

West Nile Virus

WNV is a Class B Disease. It must be reported to the state within one business day.

West Nile virus (WNV) is a flavivirus belonging taxonomically to the Japanese encephalitis subgroup that includes the serologically closely related Saint Louis Encephalitis (SLE) virus, Japanese Encephalitis virus, Murray Valley encephalitis virus and others. These viruses commonly infect birds in nature. Yellow Fever and Dengue viruses are also in the flavivirus group.

WNV infection is naturally spread from bird-to-bird by mosquito bites. Most reported WNV in the wild has occurred in crows, but 150 species of birds have been found positive for WNV. The species more apt to be found positive among dead birds are crows, blue jays, grackles, house sparrows, cardinals, birds of prey and seagulls.

Like the SLE virus, WNV is transmitted principally by *Culex* species mosquitoes, but may be transmitted by *Aedes*, *Anopheles*, and other species. Most of these are not very competent vectors. In Louisiana *Culex quinquefasciatus*, also named the Southern House Mosquito, is the main vector of WNV. The females lay a single raft of 140 to 340 eggs on heavily polluted, small water collections after each blood meal. The eggs hatch in one to two days and become adults in eight to 12 days. Preferred breeding places are all types of large man-made containers, collections of ground water, storm sewer catch basins, ground pools, ditches, run-off from sewage plants, small artificial containers, cesspits, drains, septic tanks, unused wells and storm water canals. The flying range of the adult female *Culex* is limited, up to 3,600 feet (1,200 m) at night. They prefer feeding on birds and poultry; however, they also readily bite humans, and usually bite humans towards the middle of the night, indoors and outdoors.

The role of other potential vectors such as *Aedes albopictus*, also named the Asian Tiger Mosquito, and other *Culex*, is still to be determined. A lesser vector is *Culex salinarius* which lives mostly in Louisiana coastal areas and breeds in fresh and brackish water in marshes, ponds, pools, ditches, barrels, bilge water from boats, and sometimes artificial containers around homes. They bite mostly outdoors, occasionally indoors and preferably at dusk, during the first hours of darkness.

Occasionally humans or other mammals are bitten by an infective mosquito and they get infected. Dogs, cats, cattle, horses and other domestic mammals get infected, but their role in transmission is minimal because of low viremia. Most of these animals do not present obvious illness, except for horses which also suffer from WNV encephalitis.

WNV was introduced in the U.S., in New York in 1999. The first cases were diagnosed in Louisiana in 2001 among one human, along with several birds (crows and blue jays), and a few horses. The year 2002 was marked by an epidemic of 204 cases of neuro-invasive disease (WNV-NID). The total number of persons infected was estimated at 30,000 to 40,000. The disease was very unevenly distributed in foci appearing in successive waves.

Infectivity period: In birds the virus is present in blood for several days to a week. Humans will have viremia for a few days before onset of disease. Humans are not infectious for mosquitoes because of low viremia, but may be infectious by transfusion, organ transplant, transmission in utero and breast milk. The incubation period for West Nile virus invasive disease is three to 14 days.

Clinical Presentation

The majority of those infected are completely asymptomatic (80% to 90%). Occasionally asymptomatic infections are detected through routine blood donation screening.

A small proportion have West Nile Fever (10% to 20%) presenting with febrile, influenza-like illness with abrupt onset of moderate to high fever, headache, sore throat, backache, myalgia, arthralgia, fatigue and a mild and transient rash, and lymphadenopathy.

A minority of infected people have meningitis or encephalitis, and are categorized as WNV Neuro-Invasive Disease (WNV-NID) (~1 in 150 cases). Encephalitis is diagnosed by the central nervous system (CNS) involvement, including altered mental status (altered level of consciousness, confusion, agitation, or lethargy), or other cortical signs (cranial nerve palsies, paresis or paralysis, parkinsonian signs, tremors, ataxia or convulsions).

