2
WEST NILE VIRUS CONTROL ACTIVITIES – 2006/2007

The Health and Emergency Medical Services Committee recommends the adoption of the recommendation contained in the following report, Febraury 23, 2007, from the Commissioner of Community Services, Housing and Health Services:

1. RECOMMENDATION

It is recommended that:

1. The Regional Clerk forward this report to area municipalities for their information.

2. PURPOSE

This report summarizes York Region Health Services (YRHS) activities related to West Nile Virus (WNV) control in 2006 and also outlines WNV control activities for 2007.

3. BACKGROUND

WNV is a potentially fatal virus that spreads to humans through the bite of an infected mosquito. It has been detected in mosquitoes and birds throughout Ontario since 2001 and in humans in Ontario since 2002. The virus is now prevalent in all regions of Ontario. There are no indications that the spread of the disease has stopped.

3.1 WNV in York Region

In 2006, there were three human cases of WNV as well as 10 WNV-positive birds and 10 WNV-positive mosquito pools in York Region. None of the three human cases were hospitalized. Table 1 summarizes WNV detection in York Region from 2001 to 2006.

Table 1
York Region WNV Statistics 2001 to 2006

	2001	2002	2003	2004	2005	2006
Human Cases*	0	4	2	0	5	3
Positive Birds**	1	8	9	11	22	10
Positive Mosquito Pools	0	14	5	1	14	10

* Only includes lab confirmed cases.

** The number of positive birds does not reflect the intensity of the virus, since once a municipality had positive results, submission of specimens from that municipality ceased.

3.2 WNV in Ontario

Table 2 shows a comparison of human cases of WNV in various jurisdictions in Ontario from 2002 to 2006.

Table 2
2002 to 2006 WNV Human Cases

	2001	2002	2003	2004	2005	2006
York Region	**0**	**4**	**2**	**0**	**5**	**3**
Toronto	0	129	44	6	38	6
Peel Region	0	40	10	0	4	2
Halton Region	0	56	0	0	5	1
Simcoe Region	0	0	0	0	0	1
Durham Region	0	2	0	0	0	0
Ontario	**0**	**319**	**89**	**13**	**101**	**42***

* This number includes two deaths associated with WNV: one in Toronto, and one in Lambton County.

3.2.1 Eliopoulos v. Ontario

In 2004, in the case of Eliopoulos v. Ontario (Minister of Health and Long-Term Care), the Ontario Superior Court of Justice determined that Ontario could potentially be liable in negligence to an individual for failing to prevent the spread of disease. In a decision dated November 3, 2006, however, the Court of Appeal overturned the lower court's decision. In doing so, the Court of Appeal stated that Ontario does not owe a duty of care to individuals though it does have a general public law duty requiring it to prevent the spreading of infectious disease.

The plaintiff in this matter has now filed an Application to seek leave to appeal of the Ontario Court of Appeal's decision to the Supreme Court of Canada.

3.3 WNV in Canada

As of December 31, 2006, there were 128 cases of WNV in Canada. In addition to the 42 cases in Ontario, one case was reported in Quebec, 50 cases were reported in Manitoba, 11 cases were reported in Saskatchewan and 24 cases were reported in Alberta.

There were a total of two deaths associated with WNV in 2006 in Canada, both in Ontario.

4. ANALYSIS AND OPTIONS

In 2006, WNV control activities within the Region included the following components:

- Education and communication initiatives.
- Surveillance in mosquito, bird and human populations.

- Larviciding to control mosquito populations in targeted areas such as municipal and regional catch basins, some stagnant surface water bodies, rear yard catch basins on private property by request, and catch basins in municipal parks (with the exception of Markham, which provided screens for rear yard catch basins and public park catch basins). Larviciding was also conducted in sewage lagoons where positive mosquitoes where identified.

4.1 WNV Education and Communication in 2006

The public education and awareness program in 2006 continued to focus on two key messages: personal protection (including the use of insect repellent and the wearing of proper clothing) and reducing larval development sites (by removing stagnant water).

4.2 WNV Surveillance in 2006

As prescribed by the Ministry of Health and Long-Term Care (MOHLTC), bird, mosquito, and human surveillance are carried out to determine the presence of WNV and to inform decision making so that preventative actions can be taken to mitigate the disease. A database developed by the Geomatics Division of the York Region Planning and Development Services Department assists YRHS with the compilation of surveillance data and the mapping of positive WNV activity.

As outlined in Table 3, data gathered in 2006 show continued activity of WNV in York Region.

