

HUMAN SURVEILLANCE

Objective:

To quickly detect human illness due to WNV.

Background:

In 2005, there were three Peel residents who had laboratory confirmed WNV infections. Two of the human cases resided in Mississauga and one was a Brampton resident. These were the first human cases reported in Peel since 2003. In 2003, there were 10 human cases in Peel, much lower than the 57 (confirmed and probable cases) identified in 2002. A combination of increased public awareness, source reduction and the larviciding of catch basins and surface waters likely have combined to contribute to Peel having relatively few human cases since the 2002.

Seventeen out of 36 health units in Ontario reported human cases in 2005. Peel Regional Health Unit, with the second highest population in Ontario, had a comparatively low rate of human cases (.25 cases per 100,000) ranking 13th out of the 17 health units reporting cases. Based on the low number of human cases in comparison with other municipalities, Peel's program to reduce *Culex* mosquito populations appears to have had a positive impact.

All WNV blood tests in the province will continue to be conducted at the Central Public Health Laboratory in Toronto. The first laboratory test performed on a potential blood sample is the Immunoglobulin M (IgM) Enzyme-Linked Immunosorbent Assay (ELISA), which, if positive, will be run a second time to rule out false positive results. These two tests are followed by the Plaque Reduction Neutralization Test (PRNT) to confirm the diagnosis in the first three cases within each public health jurisdiction. ELISA test results are available within 24 hours, while the PRNT confirmation testing takes an additional seven days.

Peel Public Health staff investigates all suspect, probable and confirmed WNV cases among residents in Peel. Standardized medical information including demographics, symptoms, risk factors (such as travel history or having received blood products) and test results are entered into the Ministry of Health and Long-Term Care's system called the integrated Public Health Information System (iPHIS). The cases will be mapped onto a Geographic Information System (GIS) according to postal code as part of the risk assessment.

Planned Activities:

- In late spring, Peel Public Health will update physicians region-wide about the importance of immediately reporting all suspected cases of viral encephalitis and viral meningitis. The update will provide information on how to submit appropriate laboratory samples to determine if the cause is a mosquito-borne virus.

- From June through October, regular WNV updates will be sent to all local hospitals and infectious disease specialists to maintain awareness of human surveillance for encephalitis and meningitis cases. Peel Public Health will provide the criteria for reporting and submission of appropriate laboratory specimens for WNV testing.
- Beginning in July, Peel Public Health will implement enhanced surveillance for WNV encephalitis and viral meningitis through local hospitals and physicians.
- Peel Public Health will ensure active hospital-based surveillance will be implemented when WNV activity is identified in bridging vectors.
- Peel Public Health staff will investigate all suspect, probable and confirmed cases of WNV.
- Peel Public Health will maintain a database and map all probable and confirmed human cases of WNV.
- Peel Public Health will work closely with the Ministry of Health and Long-Term Care to ensure that surveillance information is standardized and that personal medical information remains confidential. Cases that meet the case definition will be reported to the Infectious Disease Division of the MOHLTC.

BIRD SURVEILLANCE

Objective:

Utilize data on bird mortality associated with WNV as a means of early detection of WNV activity in the Region of Peel in order to predict the risk of human illness.

Background:

Bird surveillance is the most sensitive early detection system for the presence of WNV. A WNV positive dead bird has been the first indicator that the virus was present in Peel every year, with the exception of 2005. Last year the first positive mosquitoes were found in Peel on July 7 while the first positive bird was not found until July 24. In 2005, there were 33 WNV positive birds reported in Peel, 18 in Mississauga, 10 in Brampton and five in Caledon.

While over 200 North American native bird species have been infected with WNV, the corvid bird family (crows, jays, and ravens) has been found to most likely die from the virus. Crows in particular will demonstrate an almost 100% mortality rate once infected with WNV. Consequently, crows continue to be the bird species of choice for most dead bird surveillance programs in Canada and the United States. In addition to crows, blue jays - the other main corvid species found in Peel - were submitted for testing in 2005. Blue jays were included in the provincial dead bird surveillance program in part due to low crow population levels in some parts of Ontario.

Peel Public Health will continue to focus on blue jay and crow deaths in 2006. The temporal analysis and geographic distribution of target positive birds and target bird sightings are important factors used to determine local WNV intensity.

Planned Activities:

- Beginning in May, Peel Public Health will ask the public to report the number and location of dead crow/blue jay sightings to Health Line Peel at 905-799-7700. This service will operate from 8:00 a.m. – 5:00 p.m. Monday to Friday and 10:00 a.m. – 5:00 p.m. on Saturday, Sunday and statutory holidays from May to September. Callers outside of these hours will be instructed via a taped message to call back during operating hours.
- Dead birds (i.e. those meeting the criteria for accessibility, species, and state of preservation) will be picked up for possible testing. Peel Public Health will select dead crow and blue jay specimens for submission to the Canadian Cooperative Wildlife Health Centre (CCWHC) in Guelph. Peel Public Health will post WNV positive bird results on the Regional WNV Web site (www.peel-bugbite.ca).

- Persons reporting birds which are not crows or blue jays, and which are not suitable or required for surveillance purposes, will be advised how to safely dispose of the bird.
- Peel Public Health will use WNV positive bird test results as early indicators of WNV activity. Trends in dead corvid (crow and blue jay) sightings will be monitored as an indicator of potential human health risk.
- Peel Public Health will continue to record sightings of dead birds other than crows or blue jays that are reported through Health Line Peel. This information will be mapped and analyzed to determine if there is significant bird mortality in an area. This information is most useful in the years when the crow population is at low levels.

