

Arboviral Infection

Agent(s): In Virginia, the agents of arboviral infection, from most to least common, are the mosquito-borne West Nile virus (WNV), La Crosse encephalitis (LAC) virus, St. Louis encephalitis (SLE) virus and Eastern equine encephalitis (EEE) virus. Other arboviral agents causing illness in Virginians include the imported dengue virus and chikungunya virus, which typically infect travelers to endemic regions of the tropics and subtropics, but have not become established in Virginia. Powassan (POW) virus, which is a tick-borne encephalitis virus, was recently discovered in Virginia.

Mode of Transmission: Most commonly through the bite of an infected mosquito. WNV may also be transmitted by blood products via transfusion or transplanted organs from infected donors, and more rarely by cuts or punctures with contaminated scalpels or needles in a laboratory.

Signs/Symptoms: Severity of symptoms differs depending on the particular virus and characteristics of the infected person. Most infections are asymptomatic. Mild cases may appear as fever with headache. More severe disease can cause encephalitis (i.e., inflammation of the brain) or meningitis (i.e., inflammation of the lining of the brain and spinal cord) and may lead to permanent neurological impairment or death.

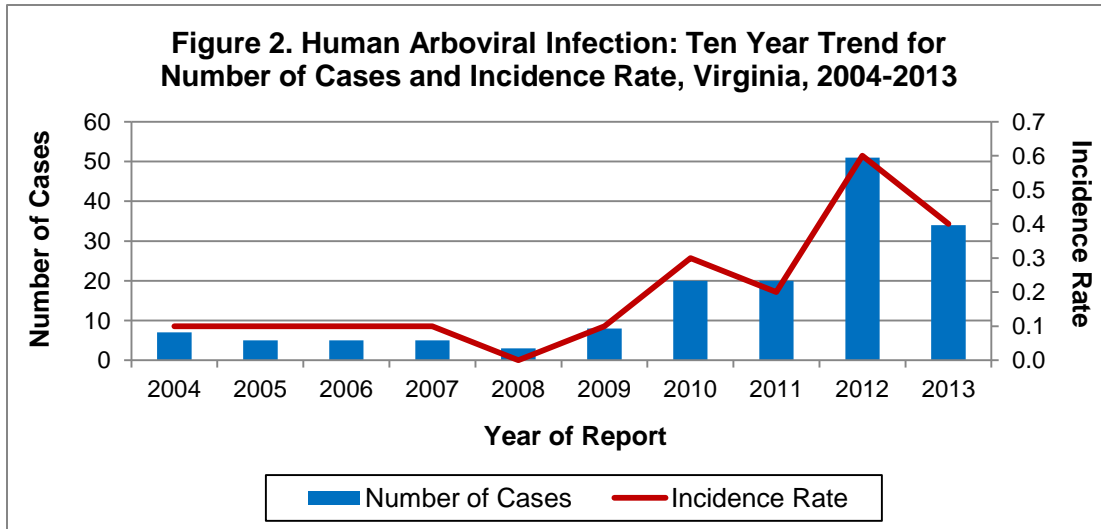
Prevention: Minimize bites by avoiding areas infested by mosquitoes or ticks, and, when in those areas, use mosquito or tick repellents and wear long-sleeved, light-colored clothing with pants legs tucked into socks. Additional mosquito control measures include maintaining screens on all open windows and doors and eliminating or regularly dumping all containers that could hold water and breed mosquitoes, including buckets, birdbaths and discarded tires. After visiting tick habitats, a person should thoroughly check all body surfaces for ticks and, if found, carefully remove attached ticks as soon as possible.

Other Important Information: WNV and SLE infections are more likely to cause severe disease in persons over the age of 50, but the majority of infections are asymptomatic. LAC is seen primarily in individuals less than 16 years of age. EEE has a high fatality rate and is more likely to affect children under the age of 15 and adults over the age of 50.

| Arboviral Infection: 2013 Data Summary | |
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| Number of Cases: | 34 |
| 5-Year Average Number of Cases: | 20.4 |
| % Change from 5-Year Average: | +67% |
| Incidence Rate per 100,000: | 0.4 |

Human

In 2013, 34 cases of arboviral infection were reported in Virginia, which is a much higher number than the five-year average of 20.4 cases per year, but lower than the 51 cases reported in 2012 (Figure 2). In contrast to the previous year in which US-acquired WNV predominated in Virginia, the majority (26 cases, 77%) of the 2013 arboviral



infections were acquired out-of-country. These imported cases included 23 cases of dengue fever and three cases of chikungunya. The remaining eight infections were acquired in the U.S. and included six caused by West Nile virus and two caused by La Crosse virus. No cases of Eastern equine encephalitis or Powassan virus were reported.

