Introduction

This project is engage with the spared of West Nile virus (WNV) in Chicago, USA.

WNV first arrived in the Western Hemisphere in 1999 (Nash et al.2001) and during the summer and fall of 2002, an epidemic (223 cases) and epizootic of West Nile virus infections occurred in Chicago. (Watson JT, Jones RC, Gibbs K, Paul W. Dead crow reports and location of human West Nile virus cases, Chicago, 2002. *Emerg Infect Dis*. 2004;10(5):938-40).

West Nile virus (WNV) is the leading cause of mosquito-borne disease in the continental United States.  It is most commonly spread to people by the bite of an infected mosquito. Cases of WNV occur during mosquito season, which starts in the summer and continues through fall. There are no vaccines to prevent or medications to treat WNV in people. Fortunately, most people infected with WNV do not feel sick. About 1 in 5 people who are infected develop a fever and other symptoms. About 1 out of 150 infected people develop a serious, sometimes fatal, illness (<https://www.cdc.gov/westnile/>).

**Transmission**

West Nile virus is most commonly spread to people by the bite of an infected mosquito.

Mosquitoes become infected when they feed on infected birds. Infected mosquitoes then spread West Nile virus to people and other animals by biting them. (<https://www.cdc.gov/zika/vector/mosquitoes-and-hurricanes.html)>

**Symptoms**

Most people (8 out of 10) infected with West Nile virus do not develop any symptoms. About 1 in 5 people who are infected develop a fever with other symptoms such as headache, body aches, joint pains, vomiting, diarrhea, or rash. Most people with this type of West Nile virus disease recover completely, but fatigue and weakness can last for weeks or months. However about 1 in 150 people who are infected develop a severe illness affecting the central nervous system such as encephalitis (inflammation of the brain) or meningitis (inflammation of the membranes that surround the brain and spinal cord). The severe illness symptoms include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis.

Severe illness can occur in people of any age; however, people over 60 years of age are at greater risk. People with certain medical conditions, such as cancer, diabetes, hypertension, kidney disease, and people who have received organ transplants, are also at greater risk. Recovery from severe illness might take several weeks or months. Some effects to the central nervous system might be permanent.

About 1 out of 10 people who develop severe illness affecting the central nervous system die.

**Diagnosis**

When symptoms as described above appear, in area known or suspected to infected with WNV it is recommended to see a healthcare provider and be tested for MNV infection.

The diagnosis is generally accomplished by testing of serum or cerebrospinal fluid (CSF) to detect WNV-specific IgM antibodies. Immunoassays for WNV-specific IgM are available commercially and through state public health laboratories. WNV-specific IgM antibodies are usually detectable 3 to 8 days after onset of illness and persist for 30 to 90 days, but longer persistence has been documented. all positive results obtained with these assays should be confirmed by neutralizing antibody testing of acute- and convalescent-phase serum specimens at a state public health laboratory.

Additional diagnosis methods are viral cultures and tests to detect viral RNA, and Immunohistochemistry (IHC) that can detect WNV antigen in formalin-fixed tissue. (<https://www.cdc.gov/westnile/healthcareproviders/healthCareProviders-Diagnostic.html>)

**Treatment**

There is no vaccine or specific antiviral treatments for West Nile virus infection.

Clinical management is supportive. Patients with severe meningeal symptoms often require pain control for headaches and antiemetic therapy and rehydration for associated nausea and vomiting. Patients with encephalitis require close monitoring for the development of elevated intracranial pressure and seizures. Patients with encephalitis or poliomyelitis should be monitored for inability to protect their airway. Acute neuromuscular respiratory failure may develop rapidly and prolonged ventilatory support may be required.

**Prevention**

No WNV vaccines are licensed for use in humans. In the absence of a vaccine, prevention of WNV disease depends on community-level mosquito control programs to reduce vector densities, personal protective measures to decrease exposure to infected mosquitoes, and screening of blood and organ donors.

**Objectives**

This project is aim to predict when and where different species of mosquitos will test positive for West Nile virus.

* Do we have any possible new knowledge that has not been in use before?

YES: West Nile Virus & Dead Birds

**Bibliography**

**T**HE ARRIVAL of West Nile virus (WNV) in the Western Hemisphere in 1999 (Nash et al.2001) sparked ample discussion as to the future potential of this emerging disease in the region and worldwide. Although the principal focus in discussions to date has been on the public health implications, the introduction of a novel virus into a new biological milieu of potential vector and reservoir species presents a fascinating view of the development and integration

of disease systems. (Peterson, Andrew & Vieglais, Dave & K Andreasen, James. (2003). Migratory Birds Modeled as Critical Transport Agents for West Nile Virus in North America. Vector borne and zoonotic diseases (Larchmont, N.Y.). 3. 27-37. 10.1089/153036603765627433.)

(Nash et al.

2001) = Nash, D, Mostashari, F, Fine, A, et al. The outbreak of West Nile virus infection in the New York City area in 1999. N Engl J Med 2001; 344:1807–1814.

How long each stage lasts depends on both temperature and species characteristics. For instance, *Culex tarsalis*, a common California (USA) mosquito, might go through its life cycle in 14 days at 70° F and take only 10 days at 80° F. On the other hand, some species have naturally adapted to go through their entire life cycle in as little as four days or as long as one month. [( https://www.mosquito.org/page/lifecycle)](https://www.mosquito.org/page/lifecycle)

* In general, nuisance mosquitoes do not spread viruses that make people sick. The types of mosquitoes that can spread viruses may increase 2 weeks to 2 months after a hurricane, especially in areas that did not flood but received more rainfall than usual. (<https://www.cdc.gov/zika/vector/mosquitoes-and-hurricanes.html)>