MOSQUITO SURVEILLANCE

Objective:

To monitor numbers, species and locations of adult and larval mosquito populations and to detect the presence of WNV.

Background:

Adult mosquitoes were collected weekly from mosquito traps at 30 fixed locations throughout the Region of Peel from mid-June to late September last year. There were 16 permanent trapping sites in Mississauga, nine in Brampton and five in Caledon. In 2005, 24 positive mosquito batches were found in the Region of Peel; 16 in Mississauga, six in Brampton and two in Caledon. This was the first time positive mosquitoes have been found in Caledon. All the mosquitoes that tested positive in Peel Region in 2005 were *Culex* species. *Culex* species have been responsible for the vast majority of positive batches in Peel since 2002. In the last two years, all of the positive mosquito batches in Peel have been attributed to *Culex* species. This confirms that the WNV prevention plan should continue to focus primarily on reducing the number of *Culex* mosquitoes.

In 2005, the Asian Tiger mosquito (*Stegomyia albopicta*) was collected in the Region of Peel for the first time. One mosquito was collected in one trapping event and tested negative for the West Nile Virus. The Asian Tiger mosquito is a non-native mosquito species that is a vector of a number of viruses including WNV, Eastern Equine Encephalitis and Dengue Fever.

Peel Public Health staff also monitored six ovipools which were set up over the course of the mosquito season. Three were located in Mississauga, two in Brampton and one in Caledon. Ovipools are designed to attract adult female *Culex* mosquitoes searching for suitable sites in which to lay their eggs. Peel Public Health staff made regular visits to these sites and noted the number of egg rafts, which provided an indication of the breeding activity of the *Culex* species.

Last year, seasonal field staff surveyed a wide range of aquatic habitats for the presence of mosquitoes in the larval stage from mid-May to late September. Breeding sites were located by referencing historical breeding site data collected in previous years, conducting field surveys and investigating stagnant water complaints. Larval surveillance also involved the collection and identification of the larvae found at the breeding sites. This information was used to determine mosquito species distribution, abundance and seasonal occurrence and will assist in guiding larviciding activities.

The risk of mosquito-borne disease depends on both the number of mosquitoes capable of transmitting the virus and the prevalence of the virus among these mosquitoes. Accurate and timely surveillance data on larval and adult mosquitoes is important for guiding appropriate prevention and reduction activities.

Planned Activities:

- Peel Public Health will continue to work closely with other agencies to collect and map information on potential mosquito-breeding habitats.
- Peel Public Health will regularly inspect priority breeding sites and sites referred for assessment for the presence of larvae.
- Peel Public Health will record and assess all stagnant water complaints reported by the public. Peel Public Health will inspect and monitor the stagnant water reported on public property. Stagnant water reported on private property will continue to be referred to the municipal property standards by-law officers. In 2004 and 2005, a stagnant water report form was available on the Peel WNV Web site to allow the public to make on-line submissions. The on-line stagnant water report will continue to be made available in 2006.
- From mid-June to late September, Peel Public Health will trap adult mosquitoes at 30 permanent sites throughout the three municipalities. Mississauga will have 16 trapping locations, Brampton and Caledon will have nine and five respectively. Mosquitoes will be collected using Centers for Disease Control (CDC) miniature light traps and gravid traps may be used at a few locations. The trapping season may be lengthened or shortened depending on the weather and the results of surveillance. Adult mosquitoes will be counted by species and tested for WNV by the mosquito lab service provider.
- A minimum of six ovipools will be placed in selected locations from May to September to monitor the egg-laying activities of the *Culex* species in Peel.
- Peel Public Health will conduct a study monitoring the abundance of Asian Tiger mosquitoes (*Stegomyia albopicta*) in Peel. The Asian Tiger mosquito was found for the first time in Peel in 2005. This is an exotic species introduced to North America from Asia. Asian Tiger mosquitoes have tested positive for the West Nile Virus in the United States. Asian Tiger mosquitoes are not readily attracted to the standard CDC light trap. Peel will be using an Omni-Directional Fay Prince trap which is a daytime trap designed specifically to capture adult Asian Tiger mosquitoes. The adult mosquitoes collected in the traps will be sent to the mosquito lab service provider for viral testing.

PESTICIDE EFFECTS SURVEILLANCE

Objective:

To identify any unplanned impacts of pesticides used in mosquito control on human or ecosystem health.

Background:

The Ministry of Environment (MOE) has conducted pesticide monitoring in Peel since 2003. Their studies indicate that methoprene, once it leaves storm sewers and enters the environment, breaks down in a short period of time. MOE monitoring results revealed that the larvicide products used to control mosquitoes in Peel has not harmed streams, rivers and drinking water in treated areas and that the pesticides were effective in controlling mosquito larvae.

In 2006, selective larviciding to reduce mosquito numbers will continue. Peel will continue to work with the MOE and other agencies to ensure our larviciding program does not negatively impact the ecosystem. Peel will also continue to use larvicide products that have been identified as having the least environmental impact. Peel's contingency plan for adult mosquito reduction will include a plan for spraying of chemical pesticides if required. All possible measures will be taken to prevent any impacts of adulticiding on human health.

Planned Activities:

- Peel Public Health will work with other municipalities, conservation authorities and the Ontario Ministry of the Environment to evaluate the impact of pesticide application on the environment, and on target and non-target species.
- Peel Public Health will collaborate with hospital emergency rooms and physicians to carry out surveillance for illness potentially associated with pesticide exposure.
- Health Line Peel will track calls related to concerns attributed to pesticides.