

Using dogs to map Lyme disease

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by Daniel J. Cameron, MD MPH

Researchers mapped Lyme disease in the USA using 11,937,925 *Borrelia burgdorferi* serologic test results from dogs collected within the 48 contiguous states between 2011 and 2015, according to [a study published in PLoS One](#). [1] Watson, from Clemson University, reported that 759,103 of those dogs had tested positive for Lyme disease.

Typically, there is a delay in diagnosing dogs with Lyme disease. Based on their review of the literature, the authors summarized several reasons for this:

- “The first signs of clinical disease in dogs are non-specific, including fever, general malaise, lameness, and swelling of local lymph nodes. These symptoms are likely to be overlooked by dog owners because they are transient, lasting only a few days.”
- “Detecting the later stages of disease require recognition of pain, however, a standardized protocol for pain assessment in veterinary species is lacking and mainly relies on dog owners to report disease symptoms.”
- “The assessment of pain in dogs can be difficult as they cannot self-report and is often reported by the owner as lethargy, decreased activity, or difficulty getting up, walking, or navigating stairs.”
- “It is often not until the dogs exhibit the characteristic shifting leg lameness several months after infection that owners note any abnormalities.” [1]

Seropositivity against *B. burgdorferi* was established using the late phase C6 antigen (ELISA) rather than the two-tier surveillance case definition established by the Centers for Disease Control and Prevention (CDC).

The study described a high prevalence of *B. burgdorferi* antibody in dogs in the 14 states identified as endemic for Lyme disease and high-risk for humans: Connecticut, Delaware, Maine, Massachusetts, Maryland, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and Wisconsin.

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The authors also noted a higher prevalence of *B. burgdorferi* antibody in dogs from other states, as well. “We observed an expansion of this endemic range to include Northern California, Southeastern Oregon, Southwestern Idaho, Eastern Colorado and Northern New Mexico,” writes Watson. [1] “Perhaps most

striking is the recognized expansion of seropositive dogs on the northern border of the contiguous U.S. along the Canadian border, including North Dakota, and the border of Northern Montana and Idaho.”

The growing number of dogs testing positive for Lyme disease in an expanding geographic region raises concerns about the threat to public health. “The westward expansion of canine *B. burgdorferi* seroprevalence from Minnesota into North Dakota mirrors recent reports that Lyme disease is poised to be a significant human public health concern in North Dakota,” notes Watson. [1] “Of note is the apparent convergence of *B. burgdorferi* infection of dogs from the Northeastern and Mid-Central United States in the Great Lakes region, encompassing Indiana, Ohio, Illinois