1
VECTOR-BORNE DISEASE PROGRAM 2010/2011 ANNUAL ACTIVITY UPDATE

The Community and Health Services Committee recommends the adoption of the recommendation contained in the following report dated March 24, 2011, from the Commissioner of Community and Health Services and the Medical Officer of Health.

1. RECOMMENDATION

It is recommended that:

1. The Regional Clerk forward this report to the local municipalities for information.

2. PURPOSE

This report is prepared for Regional Council to carry out its legislative duties and responsibilities as the Board of Health under the *Health Protection and Promotion Act.* It summarizes the Public Health Branch's Vector-Borne Disease program activities in 2010 and outlines activities planned for 2011, with a focus on West Nile virus control actions.

3. BACKGROUND

Ontario health units are mandated to implement an integrated management strategy for prevention and control of vector-borne diseases

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

West Nile virus, spread through the bite of an infected mosquito, was first detected in York Region in 2002. According to the Ministry of Health and Long-Term Care (the Ministry), West Nile virus is now established in Ontario, though its severity may vary from year to year depending on the weather's influence on mosquito breeding conditions. In response, the Public Health Branch conducts a multifaceted West Nile virus program, including surveillance, mosquito population control, and public awareness.

In 2009, in line with new Ontario Public Health Standards, the West Nile virus program became part of a more comprehensive Vector-Borne Disease program which has begun to address emerging diseases: Lyme disease and Eastern Equine Encephalitis virus.

The York Region Vector-Borne Disease program conducts Lyme disease surveillance in partnership with the Ministry

Lyme disease is spread through the bite of an infected blacklegged tick. It is a reportable disease under the *Health Protection and Promotion Act*. Public health units actively investigate reports from healthcare providers, to confirm diagnosis, collect epidemiological information and identify the location where the individual case encountered a Lyme disease-bearing tick. Identifying the geographic area of exposure is important to determine the level of risk in a health unit. The Ministry tracks Lyme disease trends in Ontario based on investigation of confirmed cases as well as blacklegged tick surveillance and testing conducted in endemic areas throughout the province. This information is provided to health units for decision making and planning.

Currently, Ontario locations with established blacklegged tick populations infected with Lyme disease include Long Point Provincial Park, Turkey Point Provincial Park, Rondeau Provincial Park, Point Pelee National Park, Prince Edward Point National Wildlife Area, Wainfleet Bog Conservation Area, and the St. Lawrence Islands National Park area. The Ministry warns that, although the potential risk is low, it is possible for an individual to be bitten by an infected blacklegged tick almost anywhere in the province as infected ticks are often carried by migratory birds.

The Province has begun surveillance for Eastern Equine Encephalitis, an emerging mosquito-borne virus

Eastern Equine Encephalitis virus is a mosquito-borne virus. It is currently found in the eastern United States, where it causes disease in humans, horses, and some bird species. Although some people experience it only as a mild illness, Eastern Equine Encephalitis is fatal in about one-third of cases. While Eastern Equine Encephalitis virus-positive mosquitoes, horses, and emus have occurred in the Ontario in recent years, no human cases have yet been reported in Canada.

In 2009, the Ministry incorporated the surveillance of mosquito species that transmit Eastern Equine Encephalitis virus into the West Nile virus species identification and viral testing program across Ontario.

Climate change may be expected to influence the distribution of vector-borne diseases

Global organizations such as Environmental Health Perspectives and National Institute of Environmental Health Sciences cite climate as one of several factors that influence the distribution of vector-borne diseases. There is concern that climate change could impact the distribution and incidence of many of these diseases by expanding the range where vectors may live.

4. ANALYSIS AND OPTIONS

VECTOR-BORNE DISEASE PROGRAM 2010

York Region recorded the lowest year of West Nile virus activity in 2010

The Public Health Branch conducted surveillance of West Nile virus in 2010 as in previous years by collecting data on virus activity in mosquito and human populations and on influential factors such as temperature. Table 1 summarizes West Nile virus detected in York Region from 2002 to 2010.

No mosquito pools tested positive for West Nile virus in York Region in 2010. This was in contrast to the provincial trend, which saw the number of positive mosquito pools in Ontario rise sharply from 14 positive mosquito pools in 2009 to 48 positive mosquito pools in 2010.

There were no positive human cases reported in York Region in 2010. In Ontario, there were two human cases of West Nile virus reported, in Durham Region and Halton Region. Human cases of West Nile virus reported in Canada decreased in 2010: the Public Health Agency of Canada reported six human cases of West Nile virus compared to eight in 2009 and 38 in 2008.

Table 1
York Region West Nile Virus Summary 2002 – 2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Confirmed human cases	7*	2	0	5	3	1	1	0	0
Suspect human cases investigated	29	81	0	44	3	2	1	0	0
Positive mosquito pools	14	5	1	14	10	0	2	1	0
Mosquito trap sites	10	41	30	40	40	38	37	34	37
Dead bird sightings (calls)	2,286	3,533	2,014	1,372	1,604	763	889	NA†	NA†
Birds picked up	127	813	1,647	1,098	1,328	968	757	NA†	NA†
Birds sent	55	48	64	53	34	24	14	NA†	NA†
Positive birds**	8	8	11	22	10	1	2	NA†	1†*
Standing water complaint investigations	25	992	379	222	232	106	111	78	49

*4 cases probable.

**Number of positive birds does not reflect the intensity of the virus. Submission of specimens from a municipality ended after first positive.

† Dead bird pick-up, testing and reporting was discontinued province wide in 2009.

†*Dead bird sent by resident for private testing. An environmental scan was conducted due to activity in the City of Toronto in the vicinity of the dead bird location. No mosquito larvae were found within 2km of the dead bird in York Region.

