

# **The Regional Municipality of York**

Committee of the Whole  
Community and Health Services  
April 16, 2020

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

## **Vector-Borne Disease Program 2019/2020 Annual Update**

### **1. Recommendations**

The Regional Clerk circulate this report to the Clerks of all 9 local municipalities.

### **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*.

This report describes York Region Public Health's 2019 Vector-Borne Disease Program deliverables and planned activities for 2020 to reduce the risk of vector-borne diseases in York Region.

- 2019 surveillance shows lower West Nile virus activity
- 2019 surveillance shows continued Lyme disease activity, including increased blacklegged ticks in natural forested areas and identification of one new Lyme disease risk area in Georgina
- In 2019, York Region Public Health partnered with the Chippewas of Georgina Island to teach staff and volunteers from the community how to conduct active tick surveillance and use Lyme disease personal protection measures
- 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 vector-borne diseases program, focusing on surveillance, mosquito control, public education and outreach, increased risk response and collaboration**

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 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.

**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 technicians, First Nations, local public health units, Public Health Ontario, Ministry of Health, additional provincial ministries and Health Canada.

## 4. Analysis

### **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. It emerged in York Region in 2002, and has since become established in Ontario.

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](http://york.ca/westnile).

### **2019 surveillance showed lower West Nile virus activity circulating in York Region**

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 2019, one mosquito trap tested positive for West Nile virus and one human case was reported in York Region. Table 1 provides an overview of York Region West Nile virus surveillance findings from 2015 to 2019 and Ontario human cases.

Temperature and precipitation plays a role in the variation of the number of West Nile virus cases from year to year. Research shows that increased temperatures are the strongest predictor of increased infection in mosquitoes that can transmit West Nile virus. Higher

temperatures can decrease the time required for mosquito development if an adequate amount of standing water is available for mosquito breeding habitat.

In 2019, average seasonal temperatures were experienced, resulting in lower West Nile virus activity. This is in contrast to 2017 and 2018, where slightly above seasonal temperatures contributed to increased positive mosquito traps and human cases. 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.

**Table 1**  
**West Nile Virus Surveillance Summary, 2014 to 2019, York Region and Ontario**

	2014	2015	2016	2017	2018	2019
Confirmed human cases	0	1	3	12	3	1
Positive mosquito traps	2	3	2	14	16	1
Ontario confirmed human cases	9	28	47	153	122	19

### **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 of southern Canada. Its habitat will continue to expand in coming decades due to climate change and increasingly compatible environments. There are no control options for ticks: surveillance, awareness and personal protection are the primary methods of preventing Lyme disease.

York Region Public Health uses three surveillance techniques to help determine the level of risk in the community: passive tick surveillance, active tick surveillance and human case surveillance.

### **Blacklegged ticks submitted through passive tick surveillance increased in 2019**

Passive tick surveillance involves residents submitting ticks removed from humans to York Region Public Health for identification by the Public Health Ontario Laboratory and testing of blacklegged ticks for *Borellia burgdorferi* by the National Microbiology Laboratory for surveillance purposes.

In 2019, York Region Public Health implemented preliminary tick identification, allowing for quicker identification of blacklegged ticks and estimating the amount of time a blacklegged tick had been feeding based on the tick's growth. This provides residents with important information to share with their physician for discussing potential treatment options and improves customer service standards.

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 2019, 189 ticks were submitted to York Region Public Health's passive tick surveillance program. Eighty-one of these ticks were identified as blacklegged ticks and, ten locally acquired blacklegged ticks tested positive for *Borellia burgdorferi* (Table 2).

### **Blacklegged ticks found by York Region through active tick surveillance increased in 2019**

Active tick surveillance (tick dragging) involves collecting ticks from their habitat by dragging a flannel cloth over and around vegetation to find blacklegged ticks and help determine Lyme disease risk areas.

In 2019, York Region Public Health conducted tick dragging at 35 locations in the Region throughout the spring and fall in natural, forested public spaces such as parks, conservation areas and river valley systems (Attachment 1). Blacklegged ticks were found in multiple locations throughout York Region. Surveillance results are available for residents at [york.ca/lymedisease](http://york.ca/lymedisease) and identify potential Lyme disease risk areas in the Region.

Public Health Ontario's Lyme Disease Map 2019 (Attachment 2) illustrates estimated risk areas in Ontario based on data from previous seasons. Lyme disease risk zones are 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.