Some individuals have severe muscle weakness or complete flaccid paralysis, which is mostly due to axonal degeneration (poliomyelitis) rather than demyelinating syndromes like Guillain-Barre syndrome.

Long-term sequelae sometimes occur for individuals with WNV infections. One year after illness, patients reported the following symptoms: fatigue, memory loss, difficulty walking, muscle weakness, and depression.

The case fatality rate for WNV-NID cases is estimated to be close to 10%. The case fatality rate is elevated among the elderly, particularly among those 75 years of age and older.

Human Surveillance

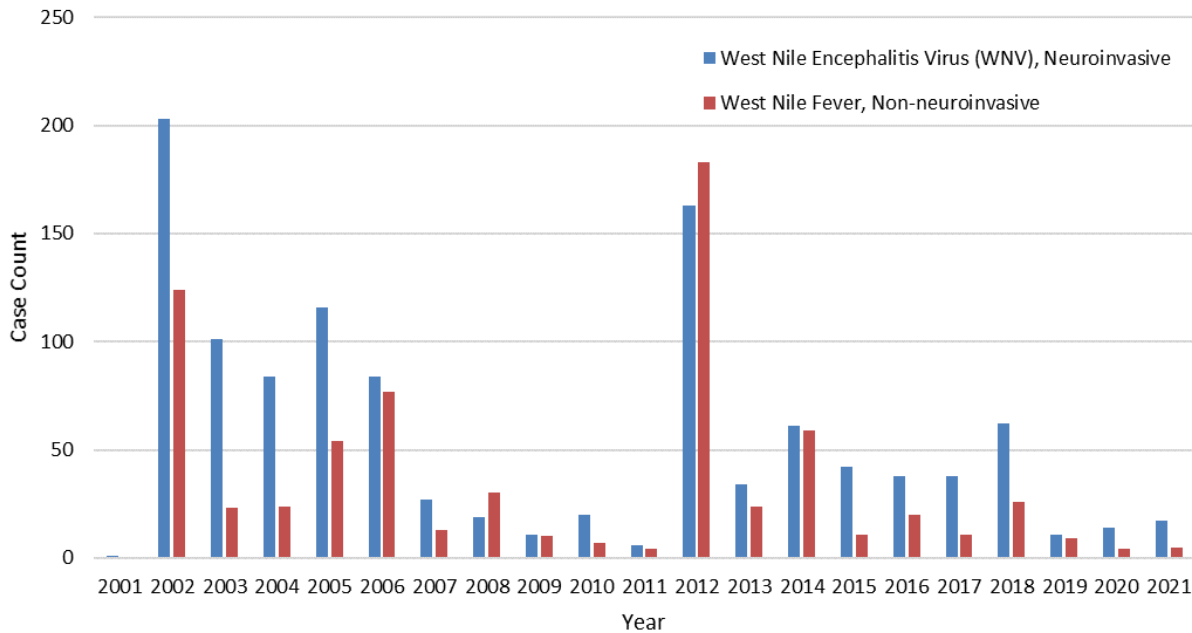
This report focuses on human surveillance. The main goal of human surveillance is to describe the disease burden in different population groups, annual trends and use the data to disseminate information to the medical community, and provide the public at large and the vector control programs information useful to guide prevention measures.

Limitations of human surveillance: Human data have very limited usefulness for mosquito control purposes. Only a small percentage of all WNV infections are reported (because most WNV infections are asymptomatic, or WNV Fever cases do not get medical care; they never get diagnosed nor are reported). The reporting of cases can also be delayed.

The cases of WNV-NID are the main indicator used to evaluate WNV disease burden. Most cases of WNV-NID are severe enough to cause hospitalization and diagnosis by some laboratory testing. Hence the reporting is assumed to be fairly complete.

