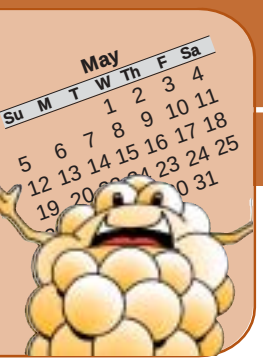

Taking the Sting Out of West Nile Virus

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In 2003, Canada experienced a sharp increase in the number of persons who were either presumed to have or who actually were infected with West Nile Virus. This mosquito-borne virus can lead to a broad symptom constellation, which initially may go undetected. Therefore, West Nile Virus is May's Bug of The Month.

West Nile Virus (WNV) is a mosquito-borne, single-stranded ribonucleic acid virus belonging to the *Flaviviridae* family. This virus was first recognized as a cause of disease in the Western hemisphere in 1999 and has since spread throughout North America. Cases have been confirmed in almost all American States and, by the end of 2004, in nine provinces.

How is WNV spread?

Humans are infected with the virus after a carrier mosquito bites them; however, most mosquitoes do not carry WNV. The *Culex* family of mosquitos is the primary species involved. The virus sustains itself through an enzootic cycle of mosquito-bird-mosquito transmissions. The *Corvidae* family, including primarily crows, but also ravens and jays, have often been affected. Crows, in particular, develop a significant viraemia and often die from the infection.

Humans are not thought to transmit the infection, as they do not develop a significant viraemia post-infection. However, transmission through blood products and organ transplantation have been reported. This has led to routine screening of blood products for the virus in Canada.

West Nile tidbit #1...

To date there has been one case of confirmed intrauterine transmission of the virus, resulting in the newborn being infected with the virus suffering severe neurologic deficits.

What are the risk factors?

WNV infection affects both sexes and all age groups. It is clear that advancing age is a significant risk factor for severe neurologic illness, long-term sequelae and mortality. It seems the incidence of people age 50 and older who suffer from encephalitis is 20-fold higher.

What are the clinical features?

WNV demonstrates a wide spectrum of diseases, often posing a diagnostic challenge. Disease presentation ranges from completely asymptomatic to mild, febrile illness, to severe meningoencephalitis. The majority of persons infected remains completely asymptomatic. Only about one in five infected persons develop any illness (usually a mild febrile form) and about one in 150 develop a severe manifestation.

The incubation period for the virus ranges from three to 14 days and the mild illness usually lasts from three to six days. The mild illness may present with: fever, malaise, anorexia, nausea, vomiting, eye pain, headache, myalgia, rash (brief, nonpruritic papular) and lymphadenopathy.

The severe illness includes meningitis, encephalitis and a poliomyelitis-like syndrome. The presentation may include: acute onset headache, nuchal rigidity, photophobia, severe muscle weakness and flaccid paralysis, ataxia, tremors, extrapyramidal signs, cranial nerve abnormalities, myelitis, optic neuritis, polyradiculitis and seizures.

How is it diagnosed?

Currently, the best diagnostic test is an IgM antibody-capture, enzyme-linked, immunosorbent assay of serum or cerebrospinal fluid (CSF). The IgM does not normally cross the blood-brain barrier, therefore if it is detected in the CSF, this confirms central nervous system infection. An acute and convalescent sample must be obtained to confirm recent infection. The first is collected within eight days of onset and the second 14 days later. As many cases of infection are completely asymptomatic, a positive test does not indicate that WNV is the causative agent in the process observed.

West Nile tidbit #2...

West Nile Virus can infect domestic pets (dogs and cats), but they rarely develop clinical disease. On the other hand, however, infected horses, can develop significant symptomatic disease (encephalitis) and may even die.

What treatments exist?

Treatment for WNV is largely supportive as ribavirin and interferon alfa-2b, once suggested as potential cures, have not proven themselves in clinical trials. Other agents, including corticosteroids, anticonvulsants and osmotic agents, have also not been shown to be of benefit in management of this disease.

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What about protection?

Prevention is an essential measure in combating this viral illness. Limiting exposure to mosquitos on a daily basis by wearing long-sleeved shirts and pants, as well as regular application of mosquito repellant to exposed skin are both extremely important. Efforts should also be made to reduce the numbers of mosquito breeding areas by eliminating sources of standing water, such as flower pots and old tires. Pregnant women should take extra precautions to prevent infection in light of possible risks to their child.

West Nile tidbit #3...

Mortality rates for patients with severe disease are noted to be around 9%.

What can we expect for 2005?

It is difficult to predict what will happen with WNVs activity in Canada for 2005, but if we consider the data in Table 1, it would appear that the threat of a significant outbreak of WNV is low. The dramatic reduction in WNV activity may be in part due to measures taken by municipalities to control mosquito populations and, possibly, the natural history of this agent.

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Table 1

West Nile Virus activity in Canada

Cases	*Year*			
	2001	**2002**	**2003**	**2004**
Probable	0	114	851	10
Confirmed	0	84	466	15
Total	0	198	1,317	25
Deaths	0	2	10	0

Source: Health Canada: http://www.phac-aspc.gc.ca/wnv-vwn