Table 3
WNV Surveillance Summary 2002-2006

Surveillance	2002	2003	2004	2005	2006
Positive mosquito pools	14	5	1	14	10
No. of mosquito trap sites	10	41	30	40	40
Dead bird sightings (calls)	2,286	3,533	2,014	1,372	1,604
Birds picked up	127	813	1,647	1,098	1,328
Birds sent	55	48	64	53	34
Positive birds	8	8	11	22	10
Suspect human cases investigated	29	81	0	44	3
Positive human cases (confirmed)	7 (4 Probable)	2	0	5	3
Positive horses	4	0	0	0	0

4.2.1 Bird Surveillance

Bird surveillance continues to be a component of the WNV surveillance program. Since crows and blue jays are susceptible to the virus and die within days of contracting the disease, they act as sentinels (an early warning signal indicating the presence of the virus) within the region. As in past years, a private company was contracted to pick up and

dispose of all dead birds reported. In 2006, the collection of dead crows and blue jays started in May, and suitable specimens were submitted to the Canadian Corporative Wildlife Health Centre of the University of Guelph for testing. Since the purpose of the submissions was to detect the presence of the virus, not its intensity, submission of specimens from each municipality ceased once that municipality had positive results.

In 2006, 1,328 birds representing all local municipalities were collected in York Region, including 99 crows, 36 blue jays and 1 blackbird, of which 34 were sent for testing and 10 were positive for WNV (8 crows and 2 blue jays).

4.2.2 Mosquito Surveillance

The mosquito surveillance program in 2006 consisted of seven components. Five of these components were employed in past years:

- Trapping adult mosquitoes to identify areas with WNV-positive mosquitoes.
- Responding to stagnant water complaints by inspecting water bodies and recommending corrective action.
- Surveying stormwater management ponds to identify the presence of larvae and the need for larviciding.
- Surveying long-term care (LTC) facilities and other residential facilities to identify potential mosquito larvae development sites and to ensure preventative measures were taken.
- Surveying York Region's seven sewage treatment facilities and the trapping of adult mosquitoes at these locations to detect the existence of mosquito larvae development sites and the presence of WNV in the mosquito population. Due to the nature of operations at these facilities, evidence of mosquito larvae was found at each of the surveyed sites. In 2007 sewage treatment lagoons will be treated with larvicide proactively.

Two components of the mosquito surveillance program were new initiatives in 2006:

- A mosquito magnet experiment.
- A survey of residential properties.

4.2.2.1 Mosquito Magnet Experiment

An experiment was set up to explore whether mosquito magnets (devices using propane to attract large numbers of adult mosquitoes into net receptacles) could be used as a viable method of mosquito control in a defined area. Two mosquito magnets were set up at a sewage treatment plant that had WNV-positive adult mosquito results. Samples from the magnets were collected weekly and tested for totals, speciation, and the presence of WNV.

It was found that the mosquito magnets are prone to malfunction and require frequent monitoring. Because of this, the machines will not be recommended as a mosquito control measure in facilities owned or operated by the region.

4.2.2.2 Survey of Residential Properties

A house-to-house pilot survey of residential properties was another new initiative of the mosquito surveillance program in 2006. From May to August, summer students visited homes in each municipality to educate residents about reducing mosquito breeding sites and offer a property inspection to look for potential mosquito larvae development sites. The focus of the survey was areas that had been the location of WNV activity in past years.

A total of 7,061 homes were visited for the survey. At homes where no one was present or where residents did not want a property inspection, students distributed educational packages, including information on how individuals could inspect their own property and eliminate potential mosquito breeding sites.

Students conducted inspections of 287 residential properties. The top four potential mosquito breeding sites found at the participating homes were miscellaneous containers, children's toys, bird baths and flower pot saucers. The findings from this survey will be used as part of the 2007 WNV educational message.

4.2.3 Human Surveillance

As part of the surveillance program, packages were sent to physicians and hospital infection control practitioners reminding them to actively look for WNV cases. Human cases are diagnosed by blood specimens taken from patients exhibiting symptoms. During 2006, YRHS Infectious Diseases Control Division investigated three suspect human cases of WNV within York Region. As of December 31, 2006, the three cases had been identified as positive. In 2005, there were five human cases of WNV identified in York Region.

4.3 Larviciding in 2006

As part of its WNV control program, YRHS contracted the services of a pest control company to provide larviciding throughout York Region. Larviciding, used to control mosquitoes during the larval stage, is preferable to trying to control adult mosquitoes since it offers greater efficacy and limited impact on the environment.

The use of larvicides is carried out under the authority of Ontario Regulation 199/03 under the *Health Protection and Promotion Act.* This Regulation requires that the local Medical Officer of Health make a determination based on a local risk assessment whether action, including the use of larvicides or adulticides, is required to decrease the risk of WNV. The risk assessment is based on the most current evidence of local activity including WNV in the human population and non-human species.

4.3.1 Catch Basins

Catch basins, which have been identified by the MOHLTC as primary targets for the control of mosquito species that transmit WNV, were treated with the larvicide Methoprene. Catch basins on regional and municipal roads were treated with four rounds

of Methoprene in pellet form to ensure continual presence of the pesticide throughout the mosquito breeding season.

With the exception of Markham, Methoprene was also applied in catch basins in municipal parks and in private rear yard catch basins. The Town of Markham provided screens for catch basin in rear yards and municipal parks.

Catch basins on the property of LTC facilities and other residential facilities were treated at their request.

