

Environment

WEST NILE VIRUS

What is it?

West Nile Virus (WNV) is a type of virus which is spread by mosquitoes. Mosquitoes are arthropods which are generally blood-sucking insects so the WNV is called an Arbovirus, an **Arthropod borne** virus. This virus belongs to the Flavivirus genus which also contains the diseases, St. Louis encephalitis, Japanese encephalitis and yellow fever.

Where did it come from?

West Nile Virus originated in Africa in 1937. Since it came from the West Nile region of Uganda, it is called the West Nile Virus. It is estimated that 65% of the people who live in the Nile delta in Egypt have WNV antibodies. The disease has been commonly found among humans, birds and other animals in Africa, Eastern Europe, West Asia and the Middle East.

WNV came to North America in 1999 where an outbreak occurred in New York City. Less than 3% of the New York City area residents in the most infected area tested positive for WNV antibodies in 1999. Since then it has spread throughout the eastern United States and Canada. It has been detected in 44 states and 5 provinces.

How does it spread?

West Nile virus is spread to humans by the bite of an infected mosquito. Mosquitoes become infected with WNV when they bite infected birds. Since birds migrate over larger distances, it is easy for the disease to spread.

There are many types of mosquitoes but only a few that spread WNV. The main carrier of the WNV is the culex pipiens mosquito which originally came to North America from Europe. It is largely an urban and suburban mosquito and they prefer biting birds to people. This type of mosquito is uncommon outside the city.

How would I get it?

You would have to be bitten by a mosquito that had the WNV. The mosquito would have bitten an infected bird ten to fourteen days before it bit you. The mosquito has to bite a bird which is known as the reservoir species. In North America there are more than 150 bird species that have had WNV but many don't get sick. Scientists think the common sparrow is the most likely reservoir species since, unlike crows, they don't seem to get very sick from WNV.

Can people spread WNV?

If a mosquito bites a person with WNV and then bites another person, the second person will not get the disease.

It is possible for a pregnant woman with WNV to give it to her fetus but it is extremely rare. There are two reported cases in the United States. One woman had a healthy baby. The other case involved a woman who was quite ill with WNV symptoms and her baby suffered birth defects. There is one reported case of a woman transmitting WNV to her baby through breast milk which was confirmed to contain WNV. Despite being infected with WNV, the child had no symptoms and remained healthy.

There is evidence that it can be spread through blood donations, organ transplants and tissue grafts What is the risk?

Fortunately, most mosquitoes in any given area do not carry WNV. Health Canada estimates less than 1% of mosquitoes in a WNV area actually carry the virus.

Who is most at risk?

People over 50 and people with compromised immune systems, for example those who are taking chemotherapy, or people who have chronic diseases such as cancer, diabetes, alcoholism or heart disease are most at risk of serious symptoms.

How is it diagnosed?

The first thing doctors look for is symptoms of WNV. Blood tests confirm the infection. They are done on two separate blood samples taken about three weeks apart. The blood tests look for antibodies to WNV. If the first test is positive it could mean the person has been exposed to WNV recently or in the past. If the second test shows an increase of antibodies four times or more it means the WNV infection is recent.

What are the symptoms?

Most people (80% of those infected) do not show any signs or symptoms. The only way it is known that they had WNV is the presence of antibodies in their blood.

Some people (about 20% of those infected) show mild symptoms which include: fever, headaches, muscle aches, skin rash on the body trunk and swollen lymph glands. These symptoms usually last from three to six days.

A very few people (about 2%) have severe symptoms which are encephalitis or meningitis. Meningitis is inflammation of the lining of the brain or the brain stem. Encephalitis is inflammation of the brain. These serious symptoms are brain swelling, headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness and paralysis. Most of those who become this ill fully recover but a few suffer serious, long-term symptoms including movement disorders, parkinsonism, polio-like syndrome and muscle degeneration. A very small percentage of those infected with WNV die and those are nearly all elderly people.

In Canada, Ontario has had the most cases and there have been a few in Quebec. These are the figures for Ontario for 2002: about 1,000 people sought medical attention and 17 people died from WNV. By comparison, other viral and bacterial infections such as pneumonia and influenza kill more than 8,000 people every year in Canada with a mortality rate of about 4%. The overall mortality rate for WNV is estimated to be between 0.5% to 1% of those infected. In the U.S. there were 274 fatalities from WNV. As of May 1, 2003, Ontario made WNV a reportable disease which means doctors have to notify the authorities. This should make statistics more reliable.

The good news is once you are infected with WNV you be immune to future WNV infection. It is assumed this is lifetime immunity.

How is it treated?

Patients with severe WNV are treated in hospital with antibiotics and antiviral agents and receive supportive care. This can include methods to try to reduce swelling, intravenous fluids, respiratory support (ventilator), prevention of secondary infections such as pneumonia and urinary tract infections, and good nursing care. Milder cases are treated at home with medications to reduce symptoms and bed rest. So far, there is no vaccine for humans.

What should I do if I think I have it?

You should seek medical attention if you develop severe WNV symptoms. If you have any doubts, see your doctor.

What is the incubation period?

