West Nile Virus Activity—United States, 2009

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3 figures omitted

West Nile virus (WNV) was first detected in the Western Hemisphere in 1999 in New York City and has since caused seasonal epidemics of febrile illness and neurologic disease across the United States, where it is now the leading cause of arboviral encephalitis.1 This report updates a previous report2 and summarizes WNV activity in the United States reported to CDC in 2009. A total of 38 states and the District of Columbia (DC) reported 720 cases of WNV disease. Of these, 33 states and DC reported 386 cases of WNV neuroinvasive disease, for an incidence of 0.13 per 100,000 population. The five states with the highest incidence of WNV neuroinvasive disease were Mississippi (1.05 per 100,000), South Dakota (0.74), Wyoming (0.73), Colorado (0.72), and Nebraska (0.61). Neuroinvasive disease incidence greatly by jurisdiction, depending on disease awareness, health-care—seeking behaviors, and testing practices. Therefore, this report focuses on WNV neuroinvasive disease cases, which are thought to be identified and reported more consistently because of the severity of the illness. In addition to human disease cases, ArboNET captures data on presumptively viremic blood donors (PVDs), veterinary cases, and WNV infections in sentinel animals (most commonly chickens), dead birds, and mosquitoes. Not all jurisdictions conduct nonhuman surveillance.

Human Surveillance
During 2009, a total of 720 cases of WNV disease were reported from 262 counties in 38 states and DC. Of these 720 cases, 386 (54%) were reported as WNV neuroinvasive disease and 334 (46%) as nonneuroinvasive disease. A total of 116 PVDs, identified through routine screening of the blood supply, also were reported. Of these PVDs, 92 (79%) were asymptomatic, 23 (20%) developed nonneuroinvasive disease, and one (1%) subsequently developed neuroinvasive disease. PVDs who developed symptomatic disease were included in disease case counts.

The 386 reported cases of neuroinvasive disease represented a rate of 0.13 per 100,000 population in the United States, based on July 1, 2009 U.S. Census population estimates. States reporting the most WNV neuroinvasive disease cases were Texas with 93 (24% of U.S. cases) and California with 67 (17%). Washington, which reported only two neuroinvasive disease cases in 2008, reported 26 (7%) cases in 2009. The five states with the highest incidence were Mississippi (31 cases, 1.05 cases per 100,000 residents), South Dakota (six cases, 0.74), Wyoming (four cases, 0.73), Colorado (36 cases, 0.72), and Nebraska (11 cases, 0.61). WNV neuroinvasive disease peaked in the United States during mid-August, and 352 (91%) of the 386 cases were reported during July—September. This seasonality was consistent with trends observed over the preceding 10 years.2

Of the 386 neuroinvasive disease cases, 226 (59%) occurred in males. The median age of patients was 60 years (range: 2-91 years), with increasing incidence among persons in older age groups. Overall, 368 (95%) patients with neuroinvasive disease were hospitalized, and 32 (8.3%) died (median age: 72 years; range: 19-89 years). A total of 229 (59%) neuroinvasive disease cases were classified as encephalitis, 117 (30%) as meningitis, and 40 (10%) as acute flaccid paralysis; 27 (68%) of the 40 cases classified as acute flaccid paralysis had coincident encephalitis or meningitis.

Serologic surveys indicate that for every case of WNV neuroinvasive disease there are approximately 140 infections and approximately 20% of infected persons develop nonneuroinvasive disease.3 Using the 386 reported neuroinvasive disease cases, CDC estimated that 54,000 infections and 10,000 cases of WNV nonneuroinvasive disease occurred in the United States in 2009. Only 334 nonneuroinvasive disease cases were reported to ArboNET in 2009, representing approximately 3% of the estimated number.

Animal Surveillance
Of 298 reported veterinary cases of WNV disease, 275 (92%) occurred in equines and 23 (8%) occurred in other species: squirrels, 13; canines, eight;
Since introduced into the United States in 1999, West Nile virus (WNV) has become the leading cause of arboviral encephalitis in the country.

What is already known on this topic?
Since 1999, West Nile virus (WNV) has become the leading cause of arboviral encephalitis in the country.

What is added by this report?
In 2009, 386 cases of WNV neuroinvasive disease were reported in the United States, or 0.13 cases per 100,000 population, the lowest incidence recorded since 2001; however, CDC also estimated that 54,000 persons were infected with WNV in 2009, including 10,000 with non-neuroinvasive WNV disease.

What are the implications for public health practice?
The continuing disease burden caused by WNV affirms the need for ongoing surveillance, mosquito control, promotion of personal protection from mosquito bites, and research into additional prevention strategies.

