

Scientists uncover details on the rise of a tick-borne disease on Long Island

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Scientists at the Center for Infection and Immunity (CII) at Columbia University's Mailman School of Public Health report elevated levels of a pathogen responsible for the tick-borne disease babesiosis in Suffolk County, New York, where rates are the highest in the state. Results are published in the journal *mSphere*.

Researchers developed and employed a method to simultaneously [test](#) for five common pathogens carried by [deer ticks](#): *Babesia microti*, the pathogen behind babesiosis; *Borrelia burgdorferi*, the cause of Lyme [disease](#); as well as *Anaplasma phagocytophilum*, *Borrelia miyamotoi*, and Powassan virus—pathogens responsible for other [tick](#)-borne infections.

The team collected and tested 318 adult and nymph ticks at five sites in Suffolk County (Southampton, Mannorville, Southold, Islip, Huntington) and three sites in Connecticut (Mansfield, Stamford, Greenwich). Nymphal ticks are about the size of a poppy seed, emerge in warmer months, and are responsible for the majority of tick-borne disease.

A Better Test

The [new test](#) uses a DNA amplification technique called [polymerase chain reaction](#) or PCR to test for tick-borne pathogens. Most existing tests use this method to test ticks for each agent individually. Even the tests that have the ability to test for more than one agent typically only test for up to three, not five agents, and never for Powassan virus, the

rarest but most pathogenic of the five. The scientists say the technique has several advantages: it lowers costs, facilitates testing for agents (*B. miyamotoi*, and especially Powassan virus) that are rarely tested for, and provides risk assessments for co-infections which may adversely affect the course of disease.

What They Found

Tests found *B. microti* present in a higher proportion of ticks in Suffolk County than Connecticut, including 17 vs. 7 percent of nymphal ticks. In both locations, *B. burgdorferi*, the causative agent for Lyme disease, was the most frequently detected agent in ticks tested while *A. phagocytophilum*, *B. miyamotoi* and Powassan virus were more rare.

One-quarter of *B. burgdorferi*-positive nymphs were also positive for *B. microti* suggesting a risk of co-infection with both agents from a single tick bite. "Gathering data on co-infections is particularly important in light of the fact that antibiotics used for Lyme disease may be ineffective for babesiosis," says first author Rafal Tokarz, a research scientist at CII.

Better Surveillance Needed

The number of counties in the Northeast with high rates of Lyme disease has more than tripled since the 1990s—a sign that ticks that spread disease have expanded their range. Rates of tick-borne illness may be much higher than reported: one study in Minnesota found 79 percent of cases were not reported to health authorities. Symptoms include fever and headaches, and, more rarely, neurological complications like encephalitis.

"This new test can strengthen surveillance for tick-borne illnesses which

are underreported and growing rapidly," says W. Ian Lipkin director of CII and John Snow Professor of Epidemiology at the Mailman School.

Provided by Columbia University's Mailman School of Public Health

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