

## **INTRODUCTION**

West Nile Virus (WNV) was first detected in Peel in birds and mosquitoes in 2001 with locally acquired human illness occurring for the first time in 2002. There were 112 residents of Peel who had laboratory evidence of WNV infection from the 2002 season (55 suspect cases, 20 probable cases and 37 confirmed cases, including two deaths). The vast majority of confirmed WNV cases were in Mississauga (34), the remaining three confirmed cases were Brampton residents. Most of these cases occurred in August and September. By the end of the year Peel Public Health documented over 1,400 dead crows in our region. Other indicators of extensive WNV activity in Peel during 2002 included positive tests for WNV in 20 crows – nine in Mississauga, six in Caledon and five in Brampton. A total of 128 WNV positive mosquito batches were also identified in Peel that year – 106 in Mississauga and 22 in Brampton.

In 2003, there were only 10 human cases and no deaths reported in Peel. Mississauga continued to be the area in Peel with the highest WNV risk as all the cases of WNV in people were Mississauga residents. A total of 12 crows tested positive for WNV in 2003. Brampton and Mississauga each had five positive crows reported and there were two positive crows found in Caledon. The number of WNV positive mosquito batches dropped dramatically to 24 in 2003. Sixteen positive WNV batches were collected from traps in Mississauga and the remaining eight positive batches were located in Brampton.

In 2004, no human cases were reported in Peel. Peel also experienced a reduction of positive mosquito batches in 2004. A total of four mosquito batches tested positive, two each in Mississauga and Brampton. As in previous years no positive mosquitoes were found in Caledon. All three municipalities reported positive birds in 2004. In 2004, in addition to crows, blue jays were also submitted for testing. Blue jays were included in the provincial dead bird surveillance program in part due to low crow populations in some parts of Ontario. The agency conducting the viral testing - Canadian Cooperative Wildlife Health Centre - also requested the submission of hawk carcasses for study purposes. Five positive crows were found in Caledon, four in Brampton and four in Mississauga. Two positive blue jays were found in Mississauga and one in Caledon. In addition, a positive hawk was found in Mississauga. The increase in positive birds from 12 in 2003 to 17 in 2004 can be attributed to Peel continuing to submit carcasses throughout the entire WNV season. In previous years, the Canadian Cooperative Wildlife Health Centre laboratory would suspend testing from a health unit when four positive birds were identified in a jurisdiction and resumed receiving samples later in the fall.

A combination of increased public awareness, cooler weather, fewer WNV susceptible birds and the larviciding of catch basins and surface waters likely contributed to Peel having lower levels of WNV activity in 2003 and 2004.

At this point it is reasonable to assume that the virus has established itself in North America and will return to Peel at some level in 2005. How much human

illness will occur in 2005 is impossible to predict given our limited experience with WNV. The extent to which WNV causes illness in Peel on a consistent basis in the future will determine the need for, and scale of an ongoing WNV program.

Evidence suggests that WNV remains in an area over the winter in infected adult mosquitoes and/or birds. Hence, a small number of infected mosquitoes and/or birds are present within the region during the early spring months. At this time, the virus begins its amplification cycle. As mosquitoes feed on birds, the virus is transmitted back and forth between the vector (mosquitoes) and the reservoir host population (birds) allowing an increasing number of birds and mosquitoes to become infected. If environmental conditions are optimum for transmission, the virus amplifies to a theoretical point of “spill over”. At this point in the amplification cycle, the virus bridges out of the enzootic, bird-mosquito cycle via bridge vectors. Bridge vectors are mosquito species that readily feed on humans and other mammals in addition to birds. It is at this point in the season that transmission to humans may occur. Recent evidence suggests that *Culex pipiens* and *Culex restuans* may play a critical role in both the WNV bird mosquito cycle and direct transmission of WNV to humans.

An effective WNV program aims to limit “spill over” by reducing the number of those mosquitoes involved in the bird-mosquito amplification cycle. Surveillance information should be able to detect the virus during the amplification cycle prior to bridge vector involvement allowing for targeted, effective reduction of the mosquito population that is limited in scope. The American crow, *Corvus brachyrhynchos*, has been the most sensitive indicator of WNV activity. Typically, infected crows can be found a month or more prior to human transmission. As the viral amplification continues, infected mosquitoes are usually found several weeks before human transmission. Eventually, proper surveillance will detect viral presence in the bridge vectors and finally in humans and other mammalian hosts. The goal of the Peel Public Health surveillance program is to monitor the virus in local bird and mosquito populations, and implement measures to reduce the number of infected mosquitoes in order to reduce the risk of human infection.

Guidelines on WNV prevention have been published by health authorities in both Ontario and the United States. Both utilize a tiered approach based on surveillance of WNV in birds, mosquitoes and humans. Surveillance and public education are essential components in any jurisdiction where WNV has been detected in a previous season.

Peel Public Health extends its gratitude to the following collaborators with whom it has worked closely to develop a plan that meets the specific needs of the Region of Peel: Health Canada (HC); the Ontario Ministry of Health and Long-Term Care (MOHLTC); and members of the Region of Peel Mosquito Control Task Force, representing the following agencies:

- Credit Valley Conservation - Biology, Field Operations, Communications

- Toronto Region Conservation Authority - Environmental Services
- Town of Caledon - Property Standards Section, Infrastructure Department, Animal Control Service
- Region of Peel - Public Works
- City of Brampton - Public Relations and Communications, Planning, Design and Development, Works and Transportation, Community Services, Animal Services
- City of Mississauga - Enforcement Division, Community Services, Transportation and Works, Recreation and Parks, Animal Services, Communications