West Nile Virus Vaccination Guidelines

Developed by the American Association of Equine Practitioners

This information is intended as a supplement to the AAEP's Guidelines for Vaccination of Horses (January 2001). Practitioners are directed to consult this publication as the following discussion is to be read in conjunction with those general guidelines for vaccination.

West Nile virus (WNV) infection was first diagnosed in horses in the United States in 1999 and is now an important consideration in the differential diagnosis of horses presenting with signs of neurologic disease in all areas of North America. West Nile virus, a flavivirus, was first identified as a cause of infection and fatal encephalomyelitis (inflammation of the spinal cord and brain) in horses and people in Egypt, Uganda and France in the early 1960's. Further epizootics of disease in horses have occurred in Morocco in 1996, Italy in 1998, France in 2000, and the United States from 1999 to the present. West Nile virus is now considered to be endemic in all areas of North America.

The flaviviruses, like the other encephalomyelitis viruses, are transmitted by mosquitoes, and infrequently by other bloodsucking insects, to horses, human beings, and a number of other mammals from avian hosts, which serve as natural reservoirs for these viruses in nature. Horses and humans are considered to be dead-end hosts of the West Nile virus and, therefore, do not contribute to the transmission cycle. The virus is not directly contagious from horse to horse or horse to human. Similarly, indirect transmission via mosquitoes from infected horses is highly unlikely because horses do not experience a significant viremia (i.e. they have negligible amounts of virus circulating in their blood).

The incubation period for West Nile virus in horses appears to be 3 to15 days. Clinical signs of WNV infection in horses may include fever, ataxia (stumbling or incoordination), depression or apprehension, stupor, behavioral changes, weakness of limbs, partial paralysis, droopy lip, teeth grinding, muscle twitching, fasciculation and tremors, difficulty rising, recumbency (inability to rise), convulsions, blindness, colic, and intermittent lameness, or death. The mortality rate for horses exhibiting clinical signs of West Nile virus infection is approximately 33%. Data has supported that 40 % of horses that survive the acute illness caused by WNV still exhibit residual effects, such as gait and behavioral abnormalities that were attributed to the illness by owners, 6 months post diagnosis.

The variable clinical signs associated with WNV infection necessitate inclusion of many neurological disorders in the differential diagnoses. These include: rabies; equine protozoal myeloencephalitis (EPM); equine herpesvirus-1; botulism; eastern, western and Venezuelan encephalomyelitis (EEE,WEE,VEE); heat stress; trauma; bacterial meningitis; cervical vertebral myelopathy (wobbler syndrome); myeloencephalopathy; and equine degenerative myelopathy.

Serologic tests used to diagnose WNV include plaque reduction neutralization (PRNT), virus neutralization, hemagglutination inhibition, complement fixation, ELISA and antigen (IgM and IgG) capture ELISA. Virus can also be identified in central nervous system tissue using techniques such as virus isolation, PCR and immunohistochemistry. The IgM-capture ELISA is

currently the most reliable test for confirmation of recent exposure to West Nile Virus in a horse exhibiting clinical signs. Horses exposed to WNV typically develop a sharp rise in West Nile virus-specific IgM antibody that persists for 4-6 weeks after infection. Little IgM is demonstrated in horses that are recently vaccinated. The antibody measured by the PRNT is stimulated both by vaccination and recent exposure, making this test difficult to interpret in the suspect horse.

Risk of exposure and geographic distribution of West Nile virus vary from year to year with changes in distribution of insect vectors and reservoirs of the virus. Because of the unpredictable nature of those factors and the effects of the disease, it is recommended that all horses in North America be immunized against West Nile virus.

Preventive management practices may minimize the risk of the spread and transmission of West Nile virus from infected mosquitoes. Reduction of mosquito numbers and exposure can be achieved by reducing or eliminating any stagnant or standing water in your area, removing old tires, keeping horses in the barns from dusk to dawn (prime mosquito feeding times), setting out mosquito traps, keeping air moving with fans, and removing organic debris (muck) promptly. Chemical controls include the use of topical anti-mosquito repellent agents approved for the horse and use of mosquito dunks in areas of standing water.