Only one case of Lyme disease was reported in York Region in 2010

Table 2 summarizes Lyme disease detected in York Region residents from 2005 to 2010. Of these cases, eight have been determined to be acquired outside of Canada and three cases were from exposure within Ontario. None of these cases were from exposure to infected ticks in York Region.

Table 2
York Region Lyme Disease Summary 2005 - 2010

	2005	2006	2007	2008	2009	2010
Confirmed human cases	3	0	4	2	1	1

West Nile virus education continued and a new Lyme disease education initiative was introduced

In addition to its West Nile virus education campaign, with a focus on personal protection and reduction of mosquito breeding sites, the Public Health Branch introduced information on Lyme disease to the residents of York Region in 2010. The campaign focused on personal protection. Pamphlets and posters provided by the Ministry were distributed to municipal offices, libraries, and garden centres. Lyme disease fact sheets and links were also posted on the York Region website.

Mosquito populations were controlled through application of larvicide

Control of the mosquito population is an important component of West Nile virus management. Larviciding, or control of the immature stage of these mosquito populations, is a particularly effective pre-emptive control strategy. Larvicide product approved by the Ontario Ministry of the Environment is applied on a scheduled basis to control mosquito populations in target areas. The following highlights larviciding activities in 2010:

- Municipal and regional catch basins were treated with methoprene pellets four times during the mosquito season. Methoprene prevents mosquito larvae from developing into adult mosquitoes, with no identified risk to wildlife, people or the environment.

- Private rear yard catch basins were larvicided upon request with long lasting methoprene briquettes.

- Catch basins in parks, grounds of long-term care and residential facilities (upon request), and municipally-owned properties were treated once a season with long lasting methoprene briquettes (with the exception of the Town of Markham, which provided screens for public park catch basins).

- Standing surface water in road side ditches and sewage treatment lagoons was treated as required, using *Bacillus thuringiensis israelensis* (Bti). Bti is a naturally occurring bacterium found in soil and water that targets and kills mosquito larvae. It has been found to have no effect on other aquatic organisms or the environment.

- Catch basins in environmentally-sensitive areas were larvicided twice a season using *Bacillus sphaericus* (B. sphaericus). B. sphaericus is a naturally occurring bacterium found in soil and water which targets and kills mosquito larvae with no impact on other aquatic organisms or the environment.

VECTOR-BORNE DISEASE PROGRAM 2011

West Nile virus control objectives for 2011 will focus on surveillance, public awareness and mosquito population control

To ensure a standardized response to West Nile virus activity, the *York Region West Nile Virus Response Plan* continues to be reviewed annually and updated in accordance with the *Health Protection and Promotion Act*, Ontario Regulation 199/03 (Control of West Nile virus), the Ontario Public Health Standards, and guidelines set out in the Ministry's *West Nile Virus Preparedness and Prevention Plan*. Various committees and working groups also ensure coordination and communication with local municipalities and neighbouring health units.

York Region Public Health will continue West Nile virus surveillance activities in 2011 in the manner prescribed by the Ministry. Mosquito-based surveillance remains the primary tool for measuring the intensity of the West Nile virus. The Public Health Branch will also continue its public awareness campaign as well as larviciding activities at the same level as in 2010. York Region's neighbouring health units (Peel, Durham, Toronto and Halton) also plan to carry out a larviciding program for 2011, to the same extent as in 2010. It is important that a consistent approach is taken by neighbouring municipalities. Reduction of mosquito breeding sites through investigation of standing water complaints will continue in 2011.

Lyme disease surveillance and public education will continue in 2011

York Region Public Health will continue Lyme disease surveillance in partnership with the Ministry. This includes the submission of ticks brought into York Region Public Health to government labs for identification and potential testing for Lyme disease causing agents. Public awareness efforts will focus on Lyme disease education and personal protection.

Eastern Equine Encephalitis virus surveillance will increase in 2011

Eastern Equine Encephalitis virus surveillance in the mosquito population will be enhanced in 2011 as prescribed by the Ministry. Using existing traps for West Nile virus

surveillance, mosquitoes known to transmit Eastern Equine Encephalitis virus will be tested in addition to mosquitoes that carry West Nile virus.

5. FINANCIAL IMPLICATIONS

Regional expenditures for the Vector-Borne Disease program totalled $418,484. This was offset by 75% provincial subsidy of $313,863, resulting in a net tax levy impact of $104,621. The program was managed within the Regional and provincial budget allocations.

6. LOCAL MUNICIPAL IMPACT

Local municipalities participate in West Nile virus control measures through enforcement of local standing water by-laws. The Region will continue to work collaboratively with local municipalities through the West Nile Virus Operations Committee, which will meet throughout the 2011 West Nile virus season.

Separate from the Vector-Borne Disease program, the Town of East Gwillimbury, the Town of Georgina, and the Township of King have programs for the control of nuisance mosquitoes that are not known to spread West Nile virus to humans.

7. CONCLUSION

Since West Nile virus is established throughout the majority of provinces and states across North America, the West Nile virus component of the Vector-Borne Disease program will continue in 2011, focusing on surveillance, education, and mosquito population control in line with efforts in neighbouring health units. Surveillance and education activities related to Lyme disease will also continue in 2011, in order to ensure that the risk to York Region residents remains low. Finally, enhanced surveillance for the emerging Eastern Equine Encephalitis virus will assist in identifying its potential risk. All components of the Vector-Borne Disease program rely on the Public Health Branch's collaborative work with the Province, local municipalities, and surrounding health units.

For more information on this report, please contact Dr. Karim Kurji, Medical Officer of Health at Ext. 4012.

The Senior Management Group has reviewed this report.