

# **Maryland Arbovirus Surveillance Annual Summary Report 2011**

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Center for Zoonotic and Vector-borne Diseases  
Office of Infectious Diseases, Outbreak, and Emergency Response

Infectious Disease and Environmental Health Administration  
Maryland Department of Health and Mental Hygiene

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## **Introduction**

Since the first appearance of West Nile virus (WNV) in the Western hemisphere in the fall of 1999, the virus has spread among human and non-human populations across North America and remains a communicable disease of public health importance both in Maryland and the US. Each year the state of Maryland conducts surveillance for WNV and other arboviruses to monitor arboviral activity in the state through a systematic process involving a partnership between state agencies and external partners.

The Maryland Department of Health and Mental Hygiene (DHMH), in collaboration with the Maryland Departments of Agriculture (MDA) and Natural Resources (DNR), the U.S. Department of Defense (DoD) and the Maryland Zoo in Baltimore, implemented an arboviral surveillance system that consists of four major components: mosquito, avian, veterinary, and human.

This report is prepared as part of the Maryland Arbovirus Surveillance and Management Plan 2011, and summarizes results of the 2011 arbovirus surveillance and control season in Maryland.

## **Summary of Surveillance Findings**

The DHMH Office of Infectious Disease Epidemiology and Outbreak Response (OIDEOR) works with the DHMH Laboratories Administration, MDA and DNR to coordinate the collection and testing of specimens and the reporting of WNV and other arboviral infections in humans and animals in Maryland.

During the 2011 surveillance season (July 1 through October 31, 2011), state officials identified West Nile virus and other arboviral activity in human and animal populations. West Nile virus was detected in 19 humans, 15 mosquito pools, two horses, and eight birds. Other arboviral activity included six Cache Valley Virus-positive mosquito pools and one human SLE case.

## **West Nile Virus Surveillance**

On July 1, 2011, DHMH issued updated guidelines to all 24 local health departments describing the state's enhanced passive surveillance for human encephalitis and aseptic meningitis cases in order to confirm or rule out arboviruses as the etiology. Infection control personnel (ICPs) and emergency department directors of acute care hospitals were requested to report any suspected, probable, or confirmed encephalitis or meningitis cases to their respective local health department. Guidance and resources were also provided for mosquito, equine, avian, and wildlife arboviral surveillance activities.

## 1) Human Surveillance

The DHMH Laboratories Administration conducted arboviral testing on 298 serological and cerebrospinal fluid (CSF) samples from Maryland residents using an IgM Microsphere immunoassay (MIA).

Nineteen human WNV cases (16 confirmed, 3 probable) were reported in six jurisdictions: Anne Arundel Co. (5), Baltimore Co. (1), Baltimore City (2), Harford Co. (1), Montgomery Co. (9) and Prince George's Co. (1). Ten cases were classified as neuroinvasive (encephalitis and/or meningitis), while the remaining nine were classified as non-neuroinvasive (Figure 2). One fatality was reported in Montgomery County. Human WNV activity decreased by 17% this year compared to 2010, when 23 cases were reported in Maryland (Table 1 and Figure 4).

Among the human cases, onset dates ranged from mid-July to late September (Figure 3) with an age range of 15 to 88 years (median 54 years, mean 55.7 years).

## 2) Avian Surveillance

DHMH discontinued dead bird surveillance at the end of the 2002 surveillance season when WNV was considered endemic in the State. However, the agency continues to coordinate with the DNR, the DoD, the Maryland Zoo in Baltimore, and other state and local agencies to receive and report Maryland avian WNV surveillance results.

Eight cases of WNV infection were reported among avian species in Maryland in 2011. These included three gulls on Poplar Island in Talbot County, one American Crow and three Cooper's Hawks in Montgomery County, and a single American Crow in Prince George's County. These findings followed increased numbers of anecdotal reports by wildlife rehabilitators and the public of morbidity and mortality among bird populations in Maryland and other neighboring states.

## 3) Mosquito Surveillance

During the period July 1 - October 31, 2011, MDA staff collected mosquitoes for arbovirus surveillance from 10 jurisdictions in Maryland. Pools were collected from designated trap sites in selected jurisdictions, and were sorted, speciated, and forwarded to the DHMH Laboratories Administration for arboviral disease testing.

MDA entomologists submitted a total of 1649 pools comprising 24,474 individual mosquitoes to the DHMH Virology Laboratory where they were tested for WNV, EEE, and SLE via reverse transcriptase polymerase chain reaction (RT-PCR).

A total of 15 mosquito pools tested positive for WNV infection in Maryland in 2011 (Figure 1). These included four positive mosquito pools in three jurisdictions (Baltimore, Prince George's, and Somerset counties) tested at the DHMH Laboratories Administration. An additional 11

positive mosquito pools were reported by the DoD at the Walter Reed Army Medical Center's Forest Glen and Glen Haven Annexes in Montgomery County.

