

The Regional Municipality of York

Committee of the Whole
Community and Health Services
April 4, 2019

Report of the Commissioner of Community and Health Services and Medical Officer of Health

Vector-Borne Disease Program 2018/2019 Annual Update

1. Recommendations

The Regional Clerk circulate this report to the Clerks of the local municipalities for their information.

2. Summary

This report is prepared for Council in order for it to carry out its legislative duties and responsibilities as the board of health under the *Health Protection and Promotion Act*.

York Region Public Health's 2018 Vector-Borne Disease Program deliverables and planned activities for 2019 reduce the risk of vector-borne diseases in York Region.

- 2018 surveillance shows continued West Nile virus activity
- 2018 surveillance shows continued Lyme disease activity, including increased blacklegged ticks in natural forested areas and identification of one new Lyme disease risk area
- Vector-borne disease education and outreach is ongoing and heightened in response to increased risk levels in the community

3. Background

York Region Public Health delivers a comprehensive and collaborative program for vector-borne diseases focusing on surveillance, mosquito control, public education and outreach, and increased risk response

Vector-borne diseases are diseases transmitted to humans through the bite of an infected vector such as a mosquito or tick. In Ontario, vector-borne diseases of public health importance include West Nile virus, Lyme disease and Eastern Equine Encephalitis.

Surveillance is used to monitor the presence, location, time and intensity of vector-borne disease activity for vectors and humans, and influential ecological factors such as temperature and habitat suitability. These findings inform decision making to enhance prevention and response activities and reduce the risk in our communities.

Mosquito control uses techniques and management strategies to effectively decrease mosquito species that can spread West Nile virus.

Public education and outreach provides information to residents on current risk levels of vector-borne diseases in the community and how to reduce the risk of infection. Personal protection against insect bites and reducing vector breeding habitats by eliminating sites of standing water are effective ways to reduce vector-borne diseases.

Response to increased risk occurs when surveillance findings indicate potential increased risk to human health. This is achieved through enhanced surveillance, amplified vector control when possible, timely notification of regional, municipal, school board and conservation authority representatives and increased communications to the public.

Collaboration with multiple stakeholders supports the Region's comprehensive, coordinated Vector-Borne Disease Program. Stakeholders include regional departments, local municipalities, conservation authorities, school boards, Long-Term Care homes, community groups, health care providers, veterinarians and veterinarian technicians, First Nations, public health units across Ontario, Public Health Ontario, Ministry of Health and Long-Term Care, additional provincial ministries, and Health Canada.

4. Analysis

SURVEILLANCE

West Nile Virus surveillance of mosquitoes and humans is used to determine risk of infection in the Region

West Nile virus is spread through the bite of an infected mosquito. It was first detected in North America in 1999, emerged in York Region in 2002, and has since become established in Ontario.

West Nile virus surveillance is the mainstay of the prevention and control of West Nile virus. Surveillance data on human cases and mosquitoes that test positive for West Nile virus help determine the risk of contracting West Nile virus in the Region and inform prevention, control and response activities. Surveillance information is available for residents at york.ca/westnile.

2018 surveillance shows continued West Nile virus activity circulating in York Region and Ontario

The number of confirmed human cases and mosquito traps that test positive for West Nile virus varies from year to year, depending on temperature and its influence on mosquito

breeding conditions. In 2018, 16 mosquito traps tested positive for West Nile virus (Attachment 1) and three human cases were reported. Table 1 provides an overview of York Region West Nile virus surveillance findings from 2012 to 2018.

West Nile virus activity levels in 2012 are used as a benchmark, demonstrating the influence of temperatures on positive activity in mosquitoes and humans. In 2012, record-breaking summer temperatures led to increased mosquito populations and more infected mosquitoes, which impacted the number of humans infected. Similarly in both 2017 and 2018, slightly above seasonal temperatures contributed to increased positive mosquito traps and human cases. This is in contrast to 2014-2016, when seasonal or below seasonal temperatures were experienced.

Table 1
West Nile Virus Surveillance Summary, 2012 to 2018, York Region and Ontario

	2012	2013	2014	2015	2016	2017	2018
Confirmed human cases	17	1	0	1	3	12	3
Positive mosquito traps	43	16	2	3	2	14	16
Ontario confirmed human cases	239	50	9	28	47	153	122

York Region Public Health monitors surveillance findings and temperatures across Ontario to identify risk levels for West Nile virus activity and assist the timing of response activities.