Symptoms appear between two and 15 days after being bitten by an infected mosquito.

Can animals get it?

Yes, since birds are carriers of WNV they are very much at risk. Thousands of birds have died of WNV. Birds most at risk are crows, ravens, magpies and jays. Wild animals such as skunks, chipmunks, squirrels and bats can get WNV.

Your pets can get WNV too but the incidence of WNV among dogs and cats is extremely low. If your pet has short hair it is more at risk of being bitten. While dogs and cats can test positive for the WNV, like sparrows, they don't seem to get sick from it. Horses are particularly at risk with the mortality rate estimated to be 40% and last year a provisional licence was granted to a vaccine that is being used on horses. There is no evidence that people can get WNV from animals other than mosquitoes unless they are handling an infected animal and the person has a cut on their skin.

How do mosquitoes breed?

Adult female mosquitoes need animal blood to develop their eggs. They lay their egg rafts on the surface of stagnant water. Larvae develop from the eggs. Pupae develop from the larvae. Larvae and pupae need to come to the surface of the water to breathe through breathing tubes. Mosquitoes emerge from the pupae.

How do you get rid of mosquitoes? Don't allow mosquitoes to breed

Fortunately, mosquitoes don't fly very far so what you do in your own yard will have a positive effect.

The main carrier of WNV, the urban and suburban culex pipiens mosquito likes to breed in small containers of stagnant water. Even a thimbleful of water that has been standing for more than four days is a good place for this type of mosquito to lay eggs which soon hatch into larvae. Fortunately, this type of mosquito doesn't like to breed in large bodies of stagnant water such as swamps.

Eliminate stagnant water in your yard

Empty out any small pools of standing water including those in containers such as:

- flower pots and the saucers underneath
- toys
- gardening cans
- wheelbarrows
- puddles
- Frisbees
- old tires, including tire swings
- pool covers

Store:

wheelbarrows, canoes and wading pools, upside down.

Cover what you can't empty:

- rain barrels with a screen
- garbage and recycling with lids

Replace:

bird bath water, pet dish water and wading pool water at least twice a week.

Drill:

holes in the bottom of containers that must be left outside so water can drain out

Repair:

leaking hoses, water pipes or joints

Clean:

- gutters, eaves troughs and downspouts
- swimming pools by keeping them aerated and chlorinated even if not in use

Check:

under shrubbery for hidden containers or pools

Kill larvae:

- in ornamental pools with fish that eat larva
- by buying briquettes of larvae killing bacteria called bti (bacillus thuringiensis israelensis, that the commercial name is Bectobac) and throwing them into any standing pools of water that you can't eliminate
- by putting mineral oil or vegetable oil in the water source. This blocks the breathing tubes of the larvae and pupae.
- by putting dish detergent on the water source. This surfactant alters the surface tension of the water which drowns the mosquitoes laying their eggs, the egg rafts, and the larvae and pupae as well as giving the pupae no purchase on which to climb onto the water and fly away as mosquitoes.
- by spraying garlic oil on the water source. Make your larvicide by soaking 10 to 15 finely chopped garlic cloves in one litre of mineral oil for 24 hours.

Repair and replace:

screens in doors, windows and vents to prevent mosquitoes from entering your home. Make sure screens fit tightly.

If mosquitoes get in:

use a swatter or rolled up newspaper to kill them. They like to sit on walls, under sinks, in closets and in the basement.

How else do I get rid of mosquitoes?

Birds and bats like to eat mosquitoes so the more you have on your property, the better. Swallows, swifts and nightjars are among the many types of birds who eat mosquitoes. Install bat houses and bird houses, especially for birds like purple martins who thrive on mosquitoes. If you have an ornamental pond, stock it with frogs.

Plant marigolds around your yard. The flowers give off a smell that insects do not like.

How do I protect myself from mosquito bites?

During May to October limit outdoor activities from dusk until dawn when mosquitoes are most active. The mosquito season is over after the first hard frost.

Wear light coloured long pants and long sleeves as well as shoes and socks.

Put an elastic band or a bicycle clip around the bottom of your pants or pull your socks up over socks over your pants and ignore your kids if they say you look like a dork. Tell them it's the latest style.

Use mosquito netting to protect small babies when sleeping outside in the summer.

If you work outside in an area with a lot of mosquitoes, such as Winnipeg, wear a bug hat (a hat with netting that goes over your whole head and extends over your neck to your shoulders).

Don't eat bananas during the summer as something in the banana oil as your body processes it seems to attract mosquitoes.

There are a variety of non-pesticide, natural materials that have been found to be effective by many people.

Take vitamin B1 regularly all summer which makes the body smell "repellent" to mosquitoes but is unnoticeable to humans.

Take vitamins that contain thiamine which is also odourless to humans but repellent to mosquitoes.

Rub on your skin (apply frequently):

- A few drops of certain health-care lotions – cedar wood, eucalyptus, peppermint or camomile – onto your skin.
- Citronella or lavender but note citronella can result in an allergic reaction to the skin of some individuals.
- Soybean oil products
- Avon’s Skin-So-Soft Bath Oil
- Bounce fabric-softener sheets that you use in your dryer.
- Vick’s VapoRub
- Mix catnip with isopropyl alcohol and water. Your cat will love you, too. (If you live in BC, don’t try this in cougar country.)

