vector-borne diseases from humans with a history of organ donation or receipt.

Lyme Disease Prevention and Control at GBHU:

Public health prevention and control for Lyme disease focus on two main areas surveillance and communication. The passive and active surveillance for blacklegged ticks has ben described above. Communication is carried out on two fronts, working with local health care providers and veterinarians, and in wider public education. Healthcare professionals are advised on local and provincial surveillance; risk assessment; tick submission notification and procedures; clinical manifestations, prophylaxis, testing and treatment; and, additional resources including consult with the MOH. Two advisories have been issues to date in 2018. There is a dedicated webpage Ticks and Lyme Disease for Healthcare Professionals.

Work with veterinarians includes local and provincial surveillance; risk assessment; tick submission notification and procedures; and, liaison through the One Heath Group.
Public education focuses on awareness of Lyme disease, characteristics of blacklegged ticks, prevention of tick bites, tick removal, tick submission process and signs and symptoms of the disease. A media release was issued July 18 identifying the first *B. burgdorferi* positive tick of the year found in Grey Bruce. The release received widespread dissemination in at least eight local newspapers as well as multiple electronic news sites.

We maintain an active social media presence throughout the summer months with messaging placing an emphasis on prevention.

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*Dr. Ian Arra*  
*Physician Consultant*

**Reference:**

1. 2017 Tick and Lyme Disease Summary. WDG Public Health. [https://www.wdgpublichealth.ca/sites/default/files/file-attachments/basic-page/bh.01.apr0418.r09_-_2017_tick_and_lyme_disease_summary_access.pdf](https://www.wdgpublichealth.ca/sites/default/files/file-attachments/basic-page/bh.01.apr0418.r09_-_2017_tick_and_lyme_disease_summary_access.pdf)
Appendix I:
Blacklegged Tick Life Cycle

Year 1

- Spring: Larvae hatch from eggs. Larvae acquire R. bongassii while blood feeding on small animals, especially the white-footed mouse.
- Summer: Larvae become dormant in leaf litter.
- Fall: Nymphs develop into adults. Adult ticks feed on large animals.
- Winter: Infectious nymphs feed on animals, including humans, potentially transmitting R. bongassii.
- Summer: Nymphs develop into nymphs.

Year 2

- Spring: Nymphs become adult ticks. Adult ticks feed on large animals.
- Summer: Larvae hatch from eggs. Larvae acquire R. bongassii while blood feeding on small animals, especially the white-footed mouse.
- Fall: Larvae become dormant in leaf litter.
- Winter: Nymphs develop into adults. Adult ticks feed on large animals.
- Summer: Nymphs develop into nymphs.
Appendix II:
Ontario Lyme Disease Map 2018 Estimated Risk Areas

* 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 brashy areas).
Appendix III:

Locally Acquired Blacklegged Tick Locations in Grey Bruce 2017

A total of 178 locally-acquired ticks were reported to DHC in 2017-20. 40 were sourced from humans with the remaining 138 sourced from participating veterinary clinics.

Of these 138 locally-acquired ticks, 117 (85.7%) were identified as blacklegged.

One tick tested positive for *Borrelia burgdorferi*, the bacterium that causes Lyme disease.
Appendix IV:
Locally Acquired Blacklegged Tick Locations in Grey Bruce 2018 – To July 24

Locally Acquired Blacklegged Tick Locations in Grey Bruce
2018 - As of July 24

Legend
- 2018, Blacklegged Ticks - Confirmed location
- 2018, B. burgdorferi-positive Blacklegged Ticks

To date, a total of 30 locally-acquired and identified ticks were reported to GBHU in 2018; 12 were sourced from humans, with the remaining 18 sourced from participating veterinary clinics.

Of those 30 locally-acquired ticks, 26 (87%) were identified as Blacklegged Ticks via laboratory identification and 10 via veterinary identification.

Two ticks tested positive for *B. burgdorferi*, the bacterium that causes Lyme disease.

Projection: NAD83 UTM Zone 17
Produced by Grey Bruce Health Unit
Grey Bruce’s First Roots of Empathy Baby Celebration

On June 12, the Grey Bruce Roots of Empathy program celebrated over a dozen babies for their part in teaching some very important life lessons to nearly 400 students over the past school year. These “tiny teachers” helped children from Kindergarten to Grade 8 in thirteen schools across Grey Bruce learn about expressing feelings, respect, inclusion, infant development, safety and the power of a loving bond between parent and child. A total of seventeen infants and their parents took part in the pilot program.

Catherine Talbot, International Liaison for Roots of Empathy, acknowledged the families, instructors and schools that made the program such a success. The celebration also recognized the contributions of the Bluewater District, the Bruce Grey Catholic District and the Chippewas of Nawash Unceded First Nation School Boards as well as community partners Keystone Child, Youth and Family Services and Kids & Us.

A second Roots of Empathy instructor training session is scheduled for September. As the program grows, recruitment continues for volunteer instructors as well as “tiny teachers” and their parents to participate. For more information, contact Amanda McManaman, Public Health Nurse, at a.mcmanaman@publichealthgreybruce.on.ca.