

## **Human Case Surveillance**

### **Human Case Surveillance Highlights in 2005**

- Three confirmed human cases in 2005 compared to none in 2004
  - Two in Mississauga and one in Brampton - one case had neurological symptoms
  - Cases in adjacent municipalities - Toronto – 38; Halton – 5; York - 5
- The onset of the first Peel Region case was August 12, 2005; all three cases were unrelated
- Eight deaths in Ontario compared to one death in 2004 in Ontario
  - Five deaths occurred in the City of Toronto, one in Middlesex-London, one in Windsor Essex and one in Lambton
- Nationally, Ontario reported the greatest number of cases, followed by Manitoba and Saskatchewan
  - Ontario – 101 cases in 2005 compared to 14 cases in 2004
- All seven Great Lakes States reported cases
  - State of Illinois had the most – 245
  - State of New York had the least - 14

Approximately one in five people (20%) who are bitten by a mosquito infected with WNV will develop symptoms. Most people who are infected have either no symptoms or mild illness such as West Nile Virus fever. The incubation period is estimated to be three to 14 days with symptoms lasting approximately three to six days. In 2005, cases were classified as West Nile Virus Neurological Syndrome (WNNS) or West Nile Virus Non-Neurological Syndrome (WN Non-NS).

WNV fever is described as a sudden onset of fever that is often accompanied by malaise, headache, nausea, vomiting, anorexia, eye pain, myalgia and less commonly, rash and/or swollen lymph nodes. This is typically classified as WN Non-NS<sup>6</sup>.

In about 1% of infected individuals, WNV can cause serious illness including severe neurological disease which is classified as WNNS. Additional symptoms among those with severe disease include muscle weakness and a change in mental status<sup>6</sup>.

Long-term health effects are possible but less well understood. They can include physical (long-term muscle weakness and paralysis, fatigue and headache) cognitive (depression, confusion, and memory loss) and functional effects (difficulty with meal preparation and shopping)<sup>6</sup>.

The human case surveillance program for WNV is intended to detect human illness in the Region of Peel. In May 2003, West Nile Virus illness was specified as a reportable and

communicable disease under the Health Promotion and Protection Act. Case definitions, developed by the MOHLTC, can be found in Appendix F<sup>7</sup>.

All probable or confirmed cases identified by hospitals and physicians are reported to the Public Health department. A blood sample is taken from the patient and submitted to the Ministry of Health and Long-Term Care (MOHLTC) Central Public Health Laboratory (CPHL) in Toronto. The first test performed is the Enzyme-linked Immunosorbent Assay (ELISA), which, if positive, is run a second time to rule out false positive results. If these two are positive then a Plaque Reduction Neutralization Test (PRNT) is conducted to confirm the diagnosis. PRNT is only conducted in the first three cases within each public health unit. ELISA results are available within 24 hours compared to days for PRNT test results.

Peel Public Health staff investigate all reported probable and confirmed cases of WNV among Peel residents. Medical information including demographics, symptoms and risk factors (i.e. travel history, blood products recipient) is collected and entered into the integrated Public Health Information System (iPHIS).

### **Human Surveillance Program - 2005**

Table 1 presents comparative data of human cases in the Region of Peel between 2002 and 2005. In 2005, there were three confirmed human cases (two female and one male) of WNV. Two cases were residents of Mississauga and one case resided in Brampton. Two of the cases were over the age of 50 and one case was in their early twenties. The youngest case was the only case with WNV neurological symptoms which included fever, headache, rash, nausea, vomiting, and weakness. All three patients have recovered from the virus. The onset of the first case was on August 12, 2005 (week 32), followed by the second case on August 16, 2005 (week 33) and the third on September 7, 2005 (week 36).

Map 1 maps the three cases by municipal ward. Each case lives in a different ward and none of the wards are adjacent to one another. Peel Public Health staff interviewed each case to assess their activities around the time of infection. The cases could not be linked to one another in any way.

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.

In 2005, three cases were reported in the Region of Peel compared to no cases in 2004 and 10 cases in 2003. In 2002, there were 57 WNV probable and confirmed cases when using the 2002 cases definition. However, the human case definition has changed since 2002. If the present day classification were applied there would have been 18 confirmed

## 2005 – West Nile Virus in the Region of Peel

human cases in 2002. Two WNV-related deaths occurred in 2002. No deaths have occurred in the Region of Peel in subsequent years.

Upon notification of a positive human case, seasonal staff in the WNV program went door-to-door in the immediate area advising residents 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 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.