Positive pools included *Culex pipiens*, *Culex salinarius*, and *Culex species* mosquitoes.

#### 4) Equine Surveillance

Two horses were reported with WNV infection in 2011: a two year-old pony in Frederick and a five year-old Amish cart horse in St. Mary's Counties. This was consistent with the previous year, in which a single equine WNV case was identified in Frederick County.

#### 5) Wildlife Surveillance

During 2011, a seasonal employee was hired to collect, organize, and ship WNV serological samples from Maryland wildlife to cooperating laboratories for arboviral testing, as well as to maintain a database for entering and monitoring sample submissions. DNR biologists along with US Fish and Wildlife Service (FWS) staff and employees of USDA Wildlife Services (WS) collect WNV blood samples during existing projects. Information gathered from all WNV wildlife surveillance activities is entered into the database at the DNR Cooperative Oxford Laboratory, Oxford, MD and shared with USDA WS and DHMH. Species routinely sampled include waterfowl, deer, bears, and other mammals.

A total of 402 serological samples were collected from Maryland wildlife in 2011 and have been sent to the USDA Agricultural Research Service in Fort Collins, CO for arboviral testing.

### **Surveillance for Other Arboviruses**

No Eastern equine encephalitis virus (EEE) activity was reported in humans or animals in Maryland in 2011. In previous years, EEE activity has been detected in mosquitoes, equines, and less frequently, ratites in Maryland. Most recently it was reported in a Wicomico County horse in 2009. The last human case of EEE in Maryland occurred in 1989.

A single confirmed human case of St. Louis encephalitis (SLE) was reported in Montgomery County, and the patient was determined to have been infected during recent travel to Trinidad and Tobago.

In addition, six mosquito pools in three jurisdictions—Anne Arundel (3), Baltimore (1), and Prince George's (2) counties—tested positive for Cache Valley virus (CVV) via virus isolation. CVV has been previously detected in mosquitoes in Maryland in 2005 and 2008. Cache Valley virus is a Bunyavirus known to cause congenital malformation in livestock, particularly sheep and cattle. Although recognized as a significant veterinary pathogen, the virus has had little role as an agent of human disease (only two human cases have been confirmed since it was first isolated in 1956).

No other arboviral activity was detected in human, animal, or mosquito populations in 2011. However, when resources allow, the Maryland DHMH Laboratories Administration, Virology

Laboratory performs virus isolation on selected mosquito pools that have already been tested through reverse transcriptase polymerase chain reaction (RT-PCR). In some instances, this additional reverse testing has revealed the presence of other arboviruses in Maryland's mosquito populations. Viruses detected in the past using this method have included Jamestown Canyon Virus, Melao Complex virus, and Highlands J virus (an Alphavirus).

### **Mosquito Control**

The MDA conducted mosquito control activities in 16 Maryland counties during 2011. Mosquito control services include source reduction, biological control, public education, and ground and aerial application of insecticides and are conducted under cooperative agreements between MDA and participating counties. Services were provided by community request in over 1,760 communities. A total of over 1,695,816 acres were treated with pesticide to control mosquito larvae and adult mosquitoes. MDA personnel carried out source reduction projects and stocked designated areas with mosquito fish (*Gambusia holbrooki*) for biological mosquito control. Public education and awareness of mosquito control and mosquito-borne diseases was conducted in local communities.

### **Summary and Future Directions**

The 2011 surveillance year revealed arboviral activity that was largely consistent with recent years. Although the current year's totals remain considerably lower than those reported in the peak year(s) of WNV activity (2002 and 2003), they indicate that WNV continues to be transmitted among mosquitoes, animals, and humans in Maryland. The periodic detection of other arboviruses such as SLE and CVV in human and mosquito populations respectively, underscores the need for continued surveillance efforts. Ongoing federal support remains essential to monitor arbovirus activity in human and animal populations and to implement vector surveillance and control.

As an important part of the statewide effort to maintain effective surveillance and control programs, the Mid-Atlantic Zoonotic and Vector-borne Disease Inter-Agency Workgroup (MAZV) met monthly throughout the 2011 arboviral surveillance season. The group consists of state, local and federal public health officials, veterinarians, animal control officers, agriculture and wildlife officials, academic researchers, students, and others with an interest in zoonotic and vector-borne disease. Despite its broad focus on various mosquito and tick-borne diseases and zoonoses, the group maintains a key focus on WNV and arboviruses throughout the annual arboviral season. In the coming years, the group will continue to review and assess the effectiveness of the arboviral surveillance and control efforts and adapt those activities as necessary to accommodate changing resources.

In conclusion, despite largely constant levels of disease activity in recent years, arboviruses remain a significant public health concern in Maryland. Maryland health officials continue to collaborate across agencies and disciplines to maintain effective surveillance and control measures.