### **Public Health partnered with the Chippewas of Georgina Island First Nation to conduct active tick surveillance and discovered a new Lyme disease risk area in Georgina**

In 2019, York Region Public Health was invited by the Chippewas of Georgina Island First Nation to conduct active tick surveillance and teach community members how to tick drag and about methods of personal protection against tick bites. Along with the Chippewas of Georgina Island, York Region Public Health found blacklegged ticks in the spring and fall sessions, resulting in the Georgina Island First Nation and the Town of Georgina being identified as a new Lyme disease risk area. This new risk area will be reflected in the Public Health Ontario's Lyme Disease Map for 2020, resulting in all of York Region becoming an estimated Lyme disease risk area.

### **2019 surveillance shows continued human cases of Lyme disease activity in York Region and Ontario**

Human case surveillance is another method to help determine the level of risk of Lyme disease 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 blacklegged tick may have occurred.

Table 2 provides an overview of York Region Lyme disease surveillance findings from 2014 to 2019. The increased Lyme disease activity is anticipated to continue in York Region and Ontario due to expanding tick habitats related to climate change.

**Table 2**  
**Lyme Disease Surveillance Summary, 2014 to 2019, York Region and Ontario**

	2014	2015	2016	2017	2018	2019
Confirmed human cases	6	8	5	18	10	15
Local blacklegged ticks - passive tick surveillance	7	11	15	35	37	81
Local blacklegged ticks - active tick surveillance	2	4	0	10	28	41
Positive <i>Borellia burgdorferi</i> local blacklegged ticks	1	0	1	2	1	10
Ontario confirmed human cases	163	379	331	927	564	1133

### **York Region Public Health monitors emerging vector-borne diseases and potential related threats**

York Region Public Health works with multiple partners at local, provincial, federal and international levels to monitor vector-borne disease trends and threats that may emerge in Ontario or may be a risk to travellers.

In 2019, the Centers for Disease Control and Prevention in the United States received reports of 38 confirmed human cases of the mosquito-borne illness, eastern equine encephalitis virus, including 15 deaths. There were no human cases reported in Canada. While some people infected with eastern equine encephalitis virus do not develop symptoms, of those who do, approximately one third of those with encephalitis may die. Many of those who recover have ongoing neurological impairment. York Region Public Health will continue to monitor for eastern equine encephalitis virus through the existing mosquito surveillance program.

## **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 mosquitoes under approved permits. In York Region, larvicides have been used for 17 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 mostly in urban environments 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. Larviciding is available at no cost to residents who have a catch basin in their backyard, on request.

Targeted elimination of standing water is another effective means of reducing mosquito populations. Reports of standing water by residents are investigated by Public Health staff.

## **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 2019, West Nile virus, Lyme disease and eastern equine encephalitis virus awareness was achieved through education and outreach strategies:

- Media releases and media interviews
- Information on Regional website: [york.ca/westnile](http://york.ca/westnile), [york.ca/lymedisease](http://york.ca/lymedisease)
- Education resources distributed throughout the community, including social media, advertisements, municipal recycling calendars, signs at trailheads and Fight the Bite! messaging provided 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 (Attachment 3)
- Timely communications to health care providers and animal health professionals

## **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 (e.g. Public Health Ontario) to decrease the risk to human health.

## **Objectives for 2020 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 2020 York Region Vector-Borne Disease Program will continue with its comprehensive and collaborative approach to managing vector-borne diseases in our community. Focal areas for 2020 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
- As of January 1, 2020, the National Microbiology Lab will no longer be testing blacklegged ticks for *Borellia burgdorferi* bacteria from passive tick submissions. The purpose of testing is to conduct surveillance. Patients are managed based on tick exposure and potential transmission of tick-borne pathogens, and not on test results of the tick submission. Ticks found through active tick surveillance by Public Health Units will continue to be tested to monitor infectivity rates of local blacklegged tick populations and potential emerging pathogens
- [eTick](#) is a new public platform for image-based identification and population monitoring of ticks in Canada. Photos of ticks found on both animals and humans can be submitted for visual identification within 48 hours at no cost. Results are posted on an interactive map that is accessible by the public and is monitored by staff for activity in York Region and surrounding jurisdictions
- Mosquito control through larviciding and standing water investigations will continue at the same levels as 2019
- 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 2019 totaled \$602,852 gross and \$172,852 net tax levy. The program was managed within the approved Regional budget for Public Health.

The Regional budget for this program for 2020 is \$544,606 gross, and \$163,382 net tax levy. The provincial allocations have not yet been confirmed.

## 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 2020, 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.

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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:

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Attachments (3)

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