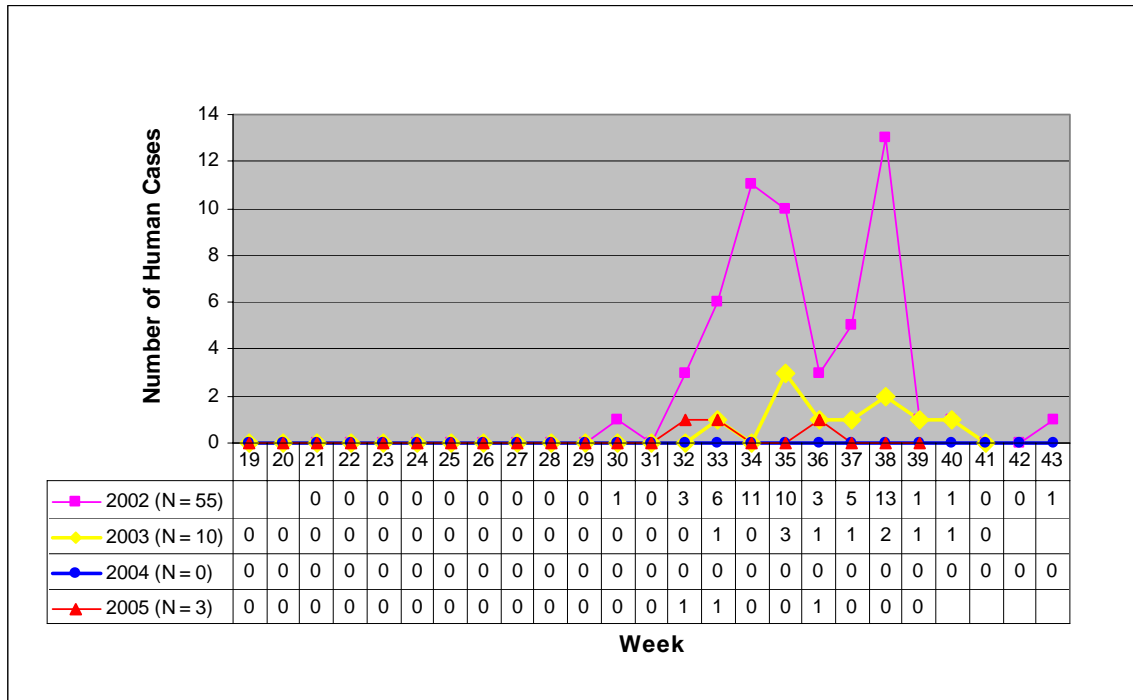
**Table 1** Number of Human Cases by Municipality, Region of Peel (2002-2005)

	<b>Peel Region</b>	<b>Mississauga</b>	<b>Brampton</b>	<b>Caledon</b>
<b>2002</b> <sup>1</sup>	57	52	5	0
<b>2003</b>	10	10	0	0
<b>2004</b>	0	0	0	0
<b>2005</b>	3	2	1	0

<sup>1</sup>In 2002, there were a total of 112 cases with laboratory evidence of WNV infection. 57 cases were classified as probable or confirmed. In subsequent years, only confirmed cases were reported as a result of changes in disease classifications. If the present day classification were applied there would have been 18 confirmed human cases in 2002.

