Protecting Yourself and Your Community from

West Nile Virus

Introduction:

Threats to our health are changing all the time. People have never liked mosquitoes, but with West Nile Virus now throughout North America, mosquitoes pose an important risk to human health. People over the age of 50 are at higher risk of severe disease or death due to West Nile Virus infection.

West Nile Virus has been known in parts of Africa, the Middle East, West and Central Asia and Eastern Europe for decades. It was first recognized in the US in 1999, in and around New York City. For the first several years, the virus expanded to reach other Eastern US states, and into the Midwest. From 1999 through 2001, there were 149 cases of human illness from West Nile virus in the United States, including 18 deaths. The picture of West Nile Virus in the US, and in North America changed radically in 2002. Virus activity reached to the West coast of the US, southern provinces in Canada and was reported from several locations in Mexico and the Caribbean. During this epidemic there were more than 4000 cases of human illness reported in the US, and 284 deaths. This was the largest outbreak of a mosquito-borne illness in the US in recent decades.

People can reduce the chance of becoming infected by avoiding mosquito bites. West Nile virus is now in most of the United States. The most common way people become infected is through the bite of an infected mosquito.

As West Nile virus has moved across the continent, many people have become concerned about this relatively new risk. West Nile virus is a serious issue, and we all need to make some small changes to reduce the risk of infection for ourselves and for our families.

The goal of this presentation is to help communities better understand West Nile Virus, and how individuals and communities can take positive steps to reduce West Nile Virus risk.

How the Virus Works:

The principle transmission cycle of West Nile virus is between mosquitoes and many species of birds. Mosquitoes become infected with West Nile virus when they feed on an infected bird. About 10 to 14 days after the mosquito bites the infected bird and gets the virus, the mosquito can transmit the virus to a person, another bird, or another kind of animal. The mosquito injects the virus into the bird, other animal, or person while taking blood.

West Nile virus can multiply inside the person, bird or animal that becomes infected, and it may cause illness. People and most other mammals don't play a role in spreading the virus, however. Humans and horses are sometimes referred to as "incidental" or "dead-end" hosts for the virus, because research suggests that they do not develop enough of the virus to continue the cycle and infect mosquitoes that bite them.

Some species of birds, such as crows and jays are more likely to die when they get infected with West Nile virus, while other birds like chickens and pigeons seem less likely to get sick. As of Spring 2002, infection with West Nile virus has been documented in over 162 different species of birds in the US.

There are several ways that health authorities look for, and measure, West Nile Virus in the environment. One important way is through collecting dead birds and testing them to see if they have been infected with West Nile Virus. This is why people are often asked to report dead birds. State and local health departments have different policies for reporting and collecting dead birds, so contact your local health department for instructions. If authorities do not need to test the dead bird you find, the bird can be disposed of with routine garbage.

It's never a good idea to touch any dead wild animal with your bare hands, so always use an inverted plastic bag or similar method to pick up a dead bird or animal.

Human Disease:

The most important way that people become infected with West Nile Virus is through the bite of an infected mosquito. Most people -- approximately 80% -- who become infected with West Nile virus do not have any symptoms at all.

Nearly 20% of those who become infected with West Nile virus develop a mild illness known as "West Nile Fever." The symptoms of West Nile Fever can include: fever, headache, body aches, nausea, vomiting, swollen lymph nodes and sometimes a body rash. This illness is mild and goes away by itself without causing any long-term effects. There is no treatment for West Nile Fever.

A small number of people who become infected with West Nile virus – about 1 in 150 –develop more severe illness, such as West Nile encephalitis (an inflammation of the brain) or meningitis (an inflammation of the membranes surrounding the brain and the spinal cord). The symptoms of severe disease include: severe headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness and paralysis. Approximately 10% (1 in 10) of the people who develop severe disease have died due to their illness.

Anyone can become infected with West Nile Virus; however, people over the age of 50 are more likely than younger people to develop severe illness. After age 50, the risk of severe disease rises with increasing age. The majority of the fatal cases of West Nile disease in the large outbreak of 2002 occurred among people over the age of 50.

