

# West Nile Virus Emergency Response

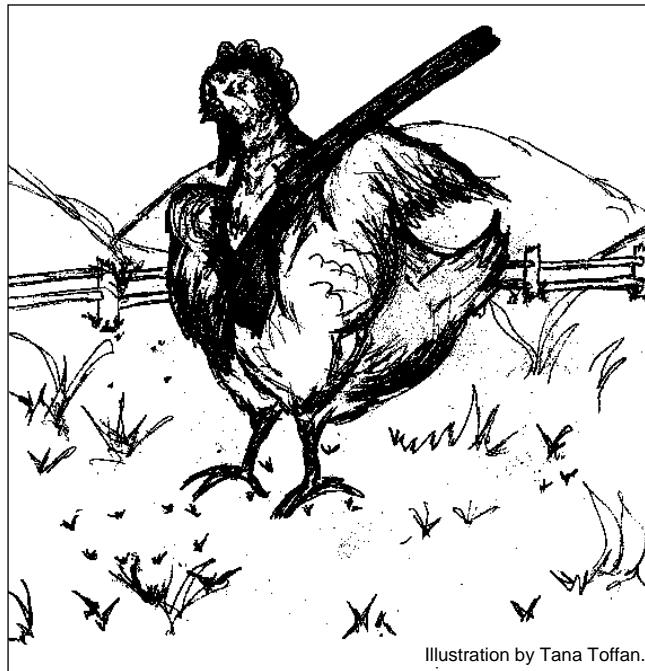
By Heather MacKenzie-Carey

**D**ue to increases in global travel, the introduction of foreign animals and imported goods, changing weather patterns, less pesticide use, ecological disruptions (such as floods, fires and droughts) and improved viral and bacterial detection techniques, we are seeing increases in animal viruses being transmitted to humans. The appearance of these new diseases poses challenges for EMS workers and a concern for personal protection. If correctly informed, EMS workers can avoid personal infection and aid in the detection and diagnosis of outbreaks occurring within their response areas.

West Nile Virus has recently appeared in Canada as yet another in the long line of "strange and unusual" viruses when it was first reported to have made an appearance in birds in the Peel Region of Ontario in August of 2001. Although new to North America, infection with West Nile Virus is not new. It was first discovered in 1937 when a human case occurred in the West Nile province of Uganda. In fact human outbreaks have occurred in a number of countries including Egypt, Israel, South Africa and parts of Asia and Europe. It occurred in Rumania in 1996-97, Russia in 1999 and France and Israel in 2000. It is not known to have occurred in North America until 1999 when it appeared in New York City.

In mid-August 1999, the Bronx Zoo in New York reported wild crows were found dead. At the same time, from the human population, there were reports of encephalitis in the city. By late August dead crows were reported in many parts of New York and Long Island and the zoo continued to report captive birds dieing over a three-week period. Unusual mortality of wild birds contin-

ued into November within an approximately 200 km radius of New York City. Horses with encephalitis began to die on Long Island in late August and continued into October. During the out-



While Sentinel Chickens have been used effectively to detect another mosquito borne virus, they have proven ineffective as an early-warning defense against West Nile virus.

break of 1999 there were 62 confirmed human cases of the disease outbreak with seven deaths attributed to the disease. It is reported to have also killed 5,000 wild birds. Twenty-four horses were affected, at least 10 of which died or had to be killed due to the infection. The virus continued to spread centrifugally during the summer of 2000. It reached all counties in New York State that border Ontario and Quebec. In the summer of 2000 there were 21 confirmed human cases in New York City and the states of New Jersey and Connecticut, resulting in two deaths.

In August of 2001 the first confirmed Canadian case of West Nile virus present in a bird occurred in the Peel Region of Ontario. By the middle of September 2001, there were 42 birds confirmed positive throughout Ontario, but no known human cases.

Now that West Nile Virus has infiltrated the Western Hemisphere, it becomes crucial we understand its pathology, spread, signs and symptoms, treatment and precautions. West

Nile Virus first infects birds. If a mosquito then feeds on the blood of an infected bird the virus may become located in the mosquitoes salivary glands. If the mosquito then bites a human, the virus can be transmitted to the person. There is also evidence to suggest mosquitoes can transmit the virus to horses, cats, domestic rabbits, chipmunks, gray squirrels, striped skunks and bats, although the most common infections were in horses. To date the mosquito remains the only mode of transmission. There has been no evidence of animals infecting other animals or humans. One of the species of mosquitoes that is found to carry West Nile Virus is a species which survives through the winter. This, plus the contin-

ued expansion of the virus, indicates that it is permanently established in the Western Hemisphere. Infection is most common in the late summer or early fall, but in southern climates where temperatures are milder, West Nile virus can be transmitted year round.

It is estimated that less than one percent of mosquitoes in an infected area will carry the virus. If, however, infection has occurred, symptoms typically occur three to 15 days after the mosquito bite has occurred. Most people who are infected show no symptoms at all or may experience only mild flue-like symptoms, such as fever, headache and body aches, before fully recovering. The virus is however capable of crossing the blood-brain barrier and in some people, particularly the elderly or immuno-suppressed

individuals, symptoms can be much more severe as the disease causes meningitis and encephalitis (inflammation of the brain and spinal cord) and include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis and can ultimately result in death.