Lyme disease surveillance of blacklegged ticks and humans is used to determine risk of infection in the Region

Lyme disease is caused by the *Borellia burgdorferi* bacteria, which is spread through the bite of an infected blacklegged tick. Lyme disease is one of the most frequent vector-borne diseases in the temperate world.

The blacklegged tick has expanded its range northward from the United States into new regions in southern Canada. Areas of Ontario where blacklegged ticks are commonly found include the north shores of Lake Erie, Lake Ontario and the St. Lawrence River. Their habitat will continue to expand in coming decades due to climate change and increasingly compatible environments.

To measure local distribution and volume of blacklegged ticks and Lyme disease cases to help determine the level of risk in the community, York Region Public Health uses three surveillance techniques: passive tick surveillance, active tick surveillance and human case surveillance.

Passive tick surveillance identifies areas for additional active tick surveillance

Passive tick surveillance involves residents submitting ticks removed from humans to York Region Public Health for identification and subsequent testing if the tick is identified as a blacklegged tick. The voluntary notification of tick submission results from physicians and veterinarians to York Region Public Health is an additional form of passive surveillance.

There has been a steady increase in passive tick surveillance submissions due to expanding tick habitat as well as increased knowledge of Lyme disease by York Region residents. In 2018, 88 ticks were submitted to York Region Public Health's passive tick surveillance program and identified by the Public Health Ontario Laboratory. Thirty-seven ticks found in York Region were identified as blacklegged ticks; however no locally acquired blacklegged ticks tested positive for *Borellia burgdorferi* (Table 2).

Locations where locally acquired blacklegged ticks were found are concentrated in the Rouge and Humber Valley systems, southern shore of Lake Simcoe, York Regional Forest Tracts and the Oak Ridges Moraine. Ticks are introduced into these areas by migrating birds and transported through the natural habitat on terrestrial animals such as deer. Tick submissions help determine areas for additional active surveillance to identify Lyme disease risk areas.

Active tick surveillance in 2018 found a substantial increase of blacklegged ticks

Active tick surveillance (tick dragging) involves collecting ticks from their habitat by dragging a flannel cloth over and around vegetation to determine Lyme disease risk areas. York Region Public Health has conducted active tick surveillance to determine Lyme disease risk areas throughout the Region since 2011.

In 2018, York Region Public Health conducted tick dragging at 35 locations in the Region throughout the spring and fall in natural, forested public spaces (e.g. parks, conservation areas, river valley systems). Twenty-eight blacklegged ticks were found at nine locations, with one tick testing positive for *Borellia burgdorferi* (Table 2). This is a substantial increase in the amount of blacklegged ticks found through active tick surveillance and is due to the expansion of blacklegged tick habitat. The blacklegged tick will continue to expand its range across southern Canada, where human populations are concentrated and will likely result in an increase in human contact with blacklegged ticks. York Region's Active Tick Surveillance 2018 map (Attachment 2) shows the tick dragging locations and where blacklegged ticks were found. Surveillance results are available for residents at york.ca/lymedisease.

One new Lyme disease risk area was identified in the Humber Valley area of York Region through active tick surveillance in 2018

Public Health Ontario's Lyme Disease Map 2018 (Attachment 3) illustrates estimated risk areas in Ontario based on data from previous seasons. Most of York Region is in an estimated risk area for Lyme disease, with risk zones identified as wooded or brushy areas within a 20 km radius of a location where blacklegged ticks were found in successive spring and fall tick dragging sessions. As blacklegged ticks were found during 2018 spring and fall

tick dragging sessions in the Humber Valley (Boyd and Kortright Conservation Areas), wooded or brushy areas within a 20 km radius zone around this vicinity will be identified as a new Lyme disease risk area by Public Health Ontario in their 2019 map.

2018 surveillance shows continued Lyme disease activity circulating in York Region and Ontario

Human case surveillance is another method to determine the level of risk in the community. When a report of Lyme disease is received, a case investigation is conducted which includes confirming the diagnosis, collecting epidemiological information, and identifying location(s) where contact with a Lyme disease-bearing tick may have occurred.