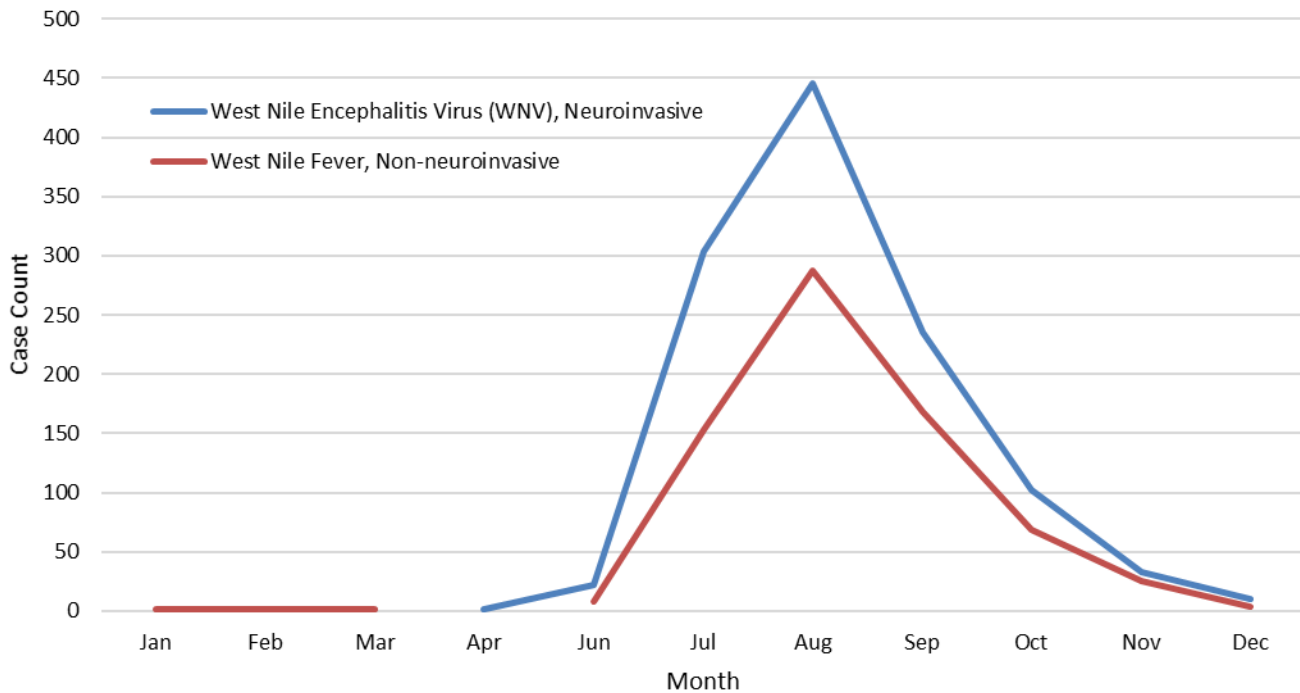
Trends

Figure 1: West Nile Cases - Louisiana, 2001 to 2021



Seasonality

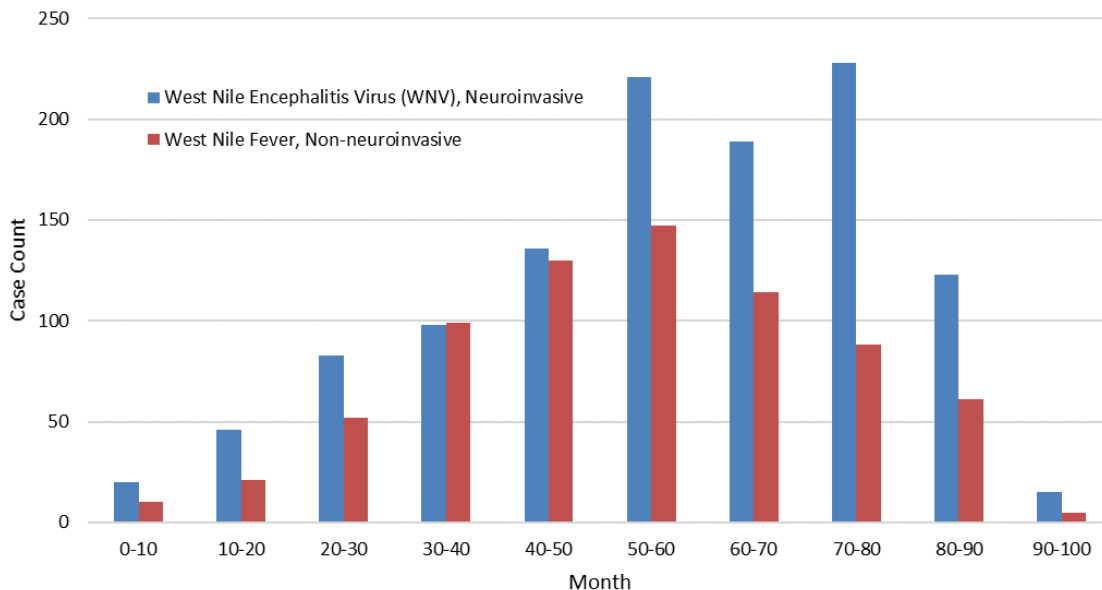
Figure 2: West Nile Cases by Month, Louisiana: 2001-2021



Case Demographics

While all individuals are at risk of infection with WNV, individuals in older age groups are more likely to develop WNV-Neuro-invasive disease (Figure 3).