Vaccination is the primary method of reducing the risk of infection from West Nile virus to the horse but clinical disease is not fully prevented. Vaccination with one of the commercially available licensed vaccines is recommended for all horses residing in those areas of North America where the disease occurs. Of the licensed vaccines currently available, one is monovalent or multivalent inactivated and the other is a live canarypox vector vaccine. These available vaccines have been tested with a challenge model and have been proven to be effective as an aid in the prevention of viremia in experimentally infected vaccinated horses compared to nonvaccinated control horses for as long as 12 months after primary vaccination with two doses of vaccine. Following the label instructions, primary vaccination of previously non-vaccinated horses involves administration of 2 doses of vaccine 3 to 6 weeks apart. In endemic areas, boosters are required or warranted according to local conditions conducive to disease risk. Vaccinate semi-annually or more frequently (every 4 months), depending on risk. Annual revaccination is best completed in the spring, prior to the onset of peak insect vector season.

While neither of the licensed vaccines is labeled for administration to pregnant mares at this time, it is recommended that mares be ideally vaccinated before breeding when possible. However, practitioners have vaccinated thousands of pregnant mares due to the risk associated with pregnant mares getting the disease from infected mosquitoes. It has been accepted practice by many veterinarians to administer vaccines to pregnant mares on the assumption that the risk of adverse consequences of WNV infection outweighs any reported adverse effects of use of vaccines in pregnant mares. Booster vaccination of pregnant mares 4 to 6 weeks before foaling provides augmented passive colostral protection to their foals, lasting for 3-4 months.

Primary vaccination of foals from vaccinated mares should be started at 3-4 months of age in order to avoid interference from colostral antibodies. Foals from non-vaccinated mares may be vaccinated earlier than three months of age as they may not have colostral interference issues; however, data on which to base more specific recommendations for foals from non-vaccinated mares is not sufficient at this time. Foals should be revaccinated at 1 year of age (in the Spring of the year following their birth) to ensure adequate protection. Because of the high mortality

associated with West Nile virus, it is recommended that foals born in areas where there is a high risk of exposure to West Nile virus should receive an initial series of three (3) doses of vaccine against West Nile beginning at 3 months of age and at 4- to 6- week intervals. The third dose may go at an interval of 8-10 weeks if desired, followed by a fourth dose at 1 year of age.

Many veterinarians, in Southern states where mosquitoes are active year-round, prefer to vaccinate horses semiannually or more frequently to help ensure uniform protection throughout the year, although this practice is not specifically recommended by manufacturers of vaccines. Horses that have been naturally infected with the disease should be vaccinated one year after the acute illness. Although the ability of horses to become re-infected with WNV is unknown at this time, horses that have been naturally infected with WNV may be included in a routine vaccination program as previously described.

West Nile Virus Vaccination Schedule

Foals/Weanlings	Yearlings	Performance Horses	Pleasure Horses	Broodmares	Comments
First dose: 3 to 4 months. Second dose: 1 month later (plus 3rd dose at 6 months in endemic areas).	Annual booster, prior to expected risk. Vaccinate semi-annually or more frequently (every 4 months), depending on risk.	Annual booster, prior to expected risk. Vaccinate semi-annually or more frequently (every 4 months), depending on risk.	Annual booster, prior to expected risk. Vaccinate semi-annually or more frequently (every 4 months), depending on risk.	Annual, 4 to 6 weeks prepartum (see full text in guidelines).	Annual booster is after primary series. In endemic areas, booster as required or warranted due to local conditions conducive to disease risk. Vaccinate semi-annually or more frequently (every 4 months), depending on risk.

Note: As with the administration of all medications, the label and product insert should be read before the administration of all vaccines.

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