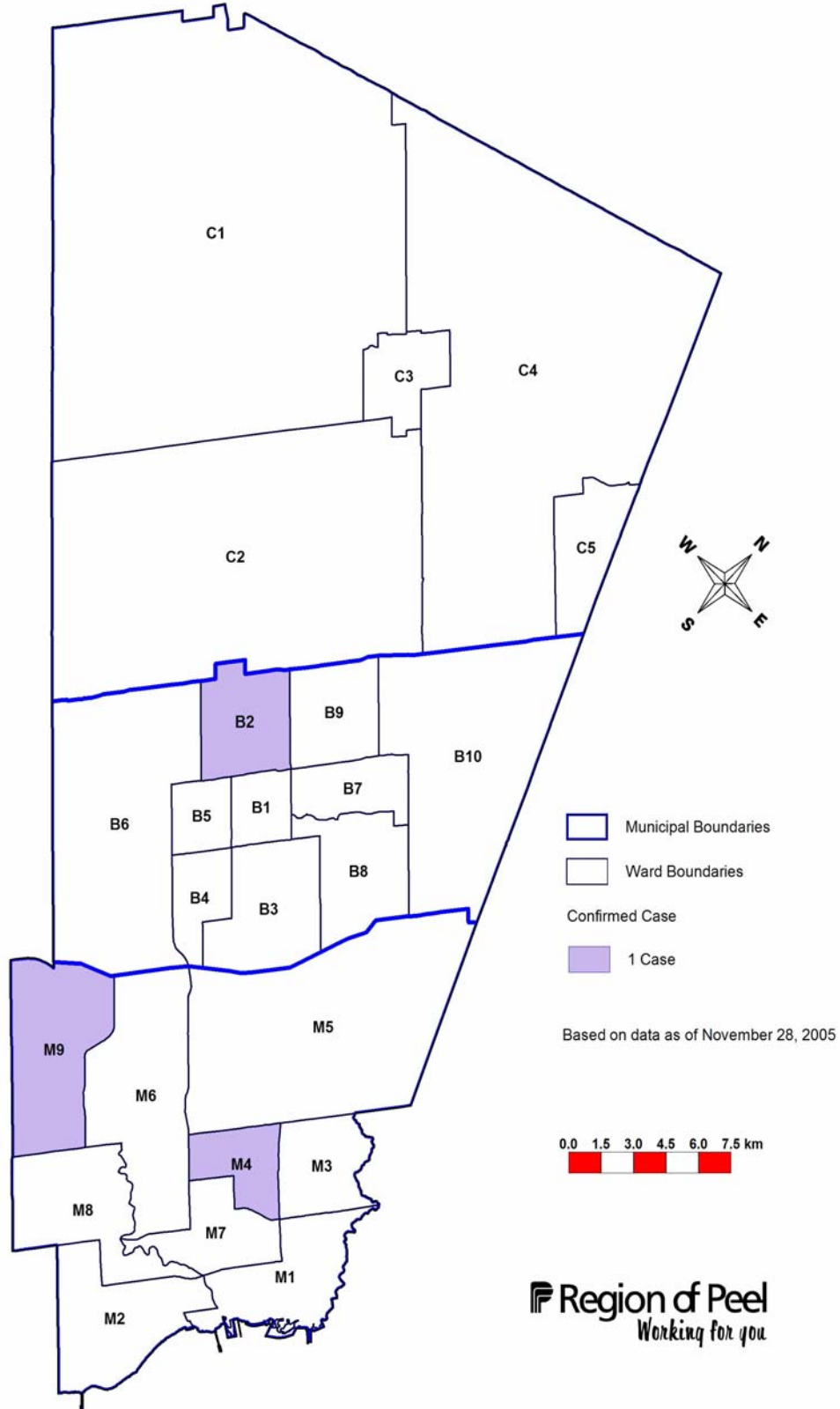
Figure 1 presents the temporal analysis of cases in Peel Region for all years since 2002. This weekly analysis shows the overall decrease in number of cases reported since 2002. It also shows that most cases are consistently reported in the months of August and September. However, the Ontario experience shows that cases can be reported as early as June and as late as October, as was the case in 2003. The reporting period for 2002 was longer than any other year which is consistent with the relatively greater number of cases being reported.

**Figure 1 Confirmed and Probable Human Cases, Region of Peel, 2002<sup>1</sup> – 2005**



<sup>1</sup>In 2002, there were a total of 112 cases with laboratory evidence of WNV infection. 57 cases were classified as probable or confirmed. In subsequent years, only confirmed cases were reported as a result of changes in disease classifications. If the present day classification were applied there would have been 18 confirmed human cases in 2002.

**Map 1** Number of Confirmed Human WNV Cases by Municipal Ward, Region of Peel, 2005



### **Comparison with other Health Units**

Across Ontario in 2005, there were a total of 101 WNV cases compared to 14 cases in 2004<sup>8</sup>. In addition, there were eight deaths reported in Ontario in 2005<sup>9</sup>. Seventy-three per cent of the Ontario cases were of the non-neurological type.

Table 2 presents the breakdown of human cases in Ontario by Health Unit. Seventeen out of 36 health units reported human cases in 2005. The City of Toronto and Windsor Essex County had the greatest number of cases, with 38 and 23, respectively. The greatest number of deaths, five, was reported from the City of Toronto.

Table 2 also presents the rate of cases per 100,000 population. Windsor-Essex County Health Unit had the highest human WNV case rate followed by Chatham-Kent at 5.46 and 4.54 per 100,000 respectively. Peel Public Health had a comparatively low human WNV case rate of 0.25 (ranked 13<sup>th</sup> out of 17 health units reporting cases). When compared to the five municipalities adjacent to the Region of Peel, only three health units reported having human cases: Halton Region (5), York Region (5) and the City of Toronto (38). Peel Region had fewer cases than each of them.