Confirmed human cases of Lyme disease were reported in 2017; eight of the 18 confirmed cases were possibly acquired in York Region. Compared to 2017, Lyme disease activity in York Region decreased in 2018: there were eight confirmed human cases, five of which may have possibly been acquired in York Region. Prior to 2016, most confirmed human cases of Lyme disease were likely acquired outside of York Region.

Table 2 provides an overview of York Region Lyme disease surveillance findings from 2012 to 2018. The increased Lyme disease activity seen over 2012 through 2018 is anticipated to continue in York Region and Ontario as a result of expanding tick habitats related to climate change. The spike in human cases of Lyme disease in Ontario in 2017 may be related to an increased number of ticks; a large number of the increased cases in 2017 were disproportionately concentrated in eastern Ontario where Lyme disease is more prevalent. Surveillance, awareness and personal protection are the best defense against Lyme disease.

Table 2
Lyme Disease Surveillance Summary, 2012 to 2018, York Region and Ontario

	2012	2013	2014	2015	2016	2017	2018
Confirmed human cases	2	13	6	8	5	18	8
Local blacklegged ticks - passive tick surveillance	1	4	7	11	15	35	37
Local blacklegged ticks - active tick surveillance	0	0	2	4	0	10	28
Positive <i>Borellia burgdorferi</i> local blacklegged ticks	0	0	1	0	1	2	1
Ontario confirmed human cases	107	182	163	379	331	927	564

York Region Public Health collaborates with multiple partners to monitor emerging vector-borne diseases and potential related threats

Climate change and the global movement of people, goods and animals impact the potential for emerging vector-borne diseases in Ontario. York Region Public Health works with multiple partners at local, provincial, federal and international levels to monitor vector-borne disease threats that may emerge in Ontario or are a risk to travellers. Examples include Eastern Equine Encephalitis virus and Zika virus.

Eastern Equine Encephalitis virus is spread through the bite of an infected mosquito and has been detected in horses, emus and mosquitoes in Ontario. In 2018, no human cases were reported in the province, however there were cases in horses in Southern Ontario. Eastern Equine Encephalitis has not been detected in local horses or through York Region Public Health's mosquito surveillance program. However, advisories were sent to health care providers and veterinarians in the Region as a precaution, recognizing the size and importance of the horse industry locally.

Zika virus surveillance by the World Health Organization and US Centres for Disease Control and Prevention indicates a decline in cases; however, travellers are advised to prevent mosquito bites to protect against potential travel-related Zika virus infection. York Region Public Health continues to collaborate with partners and monitor surveillance in Ontario and reporting globally regarding emerging or re-emerging vector-borne diseases and related potential threats.

MOSQUITO CONTROL

Larviciding and source reduction are the primary methods used to reduce the abundance of mosquitoes that can transmit West Nile virus

The most efficient method of reducing mosquitoes that could potentially carry West Nile virus is through larviciding. The Ministry of the Environment, Conservation and Parks has authorized the use of larvicides to control mosquito populations under approved permits. In York Region, larvicides have been used for the past 16 years as the primary method of mosquito control.

The main mosquito vectors of West Nile virus in Ontario are the *Culex* species. These mosquitoes breed in natural or artificial containers of standing water including catch basins, ditches, sewage lagoons, and standing water around the home. Over 100,000 catch basins in the Region are treated with larvicides four times a season. In 2018, 127 rear yard catch basins were treated on a request basis. Larviciding is available at no cost to residents who have a catch basin in their backyard.

Targeting elimination of standing water is another effective means of reducing mosquito populations. Through education, the public can make significant impacts in reducing the number of mosquito breeding habitats around their homes and businesses. Reports of standing water by residents are investigated by York Region Public Health staff.

There are no control options for ticks: surveillance, awareness and personal protection are the primary methods of preventing Lyme disease.