CDC Editorial Note: Since introduced into the United States in 1999, WNV has become the leading cause of arboviral encephalitis in the country. However, in 2009, the reported incidence of WNV neuroinvasive disease in the United States was 0.13 per 100,000 population, the lowest recorded since 2001. During 2004-2007, WNV had appeared to reach a stable incidence of approximately 0.4 per 100,000. However, incidence dropped to 0.2 per 100,000 in 2008 and continued to decline in 2009. This trend might be attributed to variation in populations of vectors and vertebrate hosts, accumulation of immunity in avian amplifying hosts, human behavior (e.g., use of repellents and protective clothing), community-level interventions, reporting practices, or environmental factors (e.g., temperature and rainfall). In 2009, evidence of WNV human disease again was detected in all geographic regions of the continental United States. The highest incidence of WNV neuroinvasive disease continued to occur mainly in the west-central United States, likely because of the high efficiency of Cx. tarsalis as a WNV vector. Mississippi (31 cases, 1.05 cases per 100,000) continued to be among those states with the highest incidence of WNV neuroinvasive disease. Arizona, which had the second highest incidence of WNV neuroinvasive disease in 2008 (62 cases, 1.0 per 100,000), reported an 81% decrease in cases with 12 cases and an incidence of only 0.18 per 100,000 in 2009. After reporting its first two neuroinvasive disease cases in 2008, Washington reported the seventh highest state incidence in 2009 (26 cases, 0.39 per 100,000). These findings illustrate the wide annual variability and locality of WNV transmission.

The findings in this report are subject to at least two limitations. First, ArboNET is a passive surveillance system that depends on clinicians to consider the diagnosis of an arboviral disease, obtain the appropriate diagnostic test, and report any positive results. Diagnosis and reporting likely are incomplete, leading to underestimation of the true incidence of disease. Second, arboviral surveillance programs, testing capacity, and reporting can vary by county, state, or region, affecting incidence estimates.

In the absence of an effective human vaccine, prevention of WNV disease depends on community-level mosquito control and promotion of personal protective measures. Such measures include use of mosquito repellents, barrier protection (e.g., long-sleeved shirts, long pants, and socks), avoiding outdoor exposure, or using personal protection from dusk to dawn. Household measures, such as window screens and covering or draining peridomestic water-holding containers can further decrease the risk for WNV exposure.

Dengue surveillance and diagnosis

After the Council of State and Territorial Epidemiologists (CSTE) recommended addition of dengue to the list of nationally notifiable diseases, in January 2010, CDC added dengue to the list. Public health jurisdictions are encouraged to report cases through the ArboNET system. Health-care providers are encouraged to submit specimens to the CDC Dengue Branch for diagnostic testing, as follows:

- Obtain an acute phase (0–5 days after onset of symptoms) serum sample, for directly detecting dengue virus.
- Obtain a convalescent phase serum sample, preferably 1–2 weeks after the first sample, for detecting antidengue antibody. Serologic testing can detect diagnostic levels of antidengue immunoglobulin M antibody for approximately 30 days after symptom onset and longer in some patients.
- To obtain viral identification and serologic diagnosis, send specimens through state or territorial health departments to the Dengue Branch, Division of Vector-Borne Infectious Diseases, National Center for Infectious Diseases, 1324 Calle Cana-da, San Juan, PR 00920-3860; telephone 787-706-2399; fax 787-706-2496.
- Attach a summary of clinical and epidemiologic information to all serum samples; be sure to include date of disease onset, date of sample collection, and detailed recent travel history.

Additional information is available at http://www.cdc.gov/dengue/resources/testpoldeng_2.pdf.

Travel-Associated Dengue Surveillance—United States, 2006-2008

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1 figure, 2 tables omitted

DENGUE IS CAUSED BY FOUR ANTIGENICALLY RELATED VIRUSES (DENV-1, DENV-2, DENV-3, and DENV-4). Dengue fever is endemic in most tropical and subtropical areas of the world, and in 2007 nearly 1 million cases were reported in the Americas alone. Dengue infections commonly occur among U.S. residents returning from travel to endemic areas and are more prevalent than malaria among returning travelers from the Caribbean, South America, South Central Asia, and Southeast Asia. This report summarizes information about dengue cases reported to CDC through two CDC-maintained passive surveillance systems: (1) the ArboNET surveillance system, a national CDC arboviral surveillance system maintained by CDC’s Arboviral Dis-

Acknowledgments

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REFERENCES


† A sample of mosquitoes (usually no more than 50) of the same species and sex, collected within a defined sampling area and period.