2005 – West Nile Virus in the Region of Peel

**Table 2 Summary of Human Cases, Deaths and Rate by Ontario Health Unit**

Health Unit	Cases <sup>1</sup>	Deaths <sup>1</sup>	Population <sup>2</sup>	# of cases per 100,000 population
Simcoe Muskoka <sup>3</sup>	0	0	86,078	0.0
York Region	5	0	889,352	0.56
Peterborough County	1	0	133,167	0.75
Haliburton, Kawartha, Pine Ridge District	2	0	173,920	0.57
Durham Region	0	0	563,220	0.0
Brant County	0	0	133,411	0.0
City of Hamilton	1	0	519,734	0.19
Haldimand-Norfolk Region	0	0	109,975	0.0
Niagara Region	3	0	431,265	0.69
<b>Peel Region</b>	<b>3</b>	<b>0</b>	<b>1,171,372</b>	<b>0.25</b>
Wellington-Dufferin-Guelph	0	0	257,048	0.0
Halton Region	5	0	427,219	1.17
Waterloo Region	1	0	475,739	0.21
Hastings and Prince Edward Counties	0	0	160,298	0.0
Leeds, Grenville and Lanark District	0	0	169,342	0.0
Eastern Ontario	2	0	199,605	1.01
Kinston, Frontenac and Lennox and Addington District	0	0	189,458	0.0
City of Ottawa	3	0	829,578	0.36
Renfrew County and District	0	0	100,545	0.0
Northwestern	0	0	82,415	0.0
Timiskaming	0	0	35,144	0.0
North Bay and District <sup>2</sup>	0	0	96,407	0.0
Algoma	0	0	119,999	0.0
Sudbury and District	0	0	197,068	0.0
Thunder Bay District	0	0	159,831	0.0
Porcupine	0	0	89,104	0.0
Chatham-Kent	5	0	110,138	4.54
Huron County	0	0	61,745	0.0
Middlesex-London	3	1	430,367	0.69
Grey Bruce	3	0	161,993	1.85
Lambton County	2	1	132,473	0.75
Elgin-St. Thomas	0	0	86,863	0.0
Perth District	0	0	77,874	0.0
Windsor-Essex County	23	1	402,629	5.46
Oxford County	1	0	105,029	0.95
City of Toronto	38	5	2,603,182	1.42
<b>TOTAL</b>	<b>101</b>	<b>8</b>	<b>-</b>	<b>-</b>

<sup>1</sup>Source: Ministry of Health and Long-term Care, 2005 (December 16, 2005, preliminary results)

<sup>2</sup>Source: Provincial Health Planning Database (PHPDB). Extracted: March 16, 2005, Health Planning Branch, Ontario Ministry of Health and Long-Term Care on March 16, 2005.

<sup>3</sup>The boundaries for the Simcoe Muskoka and North Bay and District Health Units were recently changed affecting the population served by these health units. The population numbers presented are those prior to the reorganization.

- Rows shaded in blue are the municipalities adjacent to the Region of Peel

## 2005 – West Nile Virus in the Region of Peel

Map 2 shows the Ontario human WNV cases by the six health unit regions for 2005. All the cases occurred in southern Ontario. Northern Ontario health units did not report any cases. These would be the health units with the smaller population centres. Peel Region is part of the Central West Health Unit Region.

### Comparison with other Provinces

In 2005, there were a total of 226 human cases of WNV and 12 deaths across Canada. This compares to 25 total clinical cases and no deaths reported in 2004<sup>9</sup>.

Table 3 presents the provincial breakdown of cases and deaths. Ontario reported the greatest number of cases, followed by Manitoba and Saskatchewan. Seventy-six per cent of all Canadian cases were non-neurological.