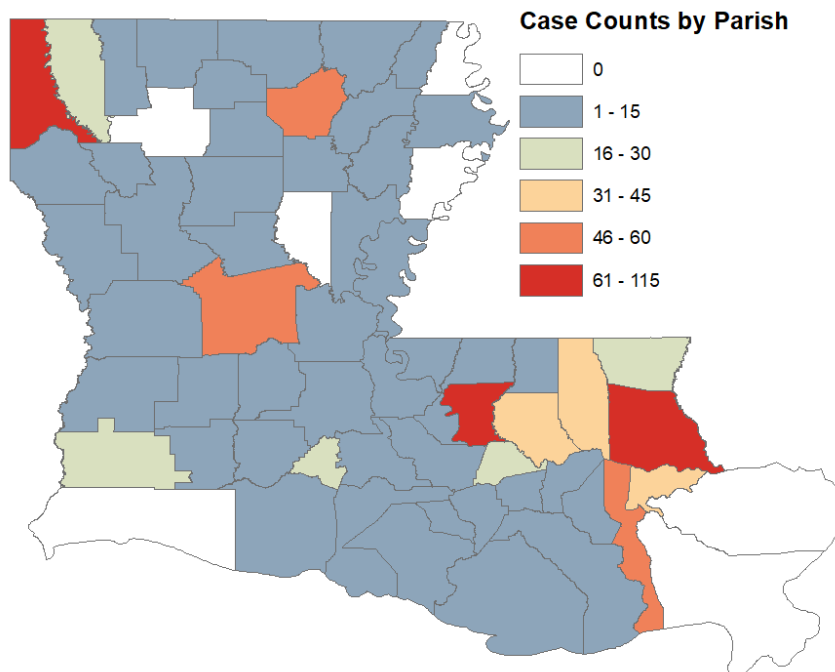
Figure 3: West Nile Cases by Age Group, Louisiana: 2001-2021



Geographical Distribution (Figure 4)

There is risk of WNV infection throughout Louisiana. Historically, the largest number of cases have been identified in Caddo, East Baton Rouge, and St. Tammany Parishes.

