

REVISION #12
JUNE 24, 2003

OCCUPATIONAL HEALTH ADVISORY

WEST NILE VIRUS

Workplace Health and Public Safety Programme
Health Canada, July 7, 2000 (revised June 24, 2003)

Canada had its first confirmed human illness caused by West Nile (WN) virus in 2002, after people tested positive for the virus in parts of Quebec and Ontario. The total number of human cases in 2002 included 329 confirmed and 87 probable cases of illness due to WN virus. These totals include 18 deaths in Ontario and two in Quebec. In addition, two people from Alberta became infected, but these cases are thought to be travel-related. The virus was also found in birds, horses or mosquitoes in Nova Scotia, Quebec, Ontario, Manitoba and Saskatchewan. For more details, see Health Canada's West Nile virus Monitor at http://www.hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/mon_e.html

Any spread of the virus to humans is most likely to be by the bite of infected mosquitoes, although the US Centers for Disease Control and Prevention has documented a few cases of WN virus infection in laboratory workers through cuts or puncture wounds. Other mosquito-transmitted viruses which can cause human disease have been documented in Canada for many years but their occurrence has been relatively rare. Surveillance systems throughout Canada will continue to monitor to detect the presence of WN virus, and, in some provinces (Manitoba and Saskatchewan), Western equine encephalitis virus activity.

When changes or intervention are indicated due to new knowledge or due to the density of viral infections in birds, mosquitoes and horses, there will be special advisories. In the absence of special advisories, the risk of contracting WN virus or other mosquito-transmitted viruses known to cause disease should be considered. Persons whose occupation may place them at risk of infection by mosquito bite or by handling of dead birds or animals should consider the following recommendations.

I. Persons who work outdoors where there is increased risk of exposure to mosquito bites (e.g., where there is standing water, stagnant pools, or in swampy or wooded areas) should consider taking the following precautions:

1. Wear long sleeved shirts and full length trousers (two layers of clothing make biting more difficult but obviously this may be hazardous in warm weather or while doing heavy work). In hot conditions (potential heat stress) where there is increased risk, special suits of a mesh material with elasticized cuffs and attached hoods can be obtained and would be useful.
2. High boots and taping or sealing ends of trousers is useful to prevent mosquito bites.

3. Wear light colored clothing as it is less attractive to mosquitos.
4. Use personal insect repellents containing DEET (N,N - diethyl m-toluamide) on exposed skin following label directions carefully. Keep repellent away from eyes and mouth. Wash your hands after applying repellent and before eating and drinking. Personal insect repellent products contain DEET in varying concentrations. When applied to exposed skin, products with lower concentrations of DEET are as effective at repelling mosquitoes as products containing higher concentrations of DEET. However, products with higher concentrations of DEET remain effective for longer periods of time. For example, products containing 10% DEET technical (N,N-diethyl m-toluamide plus related compounds) provide approximately 3 hours of protection whereas products containing 30% DEET technical provide approximately 6 hours of protection. Adults should not use products containing more than 30% DEET technical.

NOTE: Refer to the safety tips as indicated in Health Canada's Information sheet "Safety Tips on Using Personal Insect Repellants". It can be found at <http://nile.healthcanada.net> or <http://www.pmra-arla.gc.ca/english/pdf/pnotes/deet-e.pdf>

Always read the product label and follow the directions carefully.

Fact Sheets on West Nile Virus prevention can also be found at <<http://www.westnilevirus.gc.ca>>.

5. Certain DEET containing products can be applied to clothing. Read and follow instructions carefully. Keep repellent away from eyes and mouth. Wash your hands after applying repellent.
6. If practical, you may wear a mosquito net over your hat or cap to protect head, face and neck. Special "bug hats" and "bug jackets" and "bug pants" made of netting material may be useful.
7. If practical, work outdoors when it is cooler and there is brisk air movement or when there is strong sunlight. Mosquitoes are less active in these weather conditions.
8. If practical, stay indoors at dawn and dusk and in the early evening hours when mosquitoes are more active.
9. In the field and at home, use proper screens that are in good condition on windows

and doors of any lodging.

10. Where practical, stagnant water breeding areas, standing water, or containers that could hold water should be drained or covered at the workplace or around the home. Refer to the Health Canada West Nile virus website or provincial and territorial links at <http://www.hc-sc.gc.ca/english/westnile/links.html> for advice on control of mosquitoes and mosquito breeding areas.