PUBLIC EDUCATION AND OUTREACH

Vector-borne disease education and outreach is ongoing and heightened to respond to increased risk levels in the community

Knowledge of risk of local vector-borne diseases and emerging blacklegged tick populations as well as personal protection messaging are critical to reducing the potential of locally acquired cases. In 2018, West Nile virus, Lyme disease and Eastern Equine Encephalitis virus awareness was achieved through education and outreach strategies, such as:

- Media releases and media interviews
- Information on Regional and municipal websites: york.ca/westnile, york.ca/lymedisease
- Social media messages on vector-borne disease personal protection: #FightTheBite
- Education resources widely distributed to: municipal and Regional offices, libraries, community and recreation centres, garden centres, golf courses, Sibbald Point Provincial Park and conservation areas, school boards and day care centres
- Fight the Bite! permanent tick signs posted at risk area trailheads
- Personal protection messaging, presentations, and distribution of educational resources at community events
- West Nile virus and Lyme disease advertisements in York Region Media Group publications, multicultural newspapers and municipal recycling calendars (Attachments 4 and 5)
- Timely communications to health care providers, veterinarians and veterinarian technicians

PUBLIC HEALTH RESPONSE TO INCREASED RISK IN THE COMMUNITY

York Region Public Health is continually monitoring and responding to increased risks due to vector-borne diseases in the community. Discovery of positive mosquito traps or blacklegged ticks subsequently increases surveillance, timely communication, education activities, and collaboration with community partners within the Region to decrease the risk to human health.

2019 VECTOR-BORNE DISEASE PROGRAM

Objectives for 2019 include continued focus on surveillance, mosquito control, education and outreach, increased risk response, and collaboration

The vector and human case trends experienced in York Region are reflective of the environmental and ecological influences on vector-borne diseases. The 2019 York Region Vector-Borne Disease Program will continue with its comprehensive and collaborative approach to managing vector-borne diseases in our community. Focal areas in 2019 include:

- Continued surveillance of West Nile virus, Lyme disease and Eastern Equine Encephalitis virus. York Region Public Health will monitor the presence, location, time and intensity of vector-borne disease activity to inform decision making to enhance prevention and response activities and reduce the risk in our communities
- Mosquito control through larviciding and standing water investigations will continue at the same levels as 2018
- Coordinated education and outreach activities will continue to provide information about personal protection measures to residents
- Collaboration with community partners will continue to enhance public awareness, surveillance initiatives and vector control strategies

5. Financial

Regional expenditures for the Vector-Borne Disease Program in 2018 totaled \$604,770 gross (\$138,770 net). The Ministry of Health and Long-Term Care provided \$54,000 in additional one time funding for 2018. Table 3 provides a summary the budget and actual spending for the Vector Borne Disease Program in 2018. The program was managed within the approved Regional budget for Public Health.

Table 3
Vector Borne Disease Program 2018 Financial Summary

	2018 Budget	2018 Actual
Gross expenditures	551,606	604,771
Provincial funding	(412,000)	(466,000)
Net Levy	139,606	138,771

The Regional budget for this program for 2019 is \$551,606 gross (\$139,606 net), although provincial allocations have not yet been confirmed for 2019.

6. Local Impact

York Region Public Health will continue to collaborate with local municipalities, conservation authorities and school boards through the Vector-Borne Disease Liaison Committee. This group meets throughout the year to discuss vector-borne disease resources, surveillance trends, program updates, increased risk response and notifications. Local municipalities also participate in West Nile virus control measures through enforcement of local by-laws regarding standing water.

7. Conclusion

York Region Public Health is responsible for the prevention of and response to vector-borne diseases of public health significance. The Vector-Borne Disease Program focuses on West Nile virus and Lyme disease, and is continually monitoring for and adaptable to emerging vector-borne diseases (e.g. Eastern Equine Encephalitis virus).

West Nile virus and Lyme disease activity continues in York Region. In 2019, York Region Public Health will continue the mandated activities of the Vector-Borne Disease Program, including vector and disease surveillance, mosquito control, public education and outreach, increased risk response, and collaboration with partners. The program's comprehensive and collaborative approach effectively prevents and responds to the risk of vector-borne diseases in York Region to protect our communities.

For more information on this report, please contact Joe La Marca, Director, Health Protection at 1-877-464-9675 ext. 74025. Accessible formats or communication supports are available upon request.

Recommended by: **Katherine Chislett**
Commissioner of Community and Health Services

Dr. Karim Kurji
Medical Officer of Health

Approved for Submission: **Bruce Macgregor**
Chief Administrative Officer

March 21, 2019
Attachments (5)
9131536