West Nile Virus in the City of Toronto 2008

Toronto Public Health

For More Information on West Nile Virus:
Please visit http://www.toronto.ca/health/westnile/ or contact Toronto Public Health at 416-338-8102.

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OVERVIEW

The following report will present the 2008 WNV data. In 2008, there were 0 human cases, 17 WNV positive mosquito batches and 3 WNV positive birds were reported in the city of Toronto.

From 2003 to 2008, a total of 98 WNV human cases, 312 WNV positive mosquito batches and 90 WNV positive birds were reported in the City of Toronto.

The last two WNV seasons in Toronto have been relatively uneventful. For each of the three indicators, the numbers are very low (Table 1). Historically, WNV activity was lower in 2004 compared to 2003, followed by a marked increase in 2005, and a considerable decrease in 2006 that has continued to 2008.

Table 1. WNV Positive Indicators in Toronto, 2003 to 2008

Year	Indicator					
	Human Cases		Mosquito Batches		Dead Birds	
	Number of Positives	Date of First* Positive	Number of Positives	Date of First* Positive	Number of Positives	Date of First* Positive
2003	44	August 9	56	August 12	17	July 18
2004	6	August 14	33	August 4	18	June 3
2005	38	July 20	142	July 21	37	July 18
2006	6	July 23	47	July 25	13	July 28
2007	4**	August 21	17	August 14	2	August 23
2008	0	NA	17	July 10	3	August 24

* Based on illness onset date and date of collection

**** Two cases were acquired outside the City of Toronto**

HUMAN SURVEILLANCE

There was no WNV human infection in Toronto in 2008. With the exception of the 2006 & 2008 seasons, the human infection rate in Toronto has been historically higher compared to the rest of Ontario

Table 2. WNV Human Cases and Deaths, 2003 to 2008.

	TORONTO				ONTARIO (excluding Toronto)			
YEAR	Number of Cases (n)	Incidence Rate (per 100,000)	Number of Deaths (n)**	Case Fatality Rate (%)	Number of Cases (n)	Incidence Rate (per 100,000)	Number of Deaths (n)	Case Fatality Rate (%)
2003	44	1.7	0	0.0	45	0.5	2	4.4
2004	6	0.2	0	0.0	8	0.1	0	0.0
2005	38	1.5	6	15.8	63	0.6	6	9.5
2006	6	0.2	1	16.7	36	0.4	1	2.8
2007* **	4*	0.2	0	0.0	11	0.1	0	0.0
2008	0	0.0	0	0.0	3	.03	0	0.0

* Two cases were acquired outside the City of Toronto

** Deaths include those with evidence of WNV infection where WNV may not be the cause of death. The fatality in 2006 was determined to not be associated with WNV. Rates are calculated based on population projections and estimates from the Ministry of Health and Long-Term Care.

** * Due to small numbers, caution must be used when interpreting rates

DEAD BIRD SURVEILLANCE

From June to September 2008, Toronto Animal Services staff received 453 dead bird reports, collected 45 dead crow and blue jay birds, 15 of which were sent for testing. The majority of the dead birds were reported and collected between June and August. The first positive bird was collected at the end of August (Table 3).

Table 3. Dead Birds Reported, Collected and Sent for Testing by Month, 2008

Month	Dead Birds Reported	Dead Crows & Jays Collected	Dead Crows & Jays Sent for Testing	Positive Birds
June	119	3	1	0
July	143	14	3	0
August	144	21	10	2
September	47	7	1	1
TOTAL	**516**	**45**	**15**	**3**

N/A: Not Applicable.

ADULT MOSQUITO SURVEILLANCE

In 2008, forty-three permanent trap locations were used to collect mosquitoes in the City of Toronto. A total of 62,904 mosquitoes from twenty seven species/species groups[1] were collected in the City of Toronto.

The most abundant captures occurred from July 6 to July 12 and July 20 to August 16. *Aedes vexans vexans* species were the most dominant, representing more than half (54%) of all species captured. Other dominant species/species groups identified include *Culex pipiens/restuans (*20%*)*, *Ochlerotatus trivittatus* (10 %) and *Ochlerotatus stimulans* (6%) (Table 4).

Compared to the 2007 season, the 2008 season trapped considerably more mosquitoes (more than two and half times). Although C*ulex pipiens/restuans* and *Aedes vexans vexans* species were the top two species trapped for both years, the proportional ranking of each switched from 2007 to 2008.

Table 4. Mosquitoes Trapped by Species/Species Group, 2007 & 2008

Mosquito Species/Species Group	Estimated Number of Mosquitoes Trapped 2007**	Percentage of Total Trapped (%) 2007	Estimated Number of Mosquitoes Trapped 2008***	Percentage of Total Trapped (%) 2008
Culex pipiens/restuans complex	7309	46.9	8265	20.4
Aedes vexans vexans	3578	23.0	21776	53.7
Coquillettidia perturbans	2066	13.3	1096	2.7
Ochlerotatus stimulans	1018	6.5	2388	5.9
Anopheles punctipennis	546	3.5	905	2.2
*Other species**	369	2.4	1353	3.3
Ochlerotatus triseriatus/hendersoni	283	1.8	558	1.4
Ochlerotatus trivittatus	250	1.6	3920	9.7
Ochlerotatus canadensis	103	0.7	249	0.6
Anopheles quadrimaculatus	58	0.4	45	0.1
Total	**15,580**	**100.0**	**40,555**	**100.0**

* Mosquito species not included were captured in 'Other species'.
****** In 2007**,** 87 mosquitoes were damaged, or .6% of the total trapped. Damaged species were not included in Total
******* In 2008, 135 mosquitoes were damaged, or .3% of the total trapped. Damaged species were not included in Total

Of the mosquitoes captured in 2008, 40,555 mosquitoes were identified and divided into mosquito batches[2]. Out of the batches tested, 17 mosquito batches (.08%) tested positive for WNV. The first positive batches were collected early July. Testing ended at the end of September, and the last positive batches were collected in early September. The majority of the positive batches were collected during August and September, with 82% of all positive batches belonging to the *Culex pipiens/restuans complex* group (Table 5). The Toronto WNV program focuses its mosquito reduction efforts on this species group of mosquitoes.

