

West Nile Virus in New Mexico, 2003

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West Nile Virus (WNV) was first identified from an infected person in the West Nile district of Uganda in 1937. The virus had only been found in Africa, Asia, the Middle East and Eastern Europe until 1999. WNV was first detected in New York City in 1999 and has spread steadily westward across the United States.

In New Mexico, the virus was first detected in August of 2002 in two horses from Quay and Curry counties. By October the virus had been detected in Bernalillo, Sandoval and Dona Ana counties and was confirmed in 78 horses from 14 eastern and central New Mexico counties and in two birds from Sandoval and Chaves counties. No human cases were detected and no mosquito pools tested positive for WNV in New Mexico in 2002. Nationally, 4,156 human cases with 284 deaths were reported in 2002 with Illinois reporting the greatest number of cases (884). Because WNV had gained a toehold in New Mexico, steps were taken to enhance public education programs and to increase surveillance activities for 2003. The Scientific Laboratory Division added serologic testing of human specimens to their mosquito testing program and Veterinary Diagnostic Services, New Mexico Department of Agriculture, added serologic testing of equine specimens. This report provides the results of human, equine, and mosquito surveillance for WNV in New Mexico in 2003.

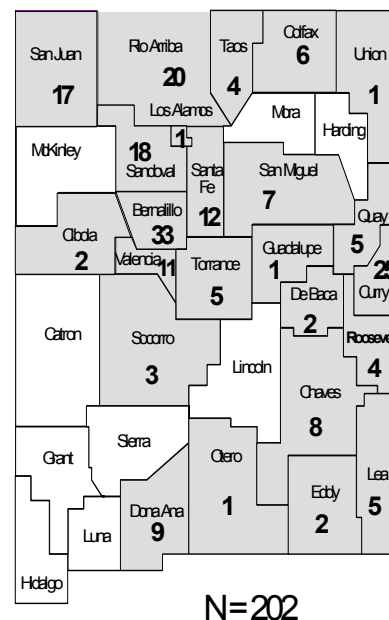
Human Surveillance

The first case of WNV acquired in-state occurred in a 42 year-old man from Bernalillo County who had illness onset on July 9, 2003. As of November 21, 202 human cases had been laboratory confirmed. Seventy cases were classified as severe infections with either meningitis or encephalitis. Many of these severe cases will likely have long-term neurological

sequelae. The state confirmed four fatal cases of WNV: a 78-year-old man from Chaves County, an 88-year-old woman from Sandoval County, and a 76-year-old woman and an 80-year-old woman both from San Miguel County.

Figure 1 is a map of the total number of human cases by county. Foci of activity included northcentral and northwestern New Mexico (Bernalillo, Sandoval, Santa Fe, and San Juan counties), eastern New Mexico (Curry, Chaves, and Colfax counties) and Dona Ana County in the south. Anecdotally, human cases appeared to be more concentrated in areas near irrigation ditches where mosquito-breeding sites were

Figure 1. Human Cases of West Nile Virus, New Mexico, 2003



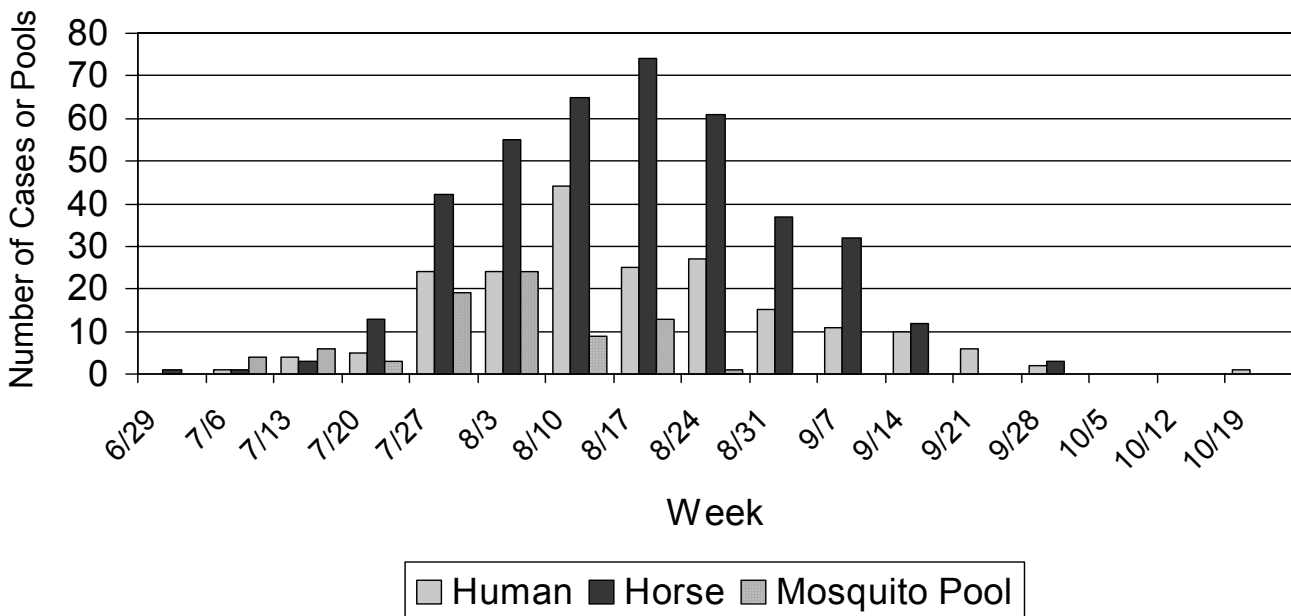
more numerous. Since the state laboratory only tested samples from individuals with severe illness (evidence of meningitis or encephalitis), many people without insurance were not tested at commercial laboratories due to the prohibitive costs (over \$100 per test in some instances). This led to a bias among less severe cases because the likelihood of diagnosis was dependent on the ability to pay for the test. Figure 2 shows cases by week of onset in New Mexico, with a peak number of human cases during the week of August 10 through August 16. With an average incubation period for human cases of around 7 days (range from 3 to 14 days), mosquito bite exposure for cases from this week was around the first week of August. Figure 3 presents severe (meningitis or encephalitis) and less severe (fever) cases. Fever cases had a median age of 47 years (range 3 - 87