WNV activity in 2013 dropped sharply from 2012, but 2012 saw the largest number of cases reported in a year since the disease first reached Virginia in 2002 and 2003. All of the 2013 cases occurred in adults between 50 and 90 years of age. WNV cases occurred in two regions of Virginia, with five cases reported from the northern region and one case from the eastern region. The WNV infection reported from the eastern region was contracted in another state. All six cases occurred in urban areas. Historically, most of Virginia's WNV infections have occurred in urban sections of northern Virginia. None of the WNV infections in 2013 resulted in a fatality.

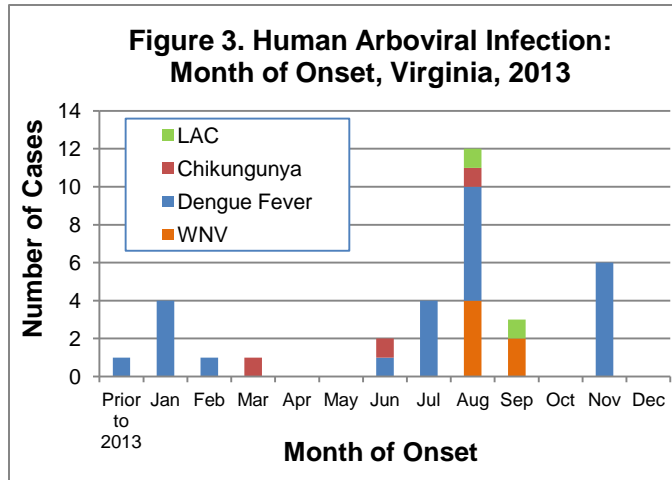
The two LAC cases (also known as California [CA] Serogroup Encephalitis) reported in 2013 occurred in young school-aged children and were reported from the northern and southwest regions. One case was contracted in another state, and neither LAC case resulted in a fatality.

All 23 cases of dengue fever were imported by travelers returning from dengue endemic countries in the American tropics (South and Central America and Mexico), south Asia, and the Middle East. Cases ranged from 17 to 60 years of age and 13 of the 23 cases were females. Dengue hemorrhagic fever was diagnosed in one case.

The three cases of chikungunya were imported. They originated in Asia or the Pacific Islands and were not associated with the Caribbean outbreak of chikungunya discovered in December of 2013.

Cases of arboviral infection occurred throughout the year with a noticeable spike in August. All WNV infections occurred in August and September, which is typically the peak of the WNV transmission season in Virginia (Figure 3). Similarly, the two La

Crosse encephalitis cases had onsets in August and September, which are also peak transmission months for LAC. Onset dates for the imported dengue fever cases occurred mostly in January, July, August and November. However, since these infections were acquired out of the country, any seasonality would be based on the travel patterns and seasonality of the illness in the endemic countries of origin.



Animal

Zoonotic surveillance for WNV and EEE is conducted each year by a limited number of jurisdictions in northern Virginia, the Richmond area, and Hampton Roads. These surveillance programs test for the presence of arboviruses in mosquitoes and sentinel chickens. Sentinel chicken flocks are maintained only in the Hampton Roads area. Veterinary records are also searched for equine cases of arboviral infection statewide. No mosquito or zoonotic surveillance and testing programs are in place for LAC or SLE viruses.

In 2013, a total of 374,737 mosquitoes were tested for WNV. These mosquitoes were tested as “pools” (i.e., batches of up to 100 mosquitoes). Of the 10,758 pools tested for WNV, 424 (4%) were positive. WNV positive pools each contained at least one WNV positive mosquito. This finding was similar to 2012, which also had a 4% rate of positive WNV pools. Of the 424 positive pools from 2013, 403 were collected from northern Virginia, five from central Virginia, and 16 from eastern Virginia. In 2013, one case of WNV infection was seen in a horse in the southwest region. Sentinel chicken testing revealed 13 WNV positive chickens in the Hampton Roads area.

In Virginia, surveillance for EEE is conducted only in the Hampton Roads area. The proportion of pools that were positive in 2013 was similar to what was observed in 2012. Of the 4,856 pools (217,024 mosquitoes) tested in that region, 123 pools (3%) tested positive for EEE. Similarly, of the 5,694 pools (262,314 mosquitoes) tested in that region in 2012, 152 pools (3%) were positive for EEE. In addition, 35 sentinel chickens tested positive for EEE in the Hampton Roads area in 2013, and 40 tested positive in 2012. One horse in the central region was infected and euthanized.