

# Researchers identify genetic makeup of new strains of West Nile

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Researchers at Connecticut Veterinary Medical Diagnostic Laboratory (CVMDL) located in UConn's College of Agriculture, Health and Natural Resources identified the genetic makeup of strains of West Nile

virus found in an alpaca and a crow. The findings were published in *Frontiers in Veterinary Science*.

In 2021, eight cases of West Nile [virus](#) were brought to the CVMDL for diagnosis—seven birds, both domestic and wild—and one alpaca.

"We decided to pursue some research avenues through these diagnostic cases because we had an interesting cohort of West Nile cases that had come through that fall," says Natalie Tocco '23 (CAHNR), a resident in anatomic pathology the Department of Pathobiology and Veterinary Science.

Of the eight cases, the alpaca from Massachusetts and a crow from Connecticut had the highest amount of virus in their systems at the time of diagnosis.

Focusing on these two cases, the researchers were interested in seeing if there were [genetic differences](#) between the viruses because they occurred in different species in different states.

After sequencing the complete genomes of the viruses, the researchers compared them to existing data. They found that the West Nile virus in the crow was similar to the virus identified in a mosquito and birds in New York between 2007 and 2013. The virus found in the alpaca resembled West Nile viruses found in mosquitos in New York, Texas, and Arizona between 2012 and 2016.

"[These findings] show the variety of the strains that are circulating and that can really alter what we see in the populations of what mosquitoes are dragging around in different areas," Tocco says.

This information can help scientists predict where different strains of the virus may appear, when considering how mosquitoes and birds move

around the country.

The researchers concluded that differences in the genetic makeup of these viruses suggests that vector-host feeding preferences are likely driving viral transmission. Different mosquito species prefer to feed on different animal hosts. This leads to multiple kinds of animals becoming infected with West Nile viruses.

Understanding the genetic makeup of the viruses could enable researchers, diagnosticians, and veterinarians to understand which animals may be more susceptible to the virus, disease severity, and what symptoms could look like.

"It could open up a whole can of worms," Tocco says. "In reality, I think we need to do more research on that to see what we're finding and what kinds of patterns we should expect in terms of the different strains and what kind of diseases we see with those."

West Nile virus was first detected in New York City in 1999 and quickly spread throughout the country. By 2000 it was present in Connecticut. Since then, West Nile has remained a public health concern in the U.S.

In the early 2000s, the CVMDL published one of the first papers on West Nile virus in the U.S.

"Aside from having it here in Connecticut and being a public health concern, it also brings more variety to the lab to bring West Nile research back to the forefront through the use of our diagnostic cases," Tocco says.

While this paper only focused on two cases, the researchers are currently working on another paper analyzing the specific symptoms from all eight cases.

The number of West Nile virus cases the CVMDL sees each year varies. During particularly wet summers, which are ideal for mosquitoes, they tend to see more cases. In 2022, they diagnosed 30 cases.

Birds—and corvids like crows, ravens, and jays in particular—are common carriers of West Nile virus.

The most common symptoms of West Nile in these animals include seizures, being unable to get up, neurological signs, and ocular signs. Symptoms affecting the eyes are particularly common in raptors like eagles, owls, and hawks. Raptors also may get heart disease from the virus.

"There's a variety of lesions we can see with West Nile so it's more about being proactive with these diagnostic cases at certain times of year and keeping on high alert because it's not just the nervous system signs in some animals," Tocco says.

The most common season for West Nile viruses is August to October. However, as the climate in Connecticut warms the range of West Nile is expanding. Tocco says she has diagnosed West Nile cases as late as November and as early as May.

"Those might be the anomalies but those might be a predictor of what we can expect in the future," Tocco says. "And to not put the blinders on to the time of year, but expand that window based on what we're seeing diagnostically."

**More information:** Ji-Yeon Hyeon et al, Whole genome sequencing and phylogenetic analysis of West Nile viruses from animals in New England, United States, 2021, *Frontiers in Veterinary Science* (2023). [DOI: 10.3389/fvets.2023.1085554](https://doi.org/10.3389/fvets.2023.1085554)

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