

Executive Summary

Surveillance results of human cases, birds and mosquitoes in 2006 showed a decrease in West Nile Virus (WNV) activity in the Region of Peel and nationally. The information collected in the various surveillance activities continues to be valuable in assessing the risk of human WNV to Region of Peel residents. This information is used to assess the need for enhanced mosquito reduction activities which include larviciding and source reduction. Public education and community outreach are a significant and important component of the program, particularly in preventing personal exposure and in eliminating breeding sites on private property.

WNV, first detected in North America in 1999, is transmitted primarily through the bite of infected mosquitoes. The spread across the continent has been rapid. Human cases were reported in five provinces/territories and in 43 U.S. states in 2006. WNV activity in the Region of Peel first occurred in birds and mosquitoes in 2001. The following year, 2002, marked the year with the greatest number of confirmed human cases in the Region including two deaths.

In keeping with the Region of Peel WNV Prevention Plan, this fifth annual report presents the surveillance information collected in 2006.

Human Case Surveillance

Surveillance of human cases in 2006 showed a decrease in West Nile Virus (WNV) activity in the Region of Peel and nationally when compared to the previous year. The rate of human WNV infection in Ontario remains well below the 2002 rates.

Human cases decreased from three in 2005 to two in 2006. Both cases were residents of the City of Brampton. The onset of the first case was consistent with the timing of the first case in previous years. There were no deaths in the Region of Peel due to WNV infection in 2006. Of the Ontario health units reporting cases, the Region of Peel had the lowest WNV case rates when adjusted for population size. Two deaths due to WNV occurred in Ontario. Of particular importance to the Region of Peel is the fact that one of those deaths occurred in the City of Toronto.

Dead Bird Surveillance

In 2006, there was a 3% decrease in the number of dead birds (all species) reported to the Customer Contact Centre when compared to 2005. Most dead bird reports, 61%, were from the City of Mississauga. Thirty-one per cent were from the City of Brampton and eight per cent were from the Town of Caledon.

2006 – West Nile Virus in the Region of Peel

The number of target birds, crows and blue jays, reported decreased by 27% in 2006 when compared to the previous year. Eleven birds tested positive for WNV in the Region of Peel. Four birds were positive in the City of Mississauga (3 of them in south Mississauga), four in the City of Brampton and three in the Town of Caledon.

The bird infection rate in the Region of Peel was 41% in 2006. This compares to a provincial rate of 26% and 9% nationally. However, a complete assessment of the infection rate in birds is limited by the capping of bird submissions towards the end of the season.

In the Region of Peel, the first positive bird was reported two weeks prior to the first human case and one week after the first positive mosquito batch. This was the second consecutive year that a positive mosquito batch occurred before the finding of a positive bird.

Adult Mosquito Surveillance

Mosquitoes were collected weekly from 30 permanent, fixed-location traps throughout the Region of Peel. A total of 71,099 female adult mosquitoes were collected in the Region of Peel; 49% in the City of Mississauga, 36% in the City of Brampton and 16% in the Town of Caledon.

Nine of the permanent traps were positive for WNV in 2006, for a total of 14 positive mosquito batches (some traps were positive multiple times). This represents a decrease from the 24 positive batches that occurred in 2005.

In 2006, twenty different mosquito species were found in the Region of Peel. The *Culex* species, *Culex pipiens* and *Culex restuans*, are associated with a greater risk of WNV transmission. In 2006, 12 of the 14 WNV positive batches in the Region of Peel were due to the *Culex* species. The abundance of the *Culex* species remained stable at five per cent in 2006. This compares to high of 30% seen in 2002. The decrease in *Culex* species is likely attributed to a successful larviciding program targeted to eliminate the *Culex* species, and a reduction in breeding sites preferred by the *Culex* species.

In 2006, a pilot study was conducted to assess the presence of the Asian tiger mosquito (*Stegomyia albopicta*). This was in response to finding this species in the Region of Peel and in two other Ontario health units, for the first time in 2005. This mosquito species is a known carrier of WNV and other viruses. The Asian tiger mosquito was not captured in the Region of Peel in 2006.

Other than *Aedes vexans*, *Coquillettidia perturbans*, *Culex* species and *Ochlerotatus japonicus*, most species decreased in abundance in 2006. *Ochlerotatus japonicus* abundance increased by four times over a one year period, from 0.1% to 0.4%. *Ochlerotatus japonicus* is not as abundant as other

species. However, its increase in proportion relative to other species, along with the fact that it is an efficient WNV vector, warrants continued monitoring in the coming season.

Larval Surveillance

Mosquito larval surveillance was undertaken at 2,233 potential breeding sites in the Region of Peel. Seventy per cent of the sites were in the City of Mississauga, 18% in the City of Brampton and 12% in the Town of Caledon. Mosquito larvae were found at 25% of the breeding sites monitored; 2.3% of all sites had only vector larvae present while 22% had both vector and non-vector larvae present. Ditches and culverts were the most common habitat where larvae were found. Forty-two per cent of the breeding sites with larvae were ditches, 14% were culverts and woodland pools.

In 2006, a total of 2,205 mosquito larvae were identified compared to 3,074 in 2005. Fifty-six per cent of the larvae identified were *Culex pipiens* and *Culex restuans*. Larvae first emerged in week 20 (May 14 to 20) and peaked in week 30 (July 23 to 29).

Larval Mosquito Reduction

As in previous years, the larval mosquito reduction activities involved several concurrent approaches. Four rounds of methoprene pellets were applied to a total of 329,469 roadside catch basins between mid-June to end of August (approximately 82,000 treated per round). Limited post-treatment monitoring indicated that the methoprene pellets were 99% effective in controlling mosquito larvae. An additional 2,261 non-roadside catch basins on Peel-owned and/or operated properties, private backyards and public parks were treated with methoprene briquets which were effective up to 86 days.

Vectolex® (*Bacillus sphaericus*) was used in 1,282 catch basins that drain to Environmentally Sensitive Areas.

A total of 201 surface water sites were treated with AquaBac 200G (*Bacillus thuringiensis var. israelensis*). Some locations required multiple treatments. This represents an increase in the number of sites when compared to the previous year when 107 sites were treated. Across the Region of Peel, ditches and culverts were the surface water sites most often larvicided.

Conclusion

There is no information suggesting that the spread of WNV has stopped. While WNV activity, as measured by the three main surveillance factors, will vary from year to year, it is reasonable to assume that the disease has established itself in North America.

2006 – West Nile Virus in the Region of Peel

A number of factors influence the risk of human WNV infection requiring the implementation of multiple surveillance and risk reduction strategies to minimize the risk of human WNV infection. The surveillance systems implemented in the Region of Peel suggest that the prevention and reduction activities are resulting in reduced risk of human WNV infection in the Region of Peel. Of the 19 health units in Ontario that reported WNV cases, the Region of Peel had the lowest number of WNV cases per 100,000 population.

Given that the *Culex* species was predominantly responsible for the WNV mosquito pools in the Region of Peel in 2006, targeted mosquito vector reduction focussing on the *Culex* species should continue.

The results of the 2006 WNV surveillance program suggest that the 2007 WNV Prevention Plan should continue to focus on surveillance, mosquito reduction and public education and community outreach.