**Table 3      Number of Human Cases and Deaths by Province – 2005**

<b>Province/Territory</b>	<b>Cases<sup>1</sup></b>	<b>Deaths</b>
Newfoundland and Labrador	0	0
Prince Edward Island	1	0
Nova Scotia	1	0
New Brunswick	1	0
Quebec	5	1
Ontario	101	8 <sup>3</sup>
Manitoba	54	1
Saskatchewan	53 <sup>2</sup>	2
Alberta	10	0
British Columbia	0	0
Yukon	0	0
Northwest Territories	0	0
Nunavut	0	0
<b>TOTAL</b>	<b>226</b>	<b>12</b>

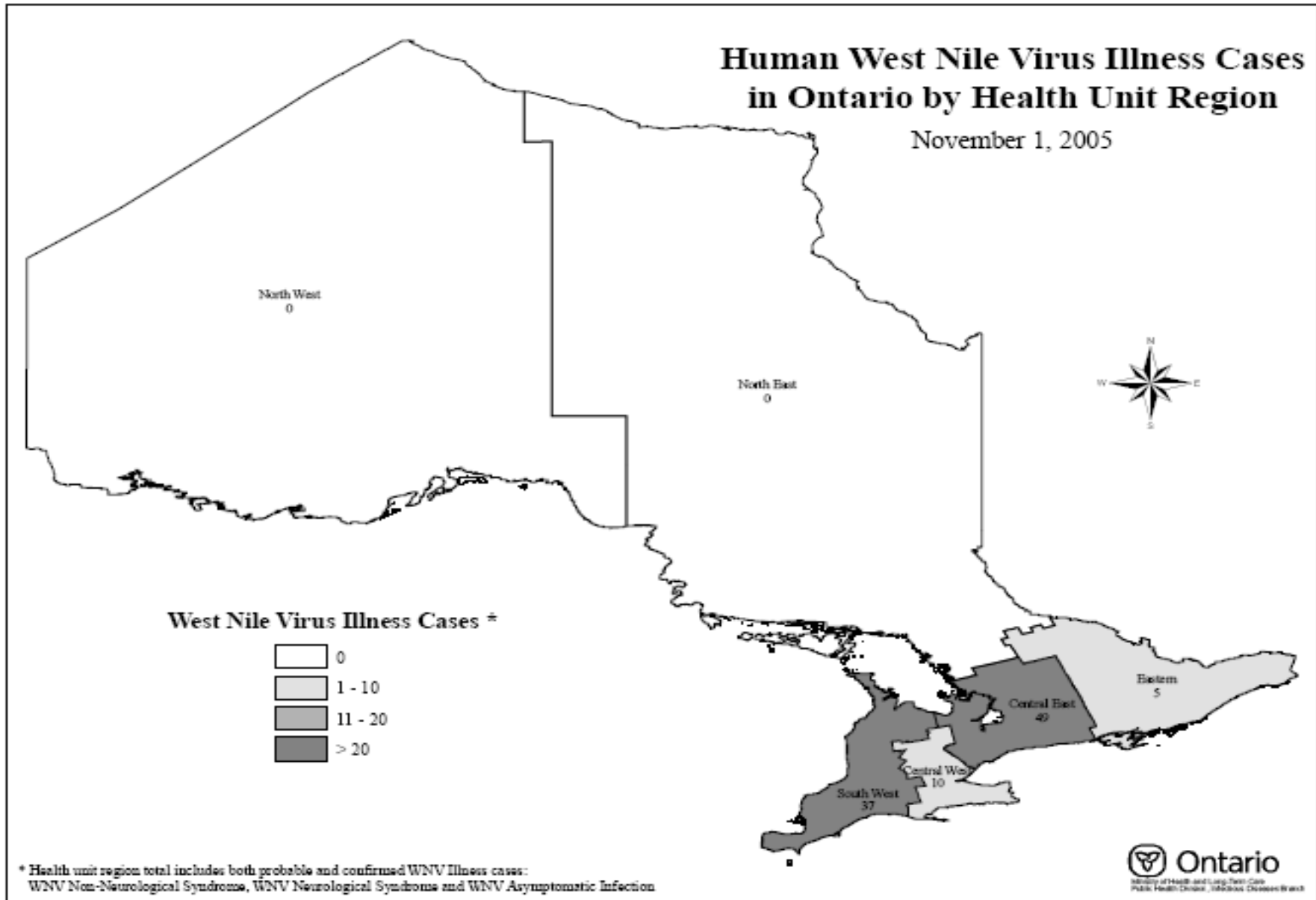
<sup>1</sup>sum of WNNS + WN Non-NS + Unclassified/Unspecified

<sup>2</sup>Three additional cases under investigation

<sup>3</sup>WNV has not been deemed the cause of death

Source: adapted from the Public Health Agency of Canada, 2005 (update as of November 22, 2005)

