West Nile virus researchers focus on neighborhood birds

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On a warm, breezy day in Oak Lawn, Ill., veterinary graduate student Jessica Girard of the University of Wisconsin-Madison removed a robin from a finely threaded net hidden in the shadows of a tree-lined meadow.

Gently, she extended its wings to check for emerging feathers and look for parasites. She took measurements, noting patterns in the feathers indicating the robin's age. Her fingers traced its orange chest, feeling along the bone for telltale fat deposits that signal a healthy bird.

Girard needed a blood sample from the robin to test the strength of its immune system, and she had to work quickly, before the bird's stress weakened its immune response. She moved feathers from the bird's neck, baring translucent skin colored with fine blood vessels. Whispering soothing words, she drew her sample with a needle.

In all, Girard and her colleagues would catch and test four robins, a sparrow, a cardinal and a blue jay on this morning as part of a research effort aimed at understanding why certain neighborhoods in the Chicago area are "hot spots" for the West Nile virus.

Mosquitoes transmit the virus to humans after feeding on infected birds, leading to sickness and even death. In 2002, as West Nile became an epidemic and moved west across the U.S., Illinois led the nation with 21 percent of all human infections, according to the Centers for Disease Control and Prevention. More than 75 percent of those infections

occurred in the Chicago area, a region that "continues to be a persistent focus of activity," said Dr. Tony Goldberg, a University of Wisconsin epidemiologist who is leading the West Nile study.

"In Cook County and the suburbs of Chicago is where we get the most reports of the virus," said Melaney Arnold, a spokeswoman for the Illinois Department of Public Health. Sixty percent of new human cases of the virus in Illinois happen in Cook County, the department reports.

By tracking birds, mosquitoes and the weather, Goldberg's team hopes to figure out exactly why West Nile virus is transmitted there at higher rates. One goal is to discover the reasons certain birds are more susceptible to the virus, perhaps different habits or weaker immune systems.

The findings also may help scientists understand, in general, why viruses become more prevalent in specific areas.

"West Nile virus is here to stay," Goldberg said. "It's an important disease and an excellent model system to study other diseases of the future so we can be in a much better position to prevent outbreaks."

"We need these types of natural history studies going in the long term so we can detect when a new disease comes up as the world becomes a smaller place," said Dominic Travis, a veterinary epidemiologist at the Lincoln Park Zoo. Travis is not involved in the study but monitors zoo animals for West Nile virus.

After drawing blood from the robin, Girard took the sample to a small table with laboratory equipment, set up next to her station wagon. The makeshift lab was powered by her car's battery.

Here, she mixed the robin's blood with bacteria to see how many would

be killed. The more dead bacteria, the stronger the bird's immune system.

The researchers are particularly interested in robins because although the birds may get sick, they usually recover, unlike blue jays and crows, which are highly sensitive to the virus and die. For that reason, researchers think robins are reservoirs for the disease.

Hatchling birds likely have different immunity than adults, Goldberg added, and seem to be important in virus transmission.

If the robin is infected with West Nile, the researchers will determine the genetic code of the virus in an effort to track variations in the virus by location. In addition to birds, virus samples are being collected from mosquitoes caught in traps. The team will see how the virus changes over time, which may contribute to how infectious it is.

Before the robin was released, it was equipped with a radio transmitter. Understanding the habits of robins may help explain their susceptibility to West Nile, but surprisingly little is known about what robins do when it gets dark. Transmitters help track the birds at night.

Gabe Hamer, a postdoctoral researcher from the University of Wisconsin, held the robin while University of Illinois graduate student Bethany Krebs slid two tail feathers through the Chiclet-size radio transmitter. An antenna was attached with a few knotted threads so it lay parallel to the feathers.

The radio transmitter, which doesn't interfere with flight and will be shed when the robin molts, emits ultrasonic beeps that a receiver can register up to a half-mile away. Goldberg and his crew drive around the suburbs, tracking beeps to sleeping birds' roosts.

Densely packed robin roosts are buffets for mosquitoes. The majority of the birds in a roost tend to be hatchlings, which may help explain why they are more frequently infected with West Nile.

The weather is tracked at these locations to determine what conditions are most favorable for birds and mosquitoes. The research group sets up weather stations that detect wind speed, temperature, humidity and rainfall.

Goldberg said coordination with local authorities is required when installing the weather stations. Even with those preparations, the team still encounters problems.

"One woman took (the weather station) down and chopped down all the shrubbery that the robins were roosting in," he said.

After a day in the field, the group prepared to return to the lab with its samples of blood and mosquitoes. Hamer, now holding the robin, opened his hands. The bird flew to a nearby branch, fluffed its feathers and took off into blue skies.

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