DEET containing repellents

Mosquito repellents which contain DEET (N,N-diethyl-meta-toluamide) are effective BUT there are non DEET containing repellents that work fine for many people. With DEET, the higher the percentage of DEET in the repellent, the more long lasting. Since DEET is a toxic chemical, use it very carefully. Don’t use DEET in excess of 30%. If you feel you must use DEET but are only going to be outside for a couple of hours, you only need 5% DEET.

If you use a DEET containing repellent, spray it on your clothes if they are not thick enough to prevent

mosquito bites and try to avoid putting it directly on your skin. Don’t spray it on skin under your clothes. Do not use repellent on open wounds or irritated or sunburned skin. Do not get it in your eyes – if this happens, rinse with water immediately.

Never use DEET on babies or small children. Never use DEET or more than 10% on older children. Don’t use DEET on children more frequently than a couple of times a day. Don’t apply DEET to children’s hands or face. Try a variety of non-pesticide alternatives on children and apply them frequently before resorting to DEET.

After using DEET on your skin wash your skin with soap and water when you go indoors or when protection is no longer needed. Avoid breathing mist from spray-type repellent. Always apply in a well-ventilated area. Never apply spray repellent in a tent. Do not use near food.

Which are better, larvicides or pesticides?

Larvicides that kill larvae are better since they are targeted to apply to the mosquito breeding areas. They can be applied directly to ditches, roadside storm sewers and catch basins. There are biological larvicides such as larvae killing bacteria, bti, bacillus thuringiensis israelensis (commercial name is Vectobac) as well as chemical larvicides such as methoprene. Larvicides kill mosquito populations before they become blood-feeding adults. Ontario municipalities will be using methoprene in catch basins and bti on surface water.

Pesticides (called adulticides) used to control adult mosquitoes don’t work very well since mosquitoes are tiny and hide under leaves, branches, awnings, porches, etc. so the sprayed pesticide misses them. If a truck sprays your front yard, the pesticide isn’t going to make it to your back yard unless wind conditions are exactly right. Aerial spraying is bound to miss lots of spots. Even if the pesticide was 100% effective, which is far from the case, new mosquitoes hatch and replace them. Since pesticides are designed to kill mosquitoes they are certainly not good for other living things such as birds, pets, and people, especially children.

The former head of the Pesticide Research Laboratory at the University of Manitoba, located in Winnipeg, the mosquito capital of Canada, says, “effective and timely larviciding, and reducing mosquito habitat, could make costly and intrusive adulticiding unnecessary. Adulticiding seems attractive, but benefits at best last for a day or so.”

What about camping or going to the cottage or cabin?

Fortunately the type of mosquito that is the main carrier of WNV is an urban and suburban mosquito. If you’re in a cottage or cabin or in a tent and don’t want to have to put up with mosquitoes, use a mosquito net.

Dead birds

Keep a look out for illness or death in wild birds. Report dead birds to your local public health department so they can be tested to see if they have died of WNV. In Ontario only crows and ravens are being accepted for WNV surveillance in 2003.

Don't handle dead birds unless instructed to do so by your local health department. If you can't reach your public health department, you can call the Canadian Cooperative Wildlife Health Centre, University of Guelph, (519) 823-8000, ext. 54662.

If you are instructed to pick up a dead bird make sure you use rubber gloves or several leak proof bags used as a glove. Make sure the beak or claws do not puncture the bag. Put the dead bird in another bag. Wash your gloved hands and then your bare hands thoroughly. The plastic bag containing the dead bird should be closed tightly, placed inside one additional, clean plastic bag and tightly close it. Refrigerate the bird if it can be delivered to a laboratory for testing within 24-36 hours. If it will be longer, freeze the bird and keep it frozen. Be careful. There have been two laboratory workers who became infected as a result of accidentally cutting themselves while handling infected animals.

Complete a submission form as instructed by your public health department. You can access the forms through the Health Canada website. Do not submit rotten or dry carcasses. Instead bury the bird several feet deep in a place it will not be disturbed or double-bag it and place it in the garbage. Do not dispose of the bird in such a manner that it would be handled by other people.

Up to date information

For up to date information visit these internet sites:

Health Canada for updates and guidelines: www.hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/

Canadian Centre for Occupational Health and Safety: www.ccohs.ca

Occupational Health Clinics for Ontario Workers: www.ohcow.on.ca

Workers Health and Safety Centre: www.whsc.on.ca

Toronto Public Health updates: www.toronto.ca/health/

Ministry of Health, Ontario: www.health.gov.on.ca

Centres for Disease Control: www.cdc.gov/ncidod/dvbid/westnile/USGS

National Wildlife Health Center (NWHC): www.nwhc.usgs.gov/research/west_nile/west_nile.html

Virginia Department of Health: www.vdh.state.va.us/epi/wnv.htm

In Ontario, you can call Telehealth Ontario 1-866-797-0000.

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