[1] Mosquito species that could not be distinguished were reported as combined groups (e.g. *Culex pipiens/restuans complex*).
[2] Trapped adult mosquitoes were grouped by trap and species into batches with a maximum of 50 mosquitoes per batch for WNV testing. When there were more than 50 mosquitoes from the same trap-night and species, additional batches were created.

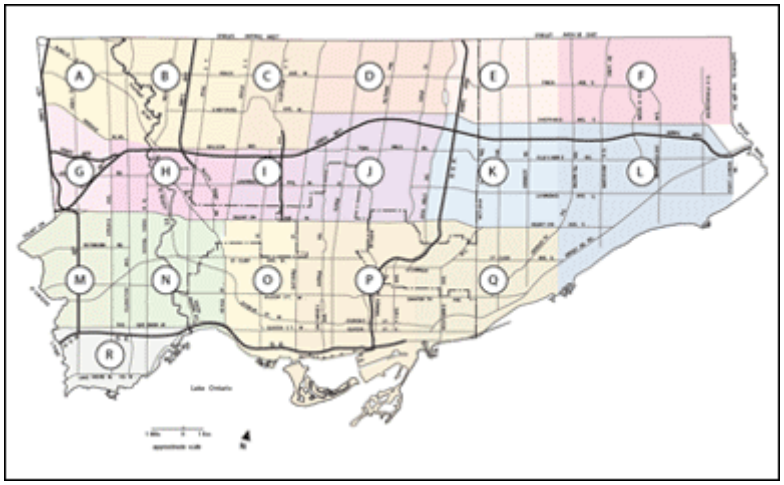
Table 5. Positive Mosquito Batches Tested by Species/Species Group, 2008

Mosquito Species/Species Group	Number of Mosquito Batches Tested	Number of Positive Batches (%)
Culex pipiens/ restuans	169	13(0.6)
Aedes vexans vexans	18	1(.004)
Ochlerotatus triseriatus	17	2 (.01)
Ochlerotatus japonicus	2	1(.004)
Total	**206**	**17 (.08)**

MOSQUITO REDUCTION

Larviciding is the use of chemical and biological products to reduce numbers of mosquito larvae. It is an important method to reduce mosquito numbers in the City of Toronto. The larviciding program divided the city into 18 zones for planning purposes (Map 1).

Map 1. WNV Geographic Zones, Toronto, 2008



Catch basins are the main site of larvae important to WNV transmission. Table 6 presents the mosquito larvicide applications to catch basins across the 18 geographic zones in the city of Toronto. *Bacillus sphaericus* (*Bs*) were applied to city-owned storm-water catch basins to reduce mosquito populations.

Table 6. Mosquito Larvicide Applications, 2008

Larvicide	Start Date	Zones	Completion Date
Bs (Round 1)	June 9, 2008	A, B, C, D, E,F, G, H, I, J, K, L, M, N, O, P, Q, R	June 28, 2008
Bs (Round 2)	June 30, 2008	A, B, C, D, E,F, G, H, I, J, K, L, M, N, O, P, Q, R	July 18, 2008
Bs (Round 3)	July 21, 2008	A, B, C, D, E,F, G, H, I, J, K, L, M, N, O, P, Q, R	Aug 8, 2008
Bs (Round 4)	August 11, 2008	M, N, O, P, Q, R	Aug 18, 2008

Mosquitoes also breed wherever there is standing water outside of catch basins (surface water sites) that lasts seven days or longer, depending on the weather. A licensed pesticide applicator was hired to apply the larvicide, *Bti*, to surface water sites that had elevated counts of mosquito larvae. From June 9 to August 18, 106 surface water sites were routinely inspected and 48 of these sites were treated at least once, with a total of 210 larvicide applications.

EDUCATION AND OUTREACH

Public education activities included a print advertising campaign, presentations to community groups, the distribution of pamphlets and information packages to various locations across the City, and displays at various institutions and community events.

WNV information was made available to the public on the Toronto Public Health website. The site was regularly updated from the middle of June to the end of October, and contained WNV fact sheets, updates on larviciding locations, the current status of WNV in the city of Toronto, and media releases. Public Health staff at Toronto Health Connection (416-338-7600) were available to provide information on WNV for those without access to the internet.

Toronto Public Health recommended the use of personal protection against mosquitoes when out at night, especially during dusk and dawn when mosquitoes tend to be most active.

Toronto Public Health requested that the public report all dead bird sightings to Toronto Health Connection, at 416-338-7600. In addition, the public was asked to report areas of stagnant water to Toronto Health Connection, as water that stands for longer than one week may serve as breeding grounds for mosquitoes. The public was also asked to minimise areas of stagnant water around their homes.