

**Picacho middle school West Nile Virus**

**New Mexico**

**Supercomputing Challenge**

**Final report**

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**Team#111**

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# **How can West Nile Spread?**

## **Statement of the Problem**

West Nile Virus is mostly spread by infected mosquitoes. Mosquitoes get the virus from birds that carry the virus. West Nile virus is not spread from person to person nor directly from birds to humans. Some cases have resulted from blood transfusion and organ transplants. We are trying to model the virus by using starlogo. The data can be used to help scientists find percentages on how many people can become infected by the virus.

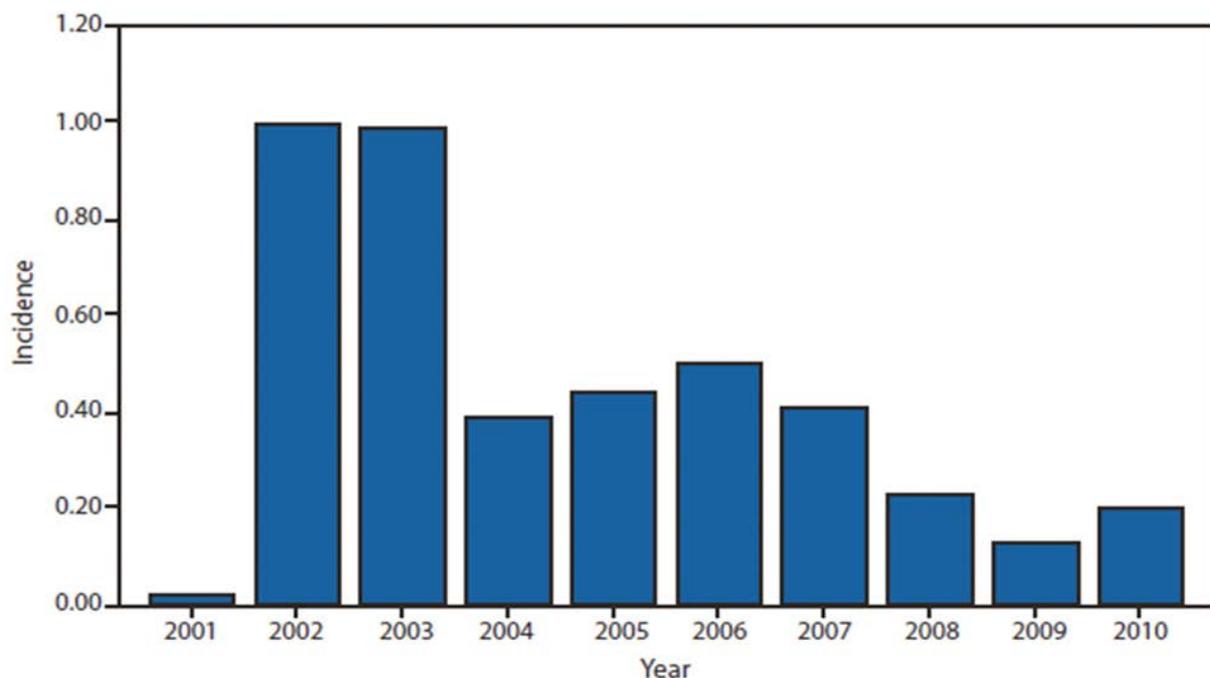
## **Description of Method Used**

Mosquitos bite infected birds and acquire the disease through the birds' blood. The white birds change their feather color to brown when infected by mosquitoes. Light skinned humans are healthy and darker skinned humans are infected. This information is depicted in the

starlogo model. We plugged in the variable for the chance of death to be between 3-15%. Mosquitoes can live to be about two weeks old on average.

## Method Used to Solve Problem

We used the Center for Disease and Control to find information on West Nile. From there we started to solve the problem using starlogo and noticed that the virus comes from birds and then infects the mosquito when it bites the infected bird.



# History of West Nile

West Nile virus has quickly set up in North America since its recognition in New York City in 1999.

of mild febrile illness.

In recent years, the epidemiology and clinical history of West Nile Virus has been associated with temporarily dispersed outbreaks. Features of the virus appear to have changed. More frequent outbreaks associated with more severe febrile illness have been noted since 1994's outbreak in Algeria, such as the 1999 outbreak in New York City.

## **The Most significant Achievement on Our Project**

Our the most significant achievement on the project is using star logo to simulate the process of the birds having the virus and

mosquitos biting humans to give them the virus, and having them possibly die. There is also a chance that the people can heal. Most people who receive treatment recover completely. About 80% of the infected people show no symptoms at all, and the remaining 20% who show symptoms could die. Only 3-5% of people who do or do not show symptoms die of West Nile Virus.

## **The discussion of how we verified and validated our model**

Our model simulates the process of how West Nile spreads. West Nile spreads from infected birds that spread the virus to mosquitos and the blood from the infected bird gets into the mosquitos system, and then the infected mosquito bites the person and the infected blood from the bird gets inside the person.

Then the person gets infected with West Nile Virus.

## **How can you prevent West Nile?**

\*One way that you can prevent West Nile is by applying insect repellent.

