

## **EXECUTIVE SUMMARY**

### **WEST NILE VIRUS SEROPREVALENCE STUDY REPORT**

This report outlines the main results from the West Nile virus (WNV) seroprevalence study undertaken by the McMaster Institute of Environment and Health for the Ontario Ministry of Health and Long Term Care. The primary objective of this study was to estimate the number of people living in south Oakville in the summer of 2002 who were infected by West Nile virus. This estimate was determined by measuring the seroprevalence of West Nile Virus (WNV) antibody among study participants. In addition, the study also examined the risk factors associated with infection by WNV in the south Oakville WNV hotspot (forward sortation postal code areas L6L and L6K) by assessing levels of knowledge, beliefs and attitudes about WNV in the community as well as measuring certain behaviours associated with risk reduction for WNV.

West Nile virus is a mosquito-borne flavivirus that primarily infects birds, producing a transient high viremia that allows transmission of the virus back to feeding mosquitoes in an amplifying cycle. Humans can become infected by bites from mosquitoes that bite both birds and us. Factors that determine the prevalence and severity of illness are not well understood. WNV was recently introduced to North America, where it was first detected during an epidemic of encephalitis in the summer of 1999 in Queens, New York. Evidence that WNV had arrived in Canada came in the summer of 2001 when active surveillance of the avian population indicated that several dead crows in southern Ontario tested positive for the virus. No human cases occurred in Ontario until 2002. Ontario had 319 confirmed and 85 probable human cases that year. Most of these cases were distributed along the shores of Lake Ontario in the Regions of Peel, Halton and the City of Toronto.

In this study data were collected from adults (18 years old and older), one individual per randomly selected household located in the L6L and L6K postal code areas in Oakville. Data were collected in two ways. First, a brief survey was conducted over the telephone by Canadian Viewpoint. The focus of the survey was background information as well as preventive behaviours and awareness. 1,650 individuals completed the survey. Survey respondents were also asked to provide a blood sample in order to assess the presence and level of WNV antibodies. 1,505 individuals provided a blood sample.

#### **Seroprevalence Results**

The seroprevalence study was carried out in the two postal areas in Oakville where the incidence of WNV cases was highest in the summer of 2002. Six cases of encephalitis (all hospitalized), five cases of meningitis (one hospitalized) and eight cases of West Nile virus fever (one hospitalized) occurred in a population of 30,467, 18 years of age or older (2001 census). Of the 1,505 people who provided a blood sample, 46 (3.1%; 95% Confidence Interval (CI): 2.2 to 4.0%) tested positive for West Nile virus antibodies. These results have been confirmed by the Winnipeg National Microbiological Laboratory using plaque reduction neutralization (PRNT). If we extrapolate the 2.2 to 4.0 % range to the entire population of adults in the two areas studied (30,467) this gives an estimate that 670-1219 individuals were infected by West Nile virus in the L6L and L6K areas in the summer of 2002. In the original outbreak in New York City in 1999, the northeastern Queens hotspot reported a WNV

seroprevalence of 2.6 percent. Cuyahoga County, Ohio reported a WNV seroprevalence of 4.0-6.4 percent in 2002. Children under five years old were excluded in both these studies.

The risk of acquiring West Nile virus infection varies for individuals in different age groups. In the Oakville study, 65% of WNV positive individuals were aged 50 years and over while only 15% (7 individuals) were less than 40 years. The age distribution of those who participated in the survey did not exactly reflect the age distribution of the 30,467 study population. In order to account for the differences in age distribution of the survey participants compared to the study population, the data were age adjusted. The age-adjusted prevalence of positive individuals was in fact not that different at 3.1%.

### **West Nile Virus Preventive Behaviours**

With respect to people's awareness of West Nile virus and its dangers as well as their preventive behaviours, the survey data indicate that virtually all respondents were aware of West Nile virus and that most (73%) obtained their information about WNV from news media (TV, radio, newspapers). 80% reported that WNV was a somewhat or very important issue for Halton Region and 72% felt it was a somewhat or very important issue for Ontario.

78% of respondents were somewhat or very worried about becoming sick with WNV compared with 59% who were very or somewhat worried about becoming sick from the pesticides used to kill mosquitoes. When asked what worries them more, 56% reported that they were more worried about getting sick from WNV, 22% were more worried about pesticide use and 18% were worried about both. In terms of responding to the threat of WNV in 2003, over two-thirds (67%) would agree to the use of pesticides in order to reduce the number of mosquitoes.

Turning to risk behaviours, two-thirds of survey respondents lived on properties that had containers that held water during the summer of 2002. Further, 25% of respondents reported tears in screens that covered doors or windows that opened to the outside.

Nearly two thirds of respondents (65%) rarely or never wore insect repellent when outdoors for 30 minutes or more. 50% rarely or never wore long sleeved shirts and/or long pants. When asked what else they did to avoid being bitten, over half (51%) reported they did nothing. Yet, four-fifths of respondents remember receiving information in the summer of 2002 about how to avoid mosquito bites.

### **Conclusions**

The community infection rate for the study area in Oakville (seroprevalence estimate 3.1%; CI: 2.2–4.0) is comparable to the experience in Queens, New York in 1999 (seroprevalence 2.6 %; CI: 1.2–4.1). The WNV infection rate appears to have been higher in Cuyahoga County (seroprevalence estimate 4.0 – 6.4).

While most area residents were aware of the risk of WNV infection as well as public health information about how to reduce the risk, area residents do not appear to have undertaken preventive measures as often as they could.