4.3.2 Stormwater Management Ponds

Stormwater Management Ponds and other municipally-owned properties with stagnant water that were found to contain larvae were treated with the larvicide Bacillus thuringiensis israelensis (Bti) by the pest control company. Bti, a bacterium that produces toxins activated by the digestive systems of mosquito larvae, is approved for use by the Ministry of the Environment (MOE). A total of 97 water bodies were treated with Bti.

4.3.3 Environmentally-sensitive Areas

In 2005, the MOE approved Bacillus sphaericus (B. sphaericus), a larvicide similar to Bti, for use in environmentally-sensitive areas (ESAs). In 2006 approximately 976 catch basins in ESAs were treated with this product.

4.4 2007 Program Initiatives

In order to contain the spread of WNV in York Region, YRHS will continue the education, surveillance, and larviciding activities carried out in 2006.

One new initiative will be a survey of industrial parks throughout the region.

4.4.1 Education and Communication Initiatives

Public education remains one of the most important components of York Region's WNV program. Key messages in 2007 will continue to focus on personal protection and reduction of mosquito larvae development, and will be conveyed through investigation of complaints, community workshops (on request), local newspapers, press releases, pamphlets, and the YRHS website.

4.4.2 Surveillance

The three types of surveillance activities (bird, mosquito, and human) prescribed by the MOHLTC will be continued in 2007.

4.4.3 Larviciding

YRHS experience to date suggests that larviciding activities are likely to continue for the foreseeable future.

A variety of studies support the effectiveness of larviciding. For example, a Michigan study, *Mosquito Management Programs and West Nile Virus in Michigan 2002*,

compared mosquito control activities in five counties and showed a ten-fold increase in the risk of humans contracting WNV in counties with no larviciding activities versus counties with larviciding activities.

Neighbouring health units (Peel, Durham, Toronto and Halton) were canvassed in the fall of 2006 to determine their course of action for 2007. They all plan to carry out a larviciding program again. It is important that a consistent approach is taken by neighbouring municipalities.

2007 larviciding activities will include:

- Larviciding municipal and regional catch basins with Methoprene up to four times during the mosquito season.
- Larviciding private rear yard catch basins upon request.
- Larviciding catch basins in parks and on the grounds of LTC facilities, other residential facilities, and municipally-owned properties such as community centres and municipal offices.
- Surveying and larviciding standing surface water such as road side ditches if required, using Bti.
- Larviciding catch basins in environmentally-sensitive areas using B. sphaericus.
- A pilot project using B. sphaericus in a prescribed number of catch basins to compare its efficacy and practical use as a possible alternative to Methoprene in non-environmentally-sensitive areas.
- Larviciding sewage treatment lagoons.

4.4.4 A Survey of Industrial Parks

Following the model of the residential survey, staff will visit industrial parks in areas of historical WNV activity in York Region. They will offer business owners an inspection of properties to look for potential mosquito larvae development sites. An educational package containing a similar letter and brochure to that used for residential properties will be developed for this initiative.

4.4.5 Local Municipal Involvement

YRHS responded to a number of concerns by residents from each local municipality. Table 4 outlines the number of residential concerns that resulted in investigations from YRHS staff. The number of concerns raised and investigations required has decreased steadily since 2003 when comprehensive education and communication strategies were employed, but appears to be stabilizing at about the 200-250 range in the last two years.

Table 4
WNV Related Investigations/Complaints

Municipality	2002	2003	2004	2005	2006
Aurora	2	27	33	22	20
East Gwillimbury	1	40	16	6	2
Georgina	3	73	18	30	14
King	2	49	24	8	4
Markham	12	190	67	45	45
Newmarket	1	143	27	18	22
Richmond Hill	3	305	89	48	60
Vaughan	1	144	103	36	60
Whitchurch-Stouffville	0	21	2	9	5
Total	25	992	379	222	232

The Region and the nine area municipalities worked collaboratively throughout the 2006 WNV season. Monthly meetings were held with representatives from the area municipalities to discuss WNV control activities in York Region and to implement ways of working together efficiently. It is expected that these meetings will continue in 2007, and that the municipalities will continue to participate in WNV control measures such as enforcement of local standing water by-laws.

4.5 Relationship to Vision 2026

The York Region WNV control program supports the Vision 2026 goal of responding to the needs of our residents.

5. FINANCIAL IMPLICATIONS

WNV program costs in the amount of $1,180,579 have been included in the proposed 2007 Public Health Business Plan and Budget.

6. LOCAL MUNICIPAL IMPACT

The Region and the area municipalities developed a successful working relationship throughout the 2006 WNV season. York Region Public Health will continue with WNV control measures in order to address the health concerns of the residents of York Region.

7. CONCLUSION

YRHS WNV control activities help minimize the impact of the disease on residents of York Region.

Since WNV is an emerging virus there are still uncertainties regarding how the disease will behave from year to year. It is important that YRHS continue its WNV program in 2007 utilizing the three components of education, surveillance, and larviciding.

The Senior Management Group has reviewed this report.