WEST NILE VIRUS IN FLORIDA: AN UPDATE

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HISTORY OF WEST NILE VIRUS IN FLORIDA

In 2001, 492 equine cases of West Nile virus (WNV) were reported in Florida, representing 66% of all WNV cases in the United States; 169 cases were documented in 2002 and 114 cases in 2003. Reported cases were symptomatic animals. It is unknown what percentage of the equine population seroconverted while experiencing minimal or no symptoms. Fort Dodge Animal Health was granted conditional licensure for a killed virus vaccine in August 2001 (West Nile-Innovator™, Ft. Dodge Animal Health; Iowa, USA). Due to limited supply, vaccine distribution was directed to geographic areas experiencing virus activity. The vaccine was made available to Florida veterinarians in early September 2001. Horses received 2 initial doses of vaccine 3–6 weeks apart with protective antibody titres developing approximately 2–3 weeks following the second vaccination. Horses which received vaccine at the outset of availability could not have developed immunity until early November. One may conclude the cases which developed in 2001 reflected the introduction of WNV into an immunlogically naïve population. Throughout September and October 2001 50% of WNV cases treated at the University of Florida College of Veterinary Medicine had received 1 dose of vaccine, leading to industry-wide speculation about vaccine efficacy (Long *et al.* 2002). It is likely that the affected animals were exposed to WNV prior to developing protective titres in response to vaccination.

FDA conditional licensure permits product distribution only to licensed veterinarians. WNV vaccine was not sold directly to consumers through catalogues or farm supply retail outlets. This restriction on distribution may have significantly limited vaccine administration, particularly in rural areas which may not be adequately serviced by veterinarians. Florida's 2002–2003 caseload occurred in unvaccinated horses, horses which had not received both initial vaccinations, and multivaccinated horses which had been vaccinated 6 or more months previously (M. Long, personal communication). It is based on the last class of case horses that vaccination is recommended every 4–6 months in a climate with a year round mosquito population. Seasonality of mosquito population must be considered in determining an appropriate vaccination frequency and interval. In a climate which experiences, on average, 5 months of freezing temperatures it would be advisable to vaccinate for West Nile Virus one month prior to the insect season and revaccinate 3–4 months later, rather than vaccinating at strict 6 month intervals. There is no need for protective antibody titres when there are no mosquitoes.

Eighty eight percent of cases occurred July–September. Freezing temperatures are rare in Florida, permitting active year round mosquito populations. It is therefore interesting to note the clustering of cases in the late summer months. Following the availability of vaccine, the overall number of cases declined; the seasonal case distribution pattern remained consistent. This seasonal incidence may reflect migratory patterns of reservoir birds or peaks in mosquito population.

Despite antibody detection in sentinel chickens statewide, more than 70% of equine WNV cases occurred in the northern half of Florida which houses less than 50% of the state's equine population (Comenetz 1997). This geographic case distribution most likely reflects diversion of government provided mosquito control services to urban and suburban areas with high density human populations (and thus greater demand for mosquito abatement). The risk of mosquito exposure is higher in rural, less densely populated communities.

WNV PREVENTION AT THE RACETRACK

To date there have been no cases of WNV at Florida racetracks. Informal surveys of racetrack veterinarians indicate a 75–80% vaccination rate within the racing population. Vaccine reactions

have been reported to be minimal with few horses missing training post vaccination. Trainers who elected not to vaccinate cited cost as a deterrent. Among horsemen, the perceived risk of WNV disease is minimal as no cases have occurred within the population and thus they do not believe the expense can be justified.

Racetrack managements have recommended vaccination but, as the horse is a dead-end host, no vaccination requirements have been established. Likewise, no travel restrictions have been placed on horses originating in areas experiencing WNV disease. The presence of a WNV infection in a horse does not inherently increase the risk of WNV disease to other horses in the population.

VECTOR CONTROL

Racetrack managements' prevention efforts include minimising mosquito breeding sites by spraying, improving drainage and educating horsemen. Mosquito abatement requires a coordinated effort over a large geographic region as Culex mosquitoes may travel up to 17 miles to feed (Reisen 1993). Mosquito control directed at the larval stage will be more effective than attempts to minimise adult airborne populations. It is important that racetrack management maintains communication and cooperation with local government agencies to maximise mosquito control and avoid duplication of efforts.

Mosquito exposure was decreased by the use of fans and overhead insect repellant spraying systems. In Florida's subtropical climate, topical application of water based insect repellant is of minimal benefit as its efficacy is diminished by sweating and ultraviolet radiation. Oil based products are contraindicated as they impair convective and evaporative cooling. The Mosquito Deleto (The Coleman Company, Kansas, USA) is a propane fueled unit which emits a pheromone, heat and carbon dioxide to attract mosquitoes to a trap in which they are exterminated. These units are reported to eradicate adult mosquitoes from an area up to half an acre in size.

AVIAN CONTROL

WNV has been detected in 138 avian species. The crow is commonly implicated in disease transmission but it is not known in which other avian species the virus amplifies and from which WNV may be transmitted (Turell *et al.* 2001). As several avian species from which WNV has been isolated are protected under state and federal law, population and/or habitat manipulation is not an option in WNV containment. WNV has also been isolated from reptiles and other mammals. Their role in virus spread has not been determined. Florida is along the migratory route of many avian species. Any attempts to alter those populations or their flyways may have serious ecologic impact elsewhere in the Americas and Canada. It is not feasible to contain WNV through management of avian hosts.

CONCLUSION

While efforts to manage mosquito populations and minimise mosquito exposure should not be overlooked, vaccination remains the most practical and reliable method of WNV disease prevention in horses. Effective immunisation through vaccination will require exposure risk assessment and ongoing virus surveillance. Each susceptible equine population is unique and vaccination protocols should be customised to provide maximal protection.

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RECOMMENDED READING LIST

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