### Treatment

West Nile Virus can be detected through blood samples. If a medical history suggests travel to or residency in an infected area and the symptoms are consistent with encephalitis, a sample should be taken.

There is no specific therapy for the disease and for milder cases no treatment is indicated other than what might be instituted for flu-like symptom relief. Anti-biotics are not effective. In severe cases treatment may include intravenous fluids, airway management, respiratory support and prevention of secondary infections such as pneumonia.

As yet there is no human vaccine.

There has been no documentation to suggest the virus can be transmitted from person to person or from animal to person. Therefore the risk to emergency services personnel is minimal in the treatment of infected persons.

### Prevention

Since the disease first appeared in North America, extensive efforts have been launched to track its course and prevent it from spreading. For decades domestic chickens have successfully been used to detect another mosquito borne virus known to infect horses. During the 2000 mosquito season, sentinel chickens were used as part of a surveillance program to detect the West Nile Virus as well. Experience gained during the U.S. outbreak in 1999 and again in 2000 clearly showed that sentinel chickens did not work as well as tracking and testing dead birds because the virus appears more commonly in crows and other wild bird species. As a result during the 2001 mosquito season, sentinel chickens were not used and instead efforts were focused on the collection and testing of dead birds. The Canadian Food Inspection

Agency takes the lead role in this surveillance and works with veterinarians and other members of the animal health community. The Canadian Cooperative Wildlife Health Centre (CCWHC) took over the wild bird surveillance component of the overall program in 2000. Blood samples are sent to the Health Canada Laboratory in Winnipeg for analysis.

Mosquito surveillance is also done to determine the current species com-

position and abundance in an affected area. Mosquitoes collected may be tested for infection with West Nile virus.

Key health care providers, including family and emergency room physicians, infectious disease specialists and neurologists, are asked to watch for symptoms of West Nile virus infection and report any probable or confirmed cases of viral encephalitis to provincial health authorities.



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## Significance for EMS workers

For the majority of cases, West Nile virus infection will not be an emergency requiring EMS activation. Providers should be assured there is no evidence to suggest they can acquire the virus from person to person contact. Questions pertaining to time spent outdoors, evidence of mosquito bites and onset of symptoms should become part of history taking. All patients should be asked if they have been traveling recently and travel into infected areas should be documented. Any suspicions as to viral infection should be documented and reported to the receiving hospital.

EMS should be considered part of the local and provincial emergency response team and providers should be updated as to the presence or possibility of viral outbreaks as part of the health care procedure.

Other actions for EMS workers remain the same as for all general public and include the following points.

- Report dead birds. There is no evidence to suggest you can get the virus from handling live or dead infected birds. There is some suspicion that dogs and cats may be able to acquire the infection by eating the bodies of dead animals and attention should be made to prevent domestic animals from touching any dead birds. Where possible CCWHC designated personnel will collect dead birds identified by the public. Reporting procedures and contact numbers can be found through municipal animal control or the CCWHC website at <http://wildlife.usask.ca>
- Reduce your risk of exposure to mosquitoes, particularly in affected areas. This may include minimizing time spent outdoors at dawn and dusk, wearing long-sleeved tops and pants and using insect repellents. Doors and windows should have tight fitting screens free of holes.
- Reduce mosquito populations in your area by ensuring things in and around houses and yards like pools, flowerpots, pet bowls and children's toys are emptied of standing water. Empty and clean bird baths twice weekly, ensure yards are free

of debris, particularly old tires, which are a common breeding ground for mosquitoes.

The appearance of viruses and bacteria are become more and more common in the human population. Symptoms, which once were easily diagnosed as the common cold, or flu, may in fact be evidence of more potentially serious illness. Emergency medicine must also change to support the detection and reporting of such new illnesses. Emergency medical services personnel have a responsibility to make themselves aware of the new diseases and disease patterns, modify their history taking to incorporate questions which may point to or rule out such illnesses and follow appropriate reporting and protection guidelines. Rather than ignoring the possibilities or treating all patients as walking time bombs, EMS providers need to become informed about new disease patterns such as West Nile virus. ■

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### About The Author.

*Heather MacKenzie-Carey is the Vice-President of TPG Inc., an Emergency Management Consulting firm. Heather has over 20 years experience in the Health Care Industry as an emergency practitioner, educator and consultant. She has worked in public, private, rural, urban, mountain park, multi-disciplinary, flight and clinical settings. She has also worked as an educator for the Aberdeen Hospital, the Jasper School District and the Southern Alberta Institute of Technology (SAIT).*

*Heather has completed a Masters of Science degree in the Study of Risk, Crisis and Disaster Management from the University of Leicester (UK). Her thesis focused on bio-terrorism and biological emergencies in Canada. The research analyzed the training needs required for emergency response to bioterrorism and biological emergencies from both the perspective of experts within the biological sciences and Canadian First Responders (EMS, police and fire disciplines). During her research efforts Heather attended a variety of conferences and talked to many experts both in Canada and the United States on the unique challenges health professionals will face in the event of such an emergency. For more information on her research findings, or emergency management products and services offered through Turning Point Group, you can contact Heather at [Geomac@home.com](mailto:Geomac@home.com) or phone (403) 285-4774. You are also invited to visit the company's website at [www.turningpointgroup.com](http://www.turningpointgroup.com)*

