

## **Authors and Disclosures**

### **Journalist**

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#### **Laura Newman, MA**

Laura Newman is a freelance writer for Medscape.

Disclosure: Laura Newman, MA, has disclosed no relevant financial relationships.

### **From Medscape Medical News**

## **Lyme Disease Ticks Endemic in Northeast, Northern Midwest**

Laura Newman, MA

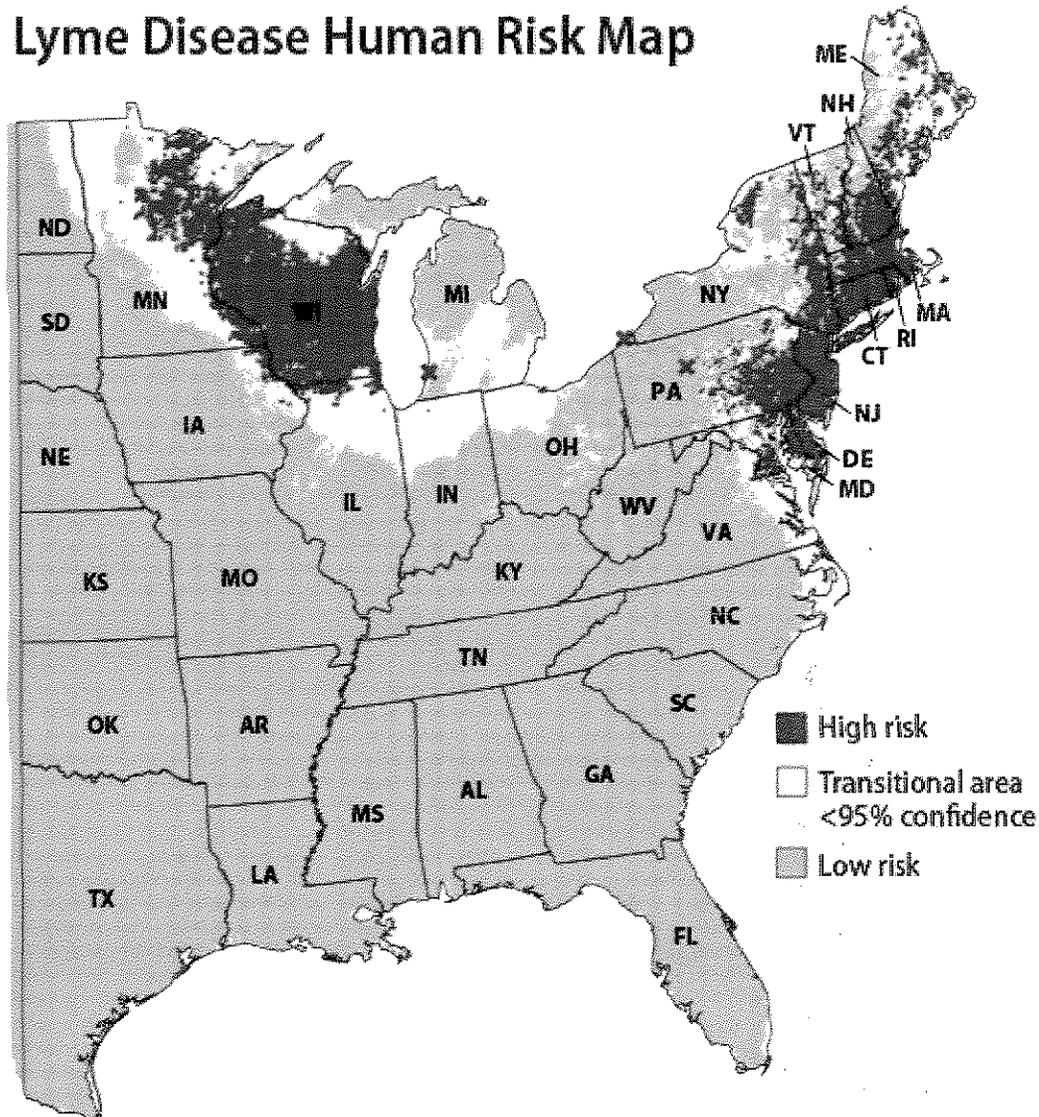
Feb. 2, 2012 — The eastern half of the United States contains 2 main foci with a high mean density of infected ticks that can cause Lyme disease. One focus is between southern Maine and northern Virginia, and the other is primarily in Wisconsin, northern Minnesota, and an area of northern Illinois.

Concerned that human tick reports are unreliable for determining areas where Lyme disease is endemic, researchers assembled a field staff of 80 tick hunters who meticulously worked at 304 sites from Maine to Florida in the most extensive mapping project of Lyme disease to date.

Armed with 1 m x 1 m pieces of corduroy, the workers set out to trap the black-legged tick *Ixodes scapularis*, which can carry the Lyme disease pathogen, *Borrelia burgdorferi*. Investigators led by Maria A. Diuk-Wasser, PhD, assistant professor of epidemiology from Yale School of Public Health, New Haven, Connecticut, determined the proportion of *I. scapularis* nymphs containing *B. burgdorferi* DNA.

Using that data, they generated a map showing the Northeast and upper-Midwest as the main endemic areas. Results from the study are published in the February *American Journal of Tropical Medicine and Hygiene*.

# Lyme Disease Human Risk Map



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Credit: Maria Diuk-Wasser, Yale School of Public Health

**Lyme map.** The map shows an elevated risk of Lyme disease from Maine south to Maryland, Northern Virginia, and the Washington DC area. Investigators found a separate region of increased risk in the upper Midwest. The 3 sites marked with red crosses indicate the only sites where investigators collected high numbers of infected ticks, but where the statistical model did not accurately predict them as high risk.

The authors question the current recommendation of tick bite prophylaxis when 20% or more of nymphs are infected with *B. burgdorferi*. Instead, they conclude, "Our results indicate that the presence of any number of infected nymphs may be considered sufficient to recommend postexposure prophylaxis."

The survey researchers found ticks in a large portion of the Northeast (including eastern Pennsylvania) from Maine to Maryland and Northern Virginia. Another pattern extended through most of Wisconsin, parts of northern Minnesota, and a piece of northern Illinois. The area could rapidly shift as a result of tree planting and deer migration.

Importantly, the researchers were able to identify areas where ticks could cause Lyme disease but where reported cases did not yet exist. Although *I. scapularis* nymphs are resident in the south, unlike their northern relatives, they have a preference for feeding off lizards and skinks. "The absence of infected host-seeking nymphal *I. scapularis* in most southern states suggests that reported cases from this region may be mostly caused by either misdiagnosis or travel to an endemic area," write the authors.

Between 2004 and 2007, field assistants sampled nymphs for a median of 5 times in each site in the study area during late spring and summer, when nymphs are most active. The investigators limited their sampling to the continental United States east of the 100th meridian, which includes 37 states. This area was selected because nymphs have been located here before.

Variables that proved significant in discriminating nymph-infected areas were low elevation, low vapor pressure deficit, and low seasonal extremes in minimum temperature ( $P < .001$ ). The proportion of infected nymphs was similar in the 2 geographic areas and between sites with high and low density of nymphs ( $P < .05$ ).

Dr. Diuk-Wasser concludes, "Because infected *I. scapularis* ticks may establish themselves in an area long before a human contracts Lyme disease, understanding where the ticks are endemic are crucial in improving prevention, diagnosis and treatment."

*The Lyme disease risk map was developed by researchers from the Yale University School of Public Health in collaboration with Michigan State University, University of Illinois, and University of California Irvine, through a cooperative agreement with the CDC. The authors have disclosed no relevant financial relationships.*

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