II Persons involved in collecting dead birds and other animals.

West Nile virus can infect many types of birds (wild and domestic) and mammals such as horses, cats, dogs, etc.. It is spread to humans primarily by the bite of infected mosquitoes. Direct animal to animal spread has only been documented with captive birds. Direct animal to human spread has been documented in three laboratory workers who acquired the disease by direct contact with animals and birds through cuts or puncture wounds while handling live or dead specimens. There is no evidence that a person can get the virus by handling live or dead infected birds. However, there is reason to believe that there is significant shedding of virus by infected birds both orally and through droppings and the virus can be found on their feathers. There are reports of live WN virus having been recovered from the droppings of at least one bird species. It is recommended that you avoid barehanded contact with dead animals and birds. Persons collecting or handling dead and possibly infected birds and animals should use vinyl, PVC, latex (if not allergic), nitrile or rubber gloves and double bag the specimen in bags made of thick plastic to resist puncture by beaks, talons, claws, nails, etc.. This is precautionary to prevent any contact of blood or body fluids of the potentially infected animal with any break in your skin, with your eyes or mucous membranes. Persons are advised to avoid punctures or cuts from bills, claws, or instruments during handling and dissection of birds and other animals. Cut-resistant gloves can be worn under vinyl, PVC, nitrile, rubber or latex gloves.

After any handling of dead birds and animals, persons are advised to wash their gloved hands and then their bare hands well with soap and running water.

The recommendation for collecting continues to be that people in the field who are handling dead birds, including those collected in surveillance programs, do so in such a manner as to minimize exposure to excretions. The recommendations are to invert a plastic bag over the carcass ensuring that no direct contact with the bird or its excretions occurs, to keep the bag closed at all times thereafter and place it in a second bag, and to wash one's hands as soon as possible afterward. The Canadian Cooperative Wildlife Health Centre (CCWHC) continues to recommend that the public should not pick up dead birds. Other risks from dead birds are Salmonella or Chlamydia infections.

III Persons who work in animal necropsy suites.

WN virus is mainly spread by the bite of infected mosquitoes. However, the possibility of spread by direct blood to blood contact exists and has been documented in laboratory situations. For this reason, if WN virus is suspected or known to be present in the locality or area, routine practices and additional precautions (e.g. universal precautions) are to be used in handling of carcass, body fluids and blood of potentially infected birds and other animals

For necropsies, these precautions include use of protective clothing (gowns), vinyl or PVC or latex (if not allergic) or rubber gloves, goggles or splash protection on eyes and masks covering mouth and nose. The virus has been suspected of spreading by blood aerosol in at least one laboratory accident so it is recommended to use a NIOSH (U.S.) certified N-95 to N-100 respirator filter mask (half or full face).

The precautions referenced in the June 2002 Biosafety Advisory on WN virus produced by the Office of Laboratory Security, PPHB, Health Canada should be followed. Where practical, animal carcasses should be manipulated in a certified biosafety cabinet as noted in this Biosafety Advisory as found at http://www.hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/bio_e.html.

If respirator are to be used, there must be a respiratory protection program in place. All users must be trained in the use of a respirator and have their respirator fitted to their face.

IV Persons who work in slaughter houses

Note: The following recommendations for the safe handling of horses and various avian species at the slaughter plants are based on the current knowledge of the epidemiology and pathogenesis of the WN virus in those species. Should future WN virus research or disease investigation indicate the need for change to the safety procedures of the inspection staff or the slaughter house employees, the above recommendations will be modified accordingly.

To date, there are no reports of transmission of WN virus to slaughter house workers. The currently known routes of infection in humans with WN virus are by mosquito bite and by cuts or punctures with bones or instruments. Persons are advised to avoid punctures (“sticks”) or cuts from bills, claws, or instruments during handling and dissection of birds and other animals. Cut-resistant gloves can be worn under vinyl, PVC, nitrile, rubber or latex gloves. The potential risk of infection was reviewed due to the possibility of exposure to infected animals. In 2002, there was an outbreak of WN virus infection in one flock of young domestic geese in Manitoba. Several similar outbreaks have occurred in geese in Israel in past

years. As well, there were hundreds of horses infected by WN virus in four provinces in Canada during 2002, with the largest number of horses infected in Ontario and Manitoba.