\*Eliminate standing water in outside of your house.

\*Wear long-sleeved shirts and long pants when you go outside during the rainy season.

\*Use air conditioning or make sure there are screens on all doors and windows to keep mosquitoes from entering the home.

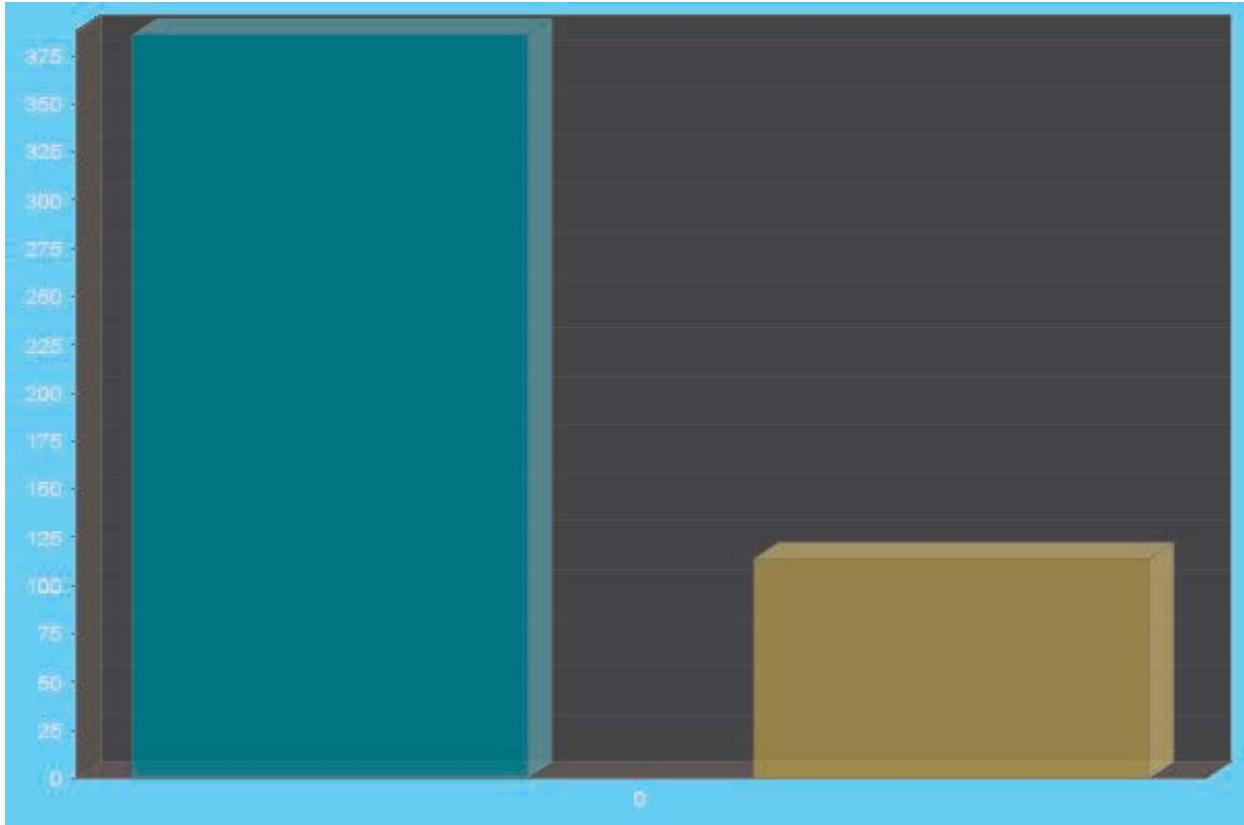
## **When did West Nile Start?**

In New Mexico there were 38 confirmed West Nile cases from 2013 to 2014 and

doctors reported it to be a strong virus. They studied the virus in 1999 in North America. The virus came first from small animals and came to infect larger animals.

## **The software, references, tables, and other products of our work**

The software that we used is StarLogo TNG to build our model. The graph is to see how many incidents there were in each year. We basically used CDC to find our research for the model so that we can make the model do of how West Nile is spread.



## The conclusions we reached by analyzing our results

We looked at our model and discovered how West Nile works and how the virus spreads. West Nile spreads by an infected bird getting bit by a mosquito and the blood from the infected bird causes the mosquito to become infected. When a mosquito bites a person the blood from the infected bird gets into the

person. Then the person is infected with West Nile Virus.

## References

United States Centers for Disease Control and Prevention. Jan 30, 2015 - **West Nile Virus Statistics & Maps - Symptoms & Treatment - Transmission - Prevention & Control**  
<http://www.cdc.gov/westnile/prevention/index.html?rf=>

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The West Nile Virus-Like Flavivirus Koutango Is Highly Virulent in Mice due to Delayed Viral Clearance and the Induction of a Poor Neutralizing Antibody Response *J. Virol.* 1 September 2014: 9947-9962.

[supercomputingchallenge.org](http://supercomputingchallenge.org)

<http://www.mayoclinic.org/diseases-conditions/west-nile-virus/basics/definition/con-20023076>

By Mayo Clinic Staff (posted Dec. 18, 2012)

# Acknowledgments

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