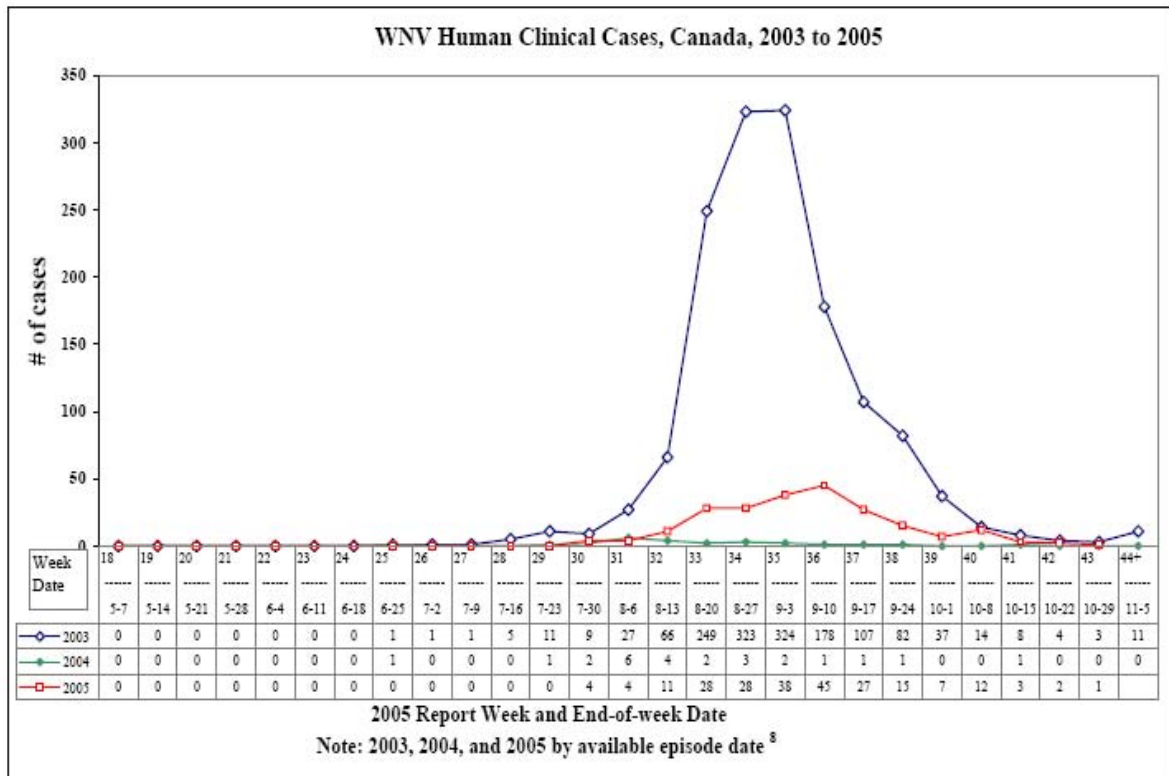
Map 2 West Nile Virus Cases by Ontario Health Unit Region – 2005



## 2005 – West Nile Virus in the Region of Peel

Over the three year period 2003 to 2005, the temporal analysis of human clinical cases nationwide shows a consistent pattern in terms of the time of year cases were reported (Figure 2). Human cases were reported from weeks 28 to 41. Over this period, 2003 was the year in which the highest numbers of cases were reported, as well as the year with the greatest number of cases in any one week period, followed by 2005. This is consistent with the temporal pattern observed in the Region of Peel (refer to Figure 1).

**Figure 2 WNV Human Clinical Cases by Week in Canada 2003-2005**



### Comparison with Great Lakes States

In the United States there were a total of 2,775 human cases and 98 deaths in 2005<sup>10</sup>. Table 4 lists total number of cases in the seven Great Lakes States for 2004 and 2005. Consistent with what was observed in Canada, the number of cases reported in the Great Lakes States in 2004 was less than 2005. The State of Illinois reported the most cases in both years at 60 and 245, respectively. New York State reported the fewest in both years.

2005 – West Nile Virus in the Region of Peel

**Table 4**      **Number of Cases Reported in the Great Lakes States, 2004-2005\***

	<b>2004</b>	<b>2005</b>
<b>State</b>	<b>Number of Cases</b>	<b>Number of Cases</b>
Illinois	60	245
Indiana	13	22
Minnesota	34	43
New York	10	14
Ohio	12	61
Pennsylvania	15	25
Wisconsin	12	17
<b>TOTAL</b>	<b>156</b>	<b>427</b>

\*As of December 6, 2005

Source: United States Centers for Disease Control, 2005 – downloaded December 7, 2005 and United States Geological Service, 2005 (last updated June 27, 2005)<sup>10</sup>