years), while meningitis/encephalitis cases had a median age of 53.5 years (range 4 - 93 years). This is consistent with previous national findings that showed older age as a risk factor for more severe illness and death.

Equine Surveillance

The first indication of the recurrence of WNV in NM in 2003 was a positive lab report from a horse from Sierra County that had become sick July 2. This was 6 weeks earlier than the first reported case of WNV in the state in 2002. By the end of the mosquito season, over 400 horse cases had been reported from all counties except DeBaca, Harding, and Hidalgo counties.

Figure 2. WNV Human, Horse and Mosquito by Onset Week, New Mexico, 2003



Clinical signs of WNV encephalitis in horses include ataxia or stumbling and incoordination; depression or apprehension; weakness of limbs, partial paralysis, or the inability to stand; muscle twitching; and death. Horses may become infected without showing any clinical signs. Fever is not a common sign. Supportive care is the only treatment once a horse becomes infected. The fatality rate of WNV encephalitis in horses has been estimated at 25 to 40%. For horses that survive, a full recovery is likely. A vaccine with proven efficacy was available for use, but many horse owners chose not to have their horses vaccinated.

Mosquito Surveillance

Adult mosquito surveillance was conducted periodically in 17 counties: Bernalillo, Chaves, Cibola, Colfax, Curry, Dona Ana, Eddy, Los Alamos, Luna, Otero, Rio Arriba, Sandoval, San Juan, Santa Fe, Sierra, Socorro, and Valencia. Surveillance was initiated beginning the third week in May and continued until the second week in October when, due to low temperatures, mosquito activity subsided and the survey was terminated. Surveillance was accomplished by using light traps and gravid traps to collect adult mosquitoes. During this 21-week period, 12,069 mosquitoes were tested. One to 50 mosquitoes were pooled according to species, date, and location of collection. Seventy-nine of 680 (12%) mosquito pools were positive for WNV. The positive pools were recovered from all of the 17 counties, except for Cibola and Los Alamos counties. It was not until the second week of July that the first WNV positive mosquito pool was recovered and positive pools were recovered on successive weeks through the fourth week of August. During this 7-week period, the greatest number of WNV positive pools was reported during the first week of August (Figure 2).

Twenty-two species of mosquitoes were collected and tested, but only three species *Culex quinquefasciatus*, *Culex salinarius*, and *Culex tarsalis* tested positive for WNV. These three species accounted for 15%, 35%, and 22%,

respectively, of the 22 species tested. Together these three species comprised 72% (8,733) of the number of mosquitoes tested (12,069). These species have the ability to feed on birds maintaining WNV in bird populations and to feed on numerous animal species including horses, humans, and birds, thus serving as a bridge for the virus to move from bird to mammal. They also have a close association with humans resulting in an increased risk of contracting WNV. *Culex quinquefasciatus*, known as the southern house mosquito, breeds in sewers, storm drains and other areas of impounded water found in urban settings. *Culex tarsalis* is associated with agricultural areas where irrigation provides a water source for breeding, and therefore poses a risk to the rural population. *Culex salinarius* readily bites and occasionally enters dwellings to feed on humans. All three species have overwintering mechanisms so that infected females will survive and become active with increasing temperatures in the spring.

Conclusion

While there are limitations to WNV surveillance, it provided a valid description of WNV in NM during 2003. Surveillance for human disease, equine disease, and infection in mosquitoes will continue in 2004 in New Mexico. It is unknown if the number of WNV cases in 2004 will exceed the number for 2003. When looking at states that have had WNV for several years, some have shown a large decrease in human cases after having a large number of cases the previous year while others had even larger numbers of cases the second or third year after the virus was first detected in their state. Health care providers also need to be aware that serologic testing for WNV becomes more complicated after it has become endemic in an area, possibly requiring both acute and convalescent sera as IgM antibodies can persist in a high percentage of infected individuals for over a year.

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Figure 3. Human WNV Cases by Age Group and Clinical Syndrome, New Mexico, 2003

