

Evaluation and Conclusions

Surveillance of humans, birds and mosquitoes in 2005 showed an increase in West Nile Virus (WNV) activity in the Region of Peel and across Canada. 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 human WNV infection.

Human Case Surveillance

In the Region of Peel, human cases increased from none in 2004 to three in 2005. As in the previous two years, no deaths due to WNV infection occurred in the Region of Peel in 2005. Of the health units reporting cases, the Region of Peel had one of the lowest WNV case rates when adjusted for population size. When compared to the City of Toronto and the Regions of Halton and York, the Region of Peel had the lowest case rate when adjusted for population size.

During 2005, Communicable Disease staff monitored local hospitals to identify suspected human WNV cases. Upon notification of a suspected human case, seasonal staff in the WNV program went door-to-door in the immediate area advising residents of the human case and offering to survey the property for mosquito breeding sites. In addition, educational material on symptoms of WNV, reduction of mosquito breeding sites and personal protection were provided to the residents. An intensified environmental scan around the area of the identified human case was conducted to verify that roadside catch basins were treated and identify stagnant water sites. Any mosquito breeding sites identified were larvicided or remediated. These targeted risk reduction measures will continue in 2006.

Dead Bird Surveillance

In 2005 there was a decrease in the reported number of dead birds (all species). Despite this fact, the number of target birds (crows and blue jays) being reported increased by 40% in 2005 over the previous year. The first positive bird in 2005 was reported two weeks prior to the first human case and three weeks after the first positive mosquito batch. This year was the first time that a positive mosquito batch occurred before the finding of a positive bird. For the remainder of the season the typical pattern of positive birds preceding positive mosquito pools prevailed throughout the Region of Peel.

Thirty-three birds tested positive for WNV in the Region of Peel corresponding to 44% of the birds tested. This is the highest infection rate in birds since 2002. However, a complete assessment of the infection rate in birds is limited by the capping of bird submissions towards the end of the season. Dead bird surveillance continues to be an effective tool for identifying the presence of WNV in the community. This program will continue in 2006.

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In 2005, a private pest control company was contracted to pick up dead crows and blue jays birds for testing. In previous years local animal control provided this service. This service worked well and there were significant cost-savings. This service will be continued in 2006.

Mosquito Surveillance and Reduction

In 2005, the number of mosquito batches testing positive increased significantly from the previous year (by 500%). However, this number is equivalent to the number of positive batches in 2003. This increase is likely attributed to the hotter summer temperatures in 2005 compared to 2003 and 2004.

In 2005, forty-two 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. This year, *Culex* mosquitoes were responsible for all of the positive mosquito batches in the Region of Peel. This finding notwithstanding, the proportion of the *Culex* species continues to decrease from a high of 30% in 2002 to approximately 5% in 2005. This declining trend has observed over the last three years since the WNV Prevention Plan has been in place. The decrease in *Culex* species appears to be attributed to a successful larviciding program targeted to eliminate the *Culex* species, and a reduction in breeding sites preferred by the *Culex* species. Other jurisdictions in North America such as the Greater Chicago Area and the State of Michigan have reported a decrease in mosquito populations and human cases where mosquito reduction programs are in place²⁵. A Michigan study observed a 10.5 times increase in the risk of WNV infection for citizens living outside of a mosquito control jurisdiction²⁶. Without taking preventive actions against the *Culex* species, the Region of Peel may well have seen an increase in their abundance from 2004 to 2005, as evidenced by the increases seen *Coquillettidia perturbans* and *Aedes vexans vexans*, the two most abundance species. However, weather conditions are a significant contributor to mosquito abundance.

This year marked the first time the Asian Tiger (*Stegomyia albopicta*) mosquito was found in the Region of Peel and in two other Ontario health units. This mosquito species is a known carrier of WNV and other viruses. A provincially sponsored pilot study assessing the presence of this mosquito in Ontario is being conducted by the provincial government. The Region of Peel is participating in the study in 2006.

Upon notification of a positive mosquito batch, seasonal staff in the WNV program went door-to-door in the immediate area advising residents of the positive batch and offering to survey the property for mosquito breeding sites. In addition, educational material on symptoms of WNV, reduction of mosquito breeding sites and personal protection were provided to the residents. An intensified environmental scan around the area of the identified positive batch was conducted to verify that roadside catch basins were treated and identify stagnant water sites. Any mosquito breeding sites identified were larvicided or remediated. These targeted risk reduction measures will continue in 2006.

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Larval surveillance activities were useful in monitoring the emergence of mosquitoes throughout the season, particularly in areas where the elimination of standing water is difficult. This information is then used to determine the need for surface water treatment. The mosquito reduction activities identified in the 2006 WNV Prevention Plan will be implemented to reduce mosquito populations.

Conclusions

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

The information collected in the various surveillance activities continues to be valuable in assessing and minimizing the risk of human WNV infection to Region of Peel residents. This information is helpful in assessing the need for enhanced mosquito reduction systems which include larviciding and increased promotion of breeding site elimination.

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. The mosquito surveillance data for 2005 shows a decrease in the percentage of *Culex* species relative to other mosquito species. Given that the *Culex* species was exclusively responsible for the WNV mosquito pools in the Region of Peel in 2005, targeted mosquito vector reduction focussing on the *Culex* species must continue.

Public education and community outreach are significant and important components of the program, particularly in preventing personal exposure and in eliminating breeding sites on private property. The education program has been successful in building awareness of the WNV risks and prevention. Peel Public Health will continue to work with the Ministry of Health and Long-Term Care to identify strategies to promote taking personal protection measures against mosquito bites. In 2004 and 2005, there were difficulties with the distribution of education materials to the Town of Caledon residents by Canada Post. In 2006, Peel Public Health will engage the services of a private company to ensure distribution of materials to the Town of Caledon residents.

The results of the 2005 WNV program suggest that the 2006 WNV Prevention Plan should continue to focus on surveillance, mosquito reduction and public education and community outreach.