The assumption is made that if the viral blood levels (viremia), tissue levels and virus shedding are all low at the time of slaughter, the risk of WN virus infection in persons handling the animals, or their meat, is also low.

Persons who work in slaughter houses (including inspectors and veterinarians) are advised to use their usual personal protective equipment. The West Nile virus causes a low level viremia of short duration in most domestic food animals and no special personal protection is currently recommended for routine slaughter house work. Antemortem inspection is extremely important to determine the animal's health status. Animals that are ill, symptomatic or exhibiting neurological signs must not go to slaughter.

A Poultry Plants:

Domestic Geese and Ducks

Domestic geese appear to be most susceptible to WN virus infection at a young age. In 2002, there was an outbreak of WN virus infection in one flock of young domestic geese in Manitoba, and several similar outbreaks have occurred in the past in Israel. Transient viremia, which coincides with the development of clinical neurological signs, develops from one to five days post-infection (PI). Viremia peaks around two days PI, with no virus present after 21 days, which also corresponds to the disappearance of clinical signs.

To ensure the safety of inspection staff and plant employees, geese originating from flocks where WN virus infection was confirmed or suspected will have to be free of clinical signs for 30 days prior to being shipped to a federally registered slaughter establishment.

Ducks may become infected with WN virus, however the limited data that is available indicates that ducks have a low to moderate viremia of short duration. There is no scientific evidence that suggests that domestic ducks could pose a threat of WN virus infection when handled at slaughter.

Turkeys

Naturally occurring WN virus infections have never been reported in turkeys. Turkeys infected experimentally do not show clinical disease but may develop a low level viremia between two and ten days post-infection (PI).

Chickens and related birds of the order Galliformes (Guinea fowl, Pheasants, and Quail)

No naturally occurring WN virus infection has been reported in domestic commercial poultry. Commercial chickens are usually raised indoors where the potential for exposure to the mosquito vector is low. In experimentally infected young chickens, virus could only be recovered from the blood for up to eight days PI. After more than three weeks of age the chickens became refractory to natural occurring WN virus infection, thus commercial chickens reaching the slaughterhouse at 37 days of age or older should have passed the critical viremic stage in the unlikely event of a natural WN virus infection.

Limited research and indirect evidence indicates that other galliform birds develop low level viremias of short duration upon experimental WN virus infection.

Rheas, Emus and Ostriches

There is very limited knowledge of the natural WN virus infection occurring in these birds, and only few cases of naturally occurring WN virus infection in these species have been reported worldwide. To date, there have been no recorded cases of these birds passing WN virus infection to other animals or to people. However, inspectors and plant employees should still follow occupational health and safety standards as recommended for handling other slaughter animal and avian species.

B Horse slaughter houses

The incidence of WN virus in horses in North America is seasonal, with most cases being reported from mid-August to the end of October. At least 350 cases of WN virus infection in horses were reported in Canada in 2002. The present understanding is that WN virus infection in horses results in a low magnitude and short duration viremia developing one to two days post infection (PI). Central Nervous System (CNS) signs may become apparent from 5 to 22 days PI and horses are usually not viremic at that stage, and little virus is found in CNS tissue. At a slaughter plant, horses displaying CNS signs would be condemned ante-mortem and treated as rabies or other reportable disease suspects. Such ill horses are not to be slaughtered in commercial slaughter houses.

Slaughter of clinically healthy horses while wearing water proof gloves, aprons and protective clothing is considered acceptable. However, in an infected herd, only a small percentage of the horses show clinical signs of the disease. Therefore, the risk of slaughtering asymptomatic horses from an infected herd requires further study. Current evidence indicates that the slaughter of asymptomatic horses does not constitute a risk of WN virus infection for inspection staff and plant employees.

V Persons handling potentially Infectious clinical material.

These persons should follow the recommendations outlined in the June 2001 (revised July 2002) Biosafety Advisory on WN virus produced by the Office of Laboratory Security, Centre for Emergency Preparedness and Response, Population and Public Health Branch, Health Canada. Specimens should be handled in a Biosafety Level 2 containment facility using Biosafety Level 3 operational practices including routine protective practices and additional precautions and certified biological safety cabinets with laminar air flow. The Biosafety Advisory can be found at http://www.hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/bio_e.html.

For virus isolation and propagation a Biosafety Level 3 containment facility using Biosafety Level 3 operational practices must be used.

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