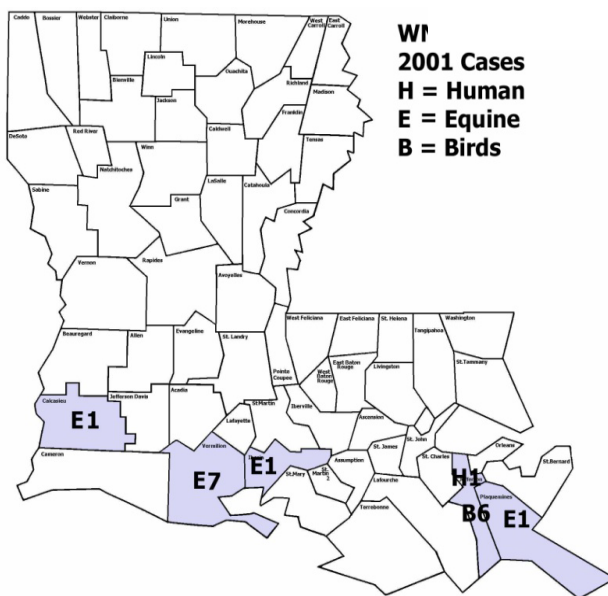
Figure 4: West Nile NID Cases by Parish: Louisiana, 2001-2021



WNV 2001: First Detection of Transmission in Louisiana

In August 2001, a crow infected with West Nile virus was identified in Kenner (Jefferson Parish), the first indication of WNV transmission within Louisiana. By the end of the year, five additional birds (crows and blue jays) in Jefferson Parish, eight horses from Calcasieu, Vermillion and Plaquemines Parishes and one human case in Jefferson Parish were reported (Figure 5).

Figure 5: West Nile Virus Cases - Louisiana, 2001

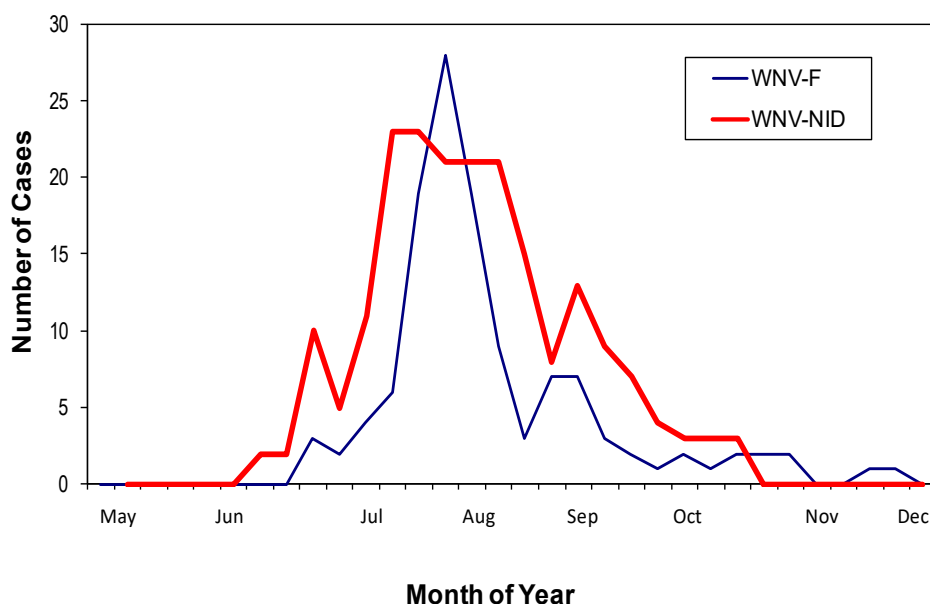


WNV 2002: Outbreak Year

There were a total of 326 cases of West Nile diseases in Louisiana in 2002: 203 cases of WNV-NID and 123 cases of WNV-F.

