

Research results confirm need for protection against ticks that carry Lyme disease

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The life cycle of the *Ixodes scapularis* commonly known as the deer tick or the black-legged tick. Lyme disease is caused by the spirochete *Borrelia burgdorferi* which is transmitted by an infected vector tick to a host during feeding. Credit: University of Illinois

Research on the population of black-legged ticks, which can transmit Lyme disease from host animals to humans, reinforces that it is important to take preventative measures when spending time outdoors.

University of Illinois graduate student Jennifer Rydzewski conducted a four-year survey of black-legged ticks (also known as deer ticks), their host animals, and their habitat preferences in Cook, Lake, DuPage, and Piatt Counties. The survey confirmed the presence of ticks in all four counties and ticks carrying Lyme disease in Piatt County. Higher

numbers of ticks were found along the Des Plaines River corridor.

"Their small size makes ticks really difficult to see. They're about the size of a poppy seed," Rydzewski said.

"Ticks in the nymph stage of their life cycle are responsible for the most human cases of Lyme disease because their peak seasonal activity coincides with increased human activity outdoors during the warmer summer months, so it's important for people to take extra precautions."

In humans, early symptoms of Lyme disease are often nondescript, flu-like symptoms such as fever, headache, and fatigue, making it difficult to diagnose from symptoms alone. In about 70 percent of the cases, people will develop the typical bullseye-shaped rash associated with Lyme disease. If it's caught in the early stages it can be treated with broad-spectrum antibiotics; however, if it's not treated early, the result can be long-term severe joint pain, arthritis and [neurological damage](#). The disease is named after the town of Lyme, Connecticut, where a number of cases were identified in 1975.

Rydzewski used a disease triangle to illustrate how Lyme disease is spread. One point of the triangle is the host - in this case, it could be a mouse, deer, or other bird or small mammal. A second point on the triangle is the pathogen *Borrelia burgdoferi*. Bacteria, in the case of Lyme disease, are spread by a vector, the tick. The third point of the triangle is the environment. "If you remove one of these components, the system fails and the disease can no longer be maintained.

"The natural landscapes of Illinois are continually being fragmented and evolving as urban development and agriculture increase," Rydzewski said.

"It's important to understand these host/vector/pathogen interactions in a

dynamic landscape. Studying this multi-host pathogen can help us to discover ways to manage either the landscape or the host in order to control the vector and the pathogen."

The white-footed mouse is a particularly competent host at maintaining the bacteria in the environment. White-tailed deer and migratory birds are important dispersal agents for ticks as they're capable of traveling long distances and depositing ticks in new areas. Rydzewski believes that deer following the river may account for the increased number of ticks found along the Des Plaines River corridor.

In the Piatt County portion of the survey, from June through October of 2005 to 2009, on approximately 24 nights per year, 200 small mammal traps within four different habitat areas were set, baited with sunflower seeds at night and retrieved the next morning. Once the traps were collected, mammals were identified, sexed and ear-tagged, ticks were removed and an ear punch was taken, which is a 2-millimeter circle biopsy of ear tissue. The ticks and ear punches were tested for presence of the bacteria that causes Lyme disease infection.

A different technique was used for the survey within forest preserves in Cook, Lake and DuPage counties. At 36 sites in the tri-county area in the spring and summer months of 2008 and 2009, tick drag cloths were used. The cloths are made from 1-square-meter corduroy attached to a wooden dowel which is dragged along the trail's edges. Every 30 seconds, the cloth was checked and ticks were removed and placed in sealed vials to be tested. Using this technique, 296 deer ticks were collected in 2008 and 306 in 2009.

Lake Cook County near Lake Michigan had the highest number of deer ticks found.

There are some fairly easy preventative measures that individuals can

take in order to prevent coming into contact with ticks:

1. Wear light-colored clothing so it's easy to see the ticks.
2. Wear long sleeves and pants; tuck pants into socks or tape pants to boots.
3. Use insect repellent containing DEET.
4. Stay in the center of maintained trails.
5. Perform frequent tick checks when you're outside.
6. Do a tick check at the end of the day and again the following morning.
7. Put your clothes in the dryer when you come home to dry out and kill the ticks.

By way of background, in 2007 deer ticks were found within the Chicago region with 32 to 37 percent of the [ticks](#) testing positive for the disease.

"This data confirmed an increased chance of contracting Lyme disease in the metropolitan region of Chicago and sparked an interest in conducting further studies," Rydzewski said.

From the Illinois Department of Public Health, 108 human cases of Lyme disease were reported in Illinois in 2008, compared to only 35 cases in 2000. "Increased surveillance and awareness of Lyme disease may account for a portion of those cases, but there is truly a rise in emergence. And it is possible that the number of [Lyme disease](#) cases in

Illinois is underreported," Rydzewski said.

Provided by University of Illinois at Urbana-Champaign

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