While mosquito bites are the main method of transmission, people can also become infected with West Nile virus when they receive donated blood or transplanted organs from a person who was infected. CDC and other health authorities are working closely with blood banking organizations to reduce the risk of infection through blood products or organs in the future. If you have questions about this issue you should discuss it with your health care provider. Beginning in July 2003, all blood donations in the US are screened for West Nile virus.

There is also evidence that West Nile virus could be passed from a pregnant woman to her baby. Because this was only one case it is not possible to draw conclusions about this risk. Scientists are working to better understand the risk that West Nile virus poses to pregnant women and fetuses. In another case, it was found that breast milk could also contain West Nile virus. Though the baby was infected with the virus, there was no illness associated with the infection. CDC scientists will continue to monitor reports of West Nile Virus infection in infants and children. The prevention recommendations for pregnant and breastfeeding women are the same as for other people. Repellents with DEET are safe for pregnant and breastfeeding women.

There is no specific treatment available for West Nile virus infection itself. This is the case with many viruses. If a person develops severe West Nile disease (encephalitis or meningitis) it is very likely that they will have to be hospitalized. In many cases a person will need intensive supportive therapy such as good nursing care, intravenous (IV) fluids and respiratory support (ventilator). Some people who develop severe West Nile virus infection will need additional treatment to help them recover, such as physical and occupational therapy over the long term. Approximately 50 percent of people who have experienced severe disease have not been able to recover fully.

There is no West Nile virus vaccine for humans. The only vaccine currently available is for horses and other equine animals.

Prevention:

The main way to reduce your risk of infection with West Nile virus is by avoiding mosquito bites. This portion addresses ways that individuals, households and communities can reduce the risk of disease. These strategies involve repelling and excluding mosquitoes and managing the environment to reduce mosquito populations.

At least thirty-seven different mosquito species have been found to be infected with West Nile virus in the US. The most important species bite between dusk and dawn. An important way that individuals can reduce their risk is by applying insect repellent containing DEET while outdoors. DEET is the most effective and best-studied insect repellent available. DEET has been used in repellents for many years and is one of the most tested compounds because it is used directly on skin. Many of the most familiar insect repellant brands contain DEET; check the label to be sure. It's also important to look at the label for safety instructions. Always follow the "Directions for Use" on the package.

The higher the percentage of DEET a product contains the longer protection it gives, up to 50%. Repellents with more than 50% DEET are unlikely to offer additional protection.

It can be hard to get into the habit of using repellent, but make it easy for yourself – put repellant where you'll see it, or keep a small bottle in your bag or with sporting equipment. Remind other family members (especially those over 50) about the importance of using repellent.

Use enough repellent to cover exposed skin or clothing. Don't apply repellent under clothing. Heavy application is not necessary to achieve protection.

There are some basic safety tips to remember with repellent:

- Do not apply repellent to cuts, wounds, or irritated skin.
- After returning indoors, wash off treated skin with soap and water.
- Do not spray repellent in small, enclosed areas.
- Do not apply products directly to your face. Spray your hands and then rub them carefully over the face, avoiding eyes and mouth.

Repellents can be used safely on children, again always following the product instructions. Most guidelines cite that it is OK to use repellents on children over 2 years old, and to use products with a low concentration of DEET. Check with your physician if you have more questions about repellent use and children. Repellents with DEET are also safe for pregnant women, again following the product instructions. Some safety tips for using repellent with kids are:

- Do not allow young children to apply insect repellent to themselves. Have an adult help them and keep repellents out of reach of children.
- Apply repellent to your own hands and then rub it on your child. Avoid children's eyes and mouth.
- Do not apply repellent to children's hands, since kids tend to put their hands in their mouths.

Another type of repellent containing permethrin [PER-METH-RIN] can be applied to clothing, and it will repel mosquitoes for a long time, but don't apply permethrin directly to human skin.

Some non-DEET repellent products also provide some protection from mosquito bites. Studies have suggested that other products do not offer the same level of protection, or that protection does not last as long as products containing DEET. A soybean-oil-based product has been shown to provide protection for a period of time similar to low concentrations of DEET. Repellents that do not contain DEET no not offer the same level of protection from mosquito bites.