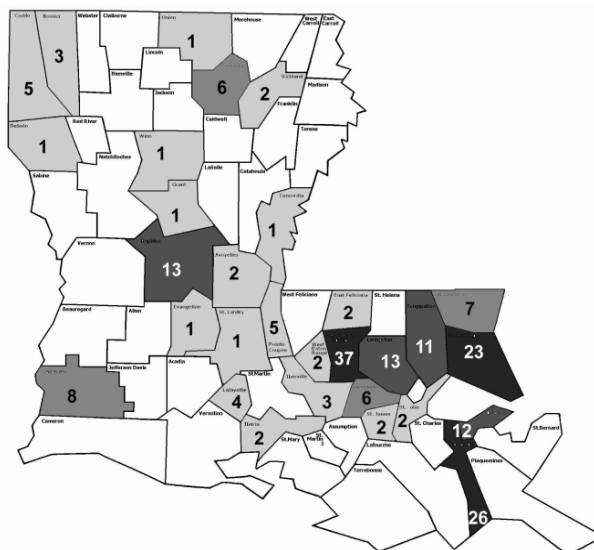
The first cases were diagnosed during the second week of June in St. Tammany and Tangipahoa Parishes. The weekly number of cases increased rapidly to plateau from mid-July to mid-August. The weekly number of cases then decreased very progressively until the first week of December. The red curve representing WNV-NID cases in Figure 6 was the most accurate and reliable tool in tracking the epidemic because specimens from these suspects were more likely to be submitted. Testing and confirmation of WNV-F cases was discouraged in order not to overwhelm laboratory capacity. However, sera that were submitted for West Nile fever suspects were tested, their results reported and integrated into the surveillance system (Figure 6).

Figure 6: WNV Cases - Louisiana, 2002



WNV human cases were identified in 61% of Louisiana parishes (39 out of 64). WNV infections were found among horses and birds in 94%, or 60 of the 64 parishes. WNV exhibited a very focal distribution - 11 parishes reporting ten cases or more comprising 263 of 326 cases (81% of cases). Within these parishes and/or separated by NID or fever infections, the distribution was also very focal (Figure 7).

Figure 7: WNV-NID Cases - Louisiana, 2002



This West Nile epidemic was characterized by a combination of small foci concentrated within cities and limited rural areas and also of sporadic cases in rural areas. These foci were staggered over time. The first outbreaks occurred north of Lake Pontchartrain in St. Tammany, Tangipahoa and Livingston Parishes during June. At the end of June, foci appeared to the west in East Baton Rouge and Ascension Parishes. In July, new foci appeared in Calcasieu and Ouachita Parishes (southwestern and northeastern corners of the state). In mid-July, foci were initiated south of the Lake in the New Orleans metropolitan area (Orleans and Jefferson Parishes), and west of Baton Rouge in Pointe Coupee Parish. In mid-August, a focus began in the central Louisiana parish of Rapides (Figures 8, 9, and 10).

