Arboviral Infection

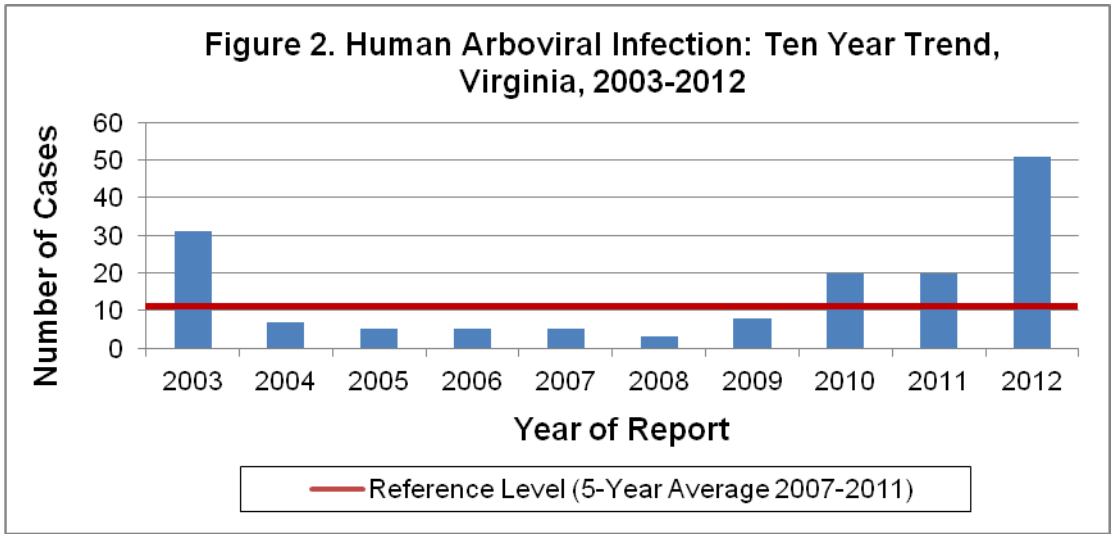
Agent(s): In Virginia, the agents of arboviral infection, from most to least common, are the mosquito-borne West Nile virus (WNV), LaCrosse encephalitis (LAC) virus, St. Louis encephalitis (SLE) virus and Eastern equine encephalitis (EEE) virus. Other arboviral agents causing illness in Virginians include the imported dengue virus and chikungunya virus, which typically infect travelers to endemic regions of the tropics and subtropics. 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, or by cuts or punctures with contaminated scalpels or needles and, more rarely, through inhalation or ingestion of dust or particles from infected bird feces.

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 on skin and wear long-sleeved, light-colored clothing with pants legs tucked into socks. Additional 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.



Human

The fifty-one human arboviral infections reported in 2012 is significantly higher than the five-year average of 11.2 cases per year (Figure 2). In 2012, 30 of the arboviral infections were caused by West Nile virus. Additional infections with endemic arboviruses included one case of La Crosse encephalitis and one case of Eastern equine encephalitis. The remaining eighteen cases were imported arboviral infections, including 17 cases of dengue fever from tropical countries, and one case of European tick borne encephalitis (TBE).

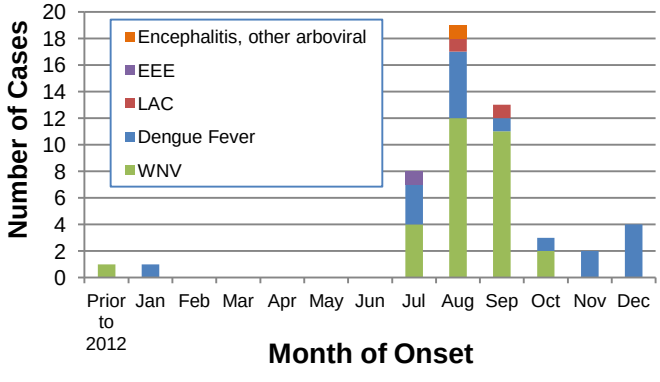
WNV activity in 2012 was greater than in any previous year in Virginia. The 30 WNV cases identified in 2012 were a six-fold increase from the five-year average of five cases per year. Seventeen of the 30 WNV cases were in male patients. All of the cases occurred in adults ranging from 28 to 84 years of age. By region, the highest incidence of WNV occurred in the northwest region (0.8 per 100,000), followed by the northern region (0.5 per 100,000). Incidence rates in the remaining regions ranged from 0.1 to 0.3 per 100,000. Twenty-one of the 30 cases occurred in urban areas. Historically, most of Virginia's WNV infections diagnosed since 2002 have occurred in urban sections of northern Virginia. Three deaths were attributed to WNV infection during 2012. The deaths occurred in an elderly female from the northwest region and two elderly males from the northern and eastern regions.

The two LAC cases reported in 2012 occurred in children age 10 years and younger. Both cases occurred in the southwest region. The single EEE case was in a young school-aged child in the eastern region.

All 17 of imported cases of dengue fever occurred in travelers returning from dengue endemic countries in the American tropics and south Asia. Cases ranged from 7 to 71 years of age and ten of the 17 cases were seen in females. The single case of European tick-borne encephalitis occurred in a male traveler who had returned from the Czech Republic. Due to cross-reactivity of the different Flaviviruses on blood tests, this patient was initially diagnosed with WNV. However, with further laboratory testing and information on travel history, the illness was determined to be TBE.

The majority of WNV infections occurred in August and September, which is the peak of WNV transmission season in Virginia (Figure 3). The LAC cases had onsets in August and September, while the EEE case occurred in July. Onset dates for the imported dengue fever cases occurred mostly in July, August and December. However, since these infections were acquired out

Figure 3. Human Arboviral Infection: Month of Onset, Virginia, 2012



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/zoonotic testing programs are in place for LAC or SLE viruses.

In 2012, a total of 406,594 mosquitoes were tested for WNV. These mosquitoes were tested as "pools" (i.e., batches of up to 100 mosquitoes). Of the 11,385 pools tested for WNV, 400 (4%) were positive, indicating that each of these pools contained at least one WNV positive mosquito. This is a higher proportion than 2011 when 2% of the pools tested positive for WNV. Of the 400 positive pools from 2012, 357 were collected from northern Virginia, 12 from central Virginia, and 31 from Hampton Roads. In 2012, one WNV infection was seen in a horse in the northwestern region. Sentinel chicken testing revealed 26 WNV positive chickens in the Hampton Roads area.

In Virginia, surveillance for EEE is conducted only in the Hampton Roads area. In 2012, there was a significant increase in zoonotic EEE activity in this area. Of the 262,314 mosquitoes (5,694 pools) tested in that region, 152 pools (3%) tested positive for EEE. By comparison, of the 39,909 mosquitoes (855 pools) tested in that region in 2011, only one pool (<1%) was positive for EEE. In addition, 40 sentinel chickens tested positive for EEE in the Hampton Roads area in 2012, while only 10 tested positive in 2011.