Another way to avoid mosquito bites is to wear long sleeve shirts, long pants and socks sprayed with repellent while outdoors. Though this may not always be practical, it can help provide extra protection during morning and evening, when mosquitoes are most likely to bite and when temperatures may be cooler.

Many mosquitoes bite between dusk and dawn. Be especially sure to use repellents and protective clothing or you may choose to limit time outdoors during these hours.

Some mosquitoes like to come indoors. Limit the time you and your family are at risk by fixing or installing window and door screens. Keep an eye out for older family members or neighbors that may need a hand in repairing screens, as well.

It's important to know that mosquitoes can lay their eggs in even a small amount of water. You may have lots of mosquitoes around your house because you have secret mosquito nurseries.

Look around your house or apartment every week for possible mosquito breeding places. You might be surprised how many places water can collect.

- Empty water from buckets, cans, pool covers, flowerpots and other items.
- Throw away or cover up stored tires and other items that aren't being used.
- Clean pet water bowls weekly.
- Check if rain gutters are clogged, and clean them if necessary.
- If you store water outside or have a well, make sure it's covered up.

Encourage your neighbors to check for breeding sites as well.

There are additional steps that communities can take to reduce the risk for all citizens. Many areas have held community clean-up days to remove trash that can be possible mosquito breeding sites, and to collect tires and other large items that people need to discard. This can be an excellent project for youth groups.

Encourage the use of repellent at outdoor summer events, such as festivals and baseball games.

Some municipalities and counties also have programs to conduct mosquito control. These programs can take many different forms, and ideally they identify important sites for mosquito and virus activity in order to target control efforts. Control efforts can include source reduction – reducing potential breeding areas, "larviciding" - using products to control immature mosquitoes, and 'adulticiding" – using chemical products to kill adult mosquitoes. Check with your local health department to see whether a mosquito abatement district or control program is active in your area. The American Mosquito Control Association can provide information on how to organize a program if one does not currently exist.

Another way that people can help their communities is through reporting dead birds to local health departments. This helps officials track West Nile virus. Check with your local or state health department to find out their policy for reporting dead birds; some areas stop collecting birds after activity has been adequately documented.

Animal Infection

Equine Animals

Equine animals, including horses, mules, donkeys and ponies, are the domesticated animals most susceptible to West Nile Virus. In 2002, over 14,000 equine animals were reported and confirmed as infected with West Nile Virus in the United States.

While we will refer specifically to horses, the information in this program pertains to all equine animals. This program reflects information that is current as of the summer of 2003.

Not all horses that are exposed to the West Nile Virus become ill. Those that do become ill could develop signs including stumbling and weakness. Some animals display muscular twitching on the face, neck or forelimbs along with depression, fever or paralysis. If you observe these signs in your horse, contact your veterinarian.

There are no specific treatments for West Nile Virus infection but there are drug treatments that will aid in the recovery of the horse, so it is important to have your horse examined by a veterinarian if it shows signs consistent with West Nile Virus infection. If a horse develops a severe form of the disease it may lie down and become unable to rise. A sling can help the horse to stand.

Experience indicates that approximately 30% of horses that develop disease from West Nile Virus infection will die or need to be euthanized. Most surviving animals recover completely, but some may show lasting neurological effects.

Fortunately, a West Nile Virus vaccine is available for horses. The killed virus vaccine has been found to be effective and was fully licensed in February of 2003. Currently, the vaccine is available only through veterinarians.

The initial vaccination requires two shots spaced 3 to 6 weeks apart. An additional 4 weeks are needed for immunity to build. This means the vaccination process should begin in Spring before the onset of the mosquito season. Work with your veterinarian to develop the best vaccination plan for your horses.

Annual boosters are required prior to the start of mosquito season. Because the length of prevention from this vaccine is still being determined, a second booster in mid-summer may be recommended in temperate climates for areas experiencing intense West Nile Virus activity. If mosquito season is year round, then multiple boosters of vaccine may be required through the year. Work with your veterinarian to develop the best plan for your region of the country and for your horse or equine.

The vaccine has not been licensed for use in pregnant mares but has been used extensively to protect brood mares from West Nile Virus infection. Vaccination programs for young foals should begin at the age of 2 to 4 months, depending on the vaccination history of the foal's mother.

