West Nile virus in the news: what happened in 2012?

The summer of 2012 marked the biggest national outbreak of West Nile virus since 2002. In all, 2,873 cases of West Nile neuroinvasive disease, the most severe manifestation of the virus, were reported to the Centers for Disease Control and Prevention (CDC), including 286 deaths. Although cases of West Nile disease were detected in all states in the continental United States, the central United States reported the highest number of West Nile severe disease cases, with Texas shouldering 29% of the disease burden. In fact, what made the Texas outbreak so striking is that just four counties in the Dallas-Fort Worth area accounted for 902 out of 1,868 total reported West Nile cases in the state. Other states hit with large West Nile outbreaks were California, Illinois, Louisiana, and Michigan — together the top five states suffered 56% of the reported national neuroinvasive disease cases.

Learning more about West Nile virus

This brochure is just an introduction to West Nile virus, and there are many more things to learn and stories to tell - you can find the unabridged version of this document at:

American Academy of Microbiology:

The best information on West Nile virus comes from the experts studying it. If you would like to learn more about WNV, you can turn to the source below:

Centers for Disease Control and Prevention (CDC):
www.cdc.gov/westnile

West Nile neuroinvasive disease cases reported to the Centers for Disease Control in 2012

2012 was the United States’ warmest year on record

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West Nile virus is spread by mosquitos.

West Nile virus (WNV) is the causative agent of West Nile fever and West Nile neuroinvasive disease. Like any virus, WNV cannot replicate on its own and requires host cells in which to make more copies of itself and spread. WNV is predominantly carried by *Culex* mosquitos. Female mosquitos are infected by biting an infected animal. The virus replicates within her for a few days and is transmitted to a new vertebrate host when she feeds again.

Birds are the amplifying hosts for West Nile virus.

The most critical hosts in the WNV lifecycle, other than mosquitos, are certain species of birds. Some species of birds are called amplifying hosts, meaning that when they get infected by a WNV-carrying mosquito, the virus replicates to such high numbers in the blood that a new mosquito coming along for a snack will be able to pick up the virus as well. Birds such as common grackles and crows can have up to a billion times more viral particles in their blood than a similarly infected human.

Humans and many other animals are “dead end hosts.”

Just like birds, humans and other vertebrates usually become infected with WNV by being bitten by an infected mosquito. However, WNV does not replicate as well in humans as it does in birds and levels of virus in our blood remains relatively low. Thus, we (as well as dogs and horses) are very poor transmitters of WNV back to mosquitos and are essentially evolutionary dead ends.

Outbreaks need a critical mass of mosquitos, susceptible birds, and humans unprotected from biting mosquitos.

Outbreaks occur during summer months when mosquitos are abundant and active. Mosquitos rely on warm temperatures to reproduce and develop, so the earlier warm spring temperatures arrive, the greater the potential for early mosquito activity and thus a longer bird-mosquito-bird amplification cycle.

Even if infected mosquitos abound, you still need the right kind of “super amplifier” birds around and their presence combined with infected mosquitos can launch an outbreak.

Humans can limit their contact with infected mosquitos:

1. launch integrated pest management programs to keep mosquito populations low
2. use personal protective measures such as cleaning up potential breeding sites on personal property, or covering exposed skin at night and using spray repellants

Surveillance is key to detecting and preventing West Nile virus outbreaks.

Surveillance starts with regularly trapping mosquitos across cities and counties and testing them for WNV. Because mosquito surveillance programs can also test trapped mosquitos for other viruses beside WNV, the surveillance infrastructure is important for a multitude of public health threats. Surveillance efforts can also include citizen participation by encouraging people to be on the lookout for sick or dead birds. These birds can be tested for the presence of WNV; dead birds are often a more visible indication that the virus is present in an area than mosquito populations.

A critical aspect of WNV surveillance is blood bank screening because WNV can be transmitted through blood transfusions. Screening donors for WNV is particularly important since the majority of people infected with WNV do not develop symptoms. Less than a year after the problem was detected, WNV tests were developed and implemented across the country and now transfusion transmission is exceedingly rare.