Figure 8: WNV Cases by CDC Week - Southeast Louisiana, 2002

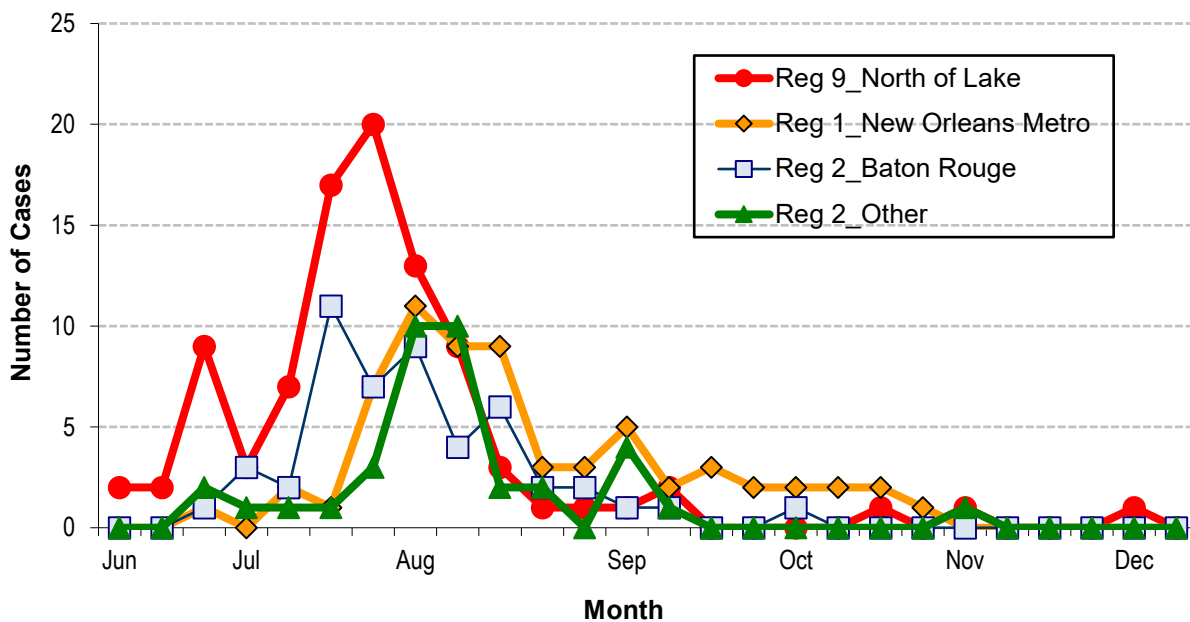


Figure 9: WNV Cases by CDC Week - Southwest, Central and Northern Louisiana, 2002

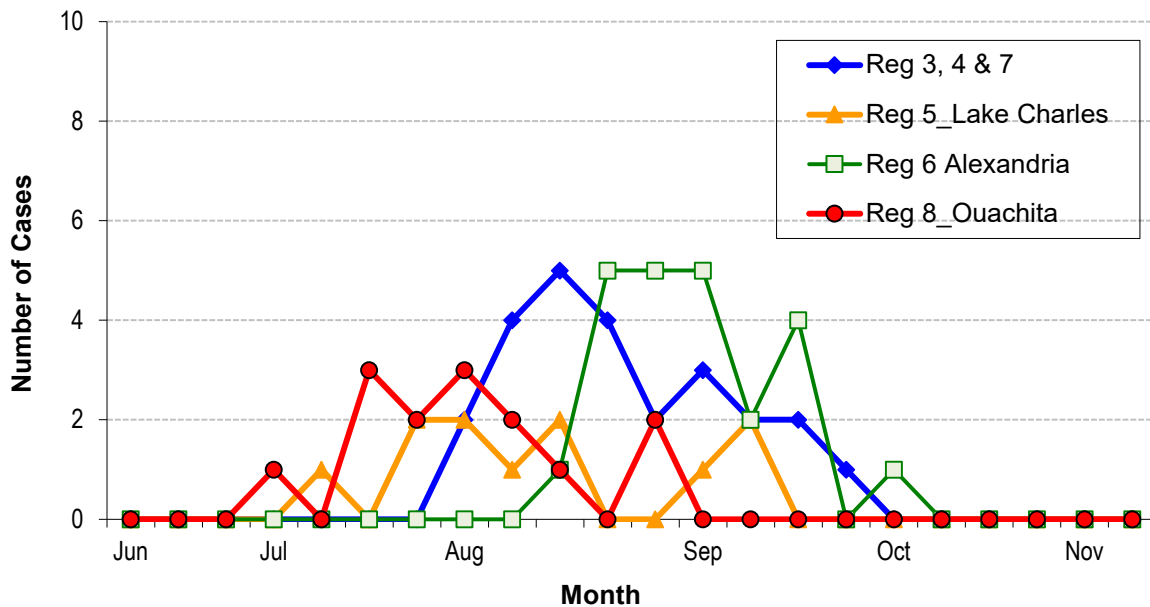


Figure 10: WNV Cases by CDC Week - Region 9 - Louisiana, 2002