Three doses of vaccine are recommended for the initial series of immunization for your foal. Again, work with your veterinarian to develop the appropriate plan for your pregnant mare or foal.

Vaccination is a critical tool for protection of horses living in West Nile Virus affected areas. West Nile Virus vaccinations are likely to become part of routine equine health maintenance.

Horses, like humans, get West Nile Virus by being bitten by disease-carrying mosquitoes. Horses cannot contract West Nile Virus through contact with a horse that has the disease.

Mosquito control should be part of every horse owner's West Nile Virus prevention program.

Try to eliminate standing water that could serve as mosquito breeding habitat. This includes buckets, puddles, old tires or other outdoor containers. Clean your gutters to ensure proper drainage.

Change the water in your stock tank at least once a week. If you cannot change the water, consider treating the water with a Bti dunk. The Bti dunk contains a bacterial toxin that will kill mosquito larvae but does not harm horses. Consult your veterinarian regarding their recommendations on this product before implementing it for your horses. You will need to sink the dunk so your horse does not try to eat it.

If you have ponds with standing water, stock them with top-feeding fish such as minnows. The fish feed on mosquito larvae and help control mosquito populations.

Fans installed inside barns can keep air moving, which discourages mosquito activity. Turn off your barn lights at night.

Mosquito repellants containing at least 35% DEET or permethrin can also help to control mosquito exposure. It is best to apply the insect repellant during times of intense mosquito feeding at dawn and dusk.

While these mosquito control measures provide added protection to both you and your animals, they are not a substitute for vaccination.

Work with your veterinarian in designing the optimal West Nile Virus protection plan for your animals. Make vaccinations part of a routine equine health program, take measures to reduce mosquito exposure, and your animals will have a good chance of avoiding this disease.

Other Animals, Dogs and Cats

Infection in horses and other equine animals is an important impact of West Nile virus. Many people are also concerned about other animals. While there is a vaccine available for horses, it is only licensed for use in equine animals and there are no data to suggest that it would be effective in preventing illness in other types of animals.

Dogs and cats can become infected with West Nile virus. The primary route of transmission is through the bite of an infected mosquito, the same as with humans. Evidence suggests that illness is very unlikely in otherwise healthy dogs or cats, however.

This means that West Nile virus is not considered a likely health threat for dogs and cats.

If you are concerned about West Nile virus, and plan to use a repellant on your pet, please discuss it with your veterinarian in order to find the appropriate product to use. Repellants made for people are usually not appropriate for pets that may ingest them by licking.

Pet birds
Many species of birds can become ill and even die when infected with West Nile virus. Try to keep pet birds where they cannot be bitten by mosquitoes, if at all possible, or consider screening cages that are outdoors, and reducing any possible mosquito breeding sites near outdoor bird cages. You can check with your veterinarian and pet bird societies for more information.

Other animals
West Nile virus has been found in other types of animals, such as squirrels, rabbits, skunks, and alligators. Wildlife and health authorities are working to better understand how infection affects these animals.

Conclusion:

Many people ask what to expect in the future from West Nile Virus. All indications are that the virus is here in North America to stay. Because of the complex ecology – involving birds, mosquitoes, variations in climate and locale environments – it is not possible to predict what might happen in any particular mosquito season, but it is best to think that we will continue to see human cases, with areas of activity possibly changing from year to year.

It is also likely that health authorities and scientists will learn more about the virus and how it affects people and animals. You can always get the latest information about West Nile virus through local and state health departments, and the Centers for Disease Control and Prevention.

Authorities will continue to monitor the virus – often referred to as surveillance – and the people, birds, animals and mosquitoes that are affected. Because this virus is so new to North America – only having been recognized here in 1999 -- these monitoring activities are important to help scientists understand how the virus will behave in this environment.

A great deal of research is underway by scientists in government, universities and industry to further our ability to prevent and control West Nile virus.

So how should people think of West Nile virus? This is a health threat that we should take seriously. People over age 50, especially, need to be on their guard about prevention. The good news is that there are steps that people can take personally, at the household level and in the community to reduce the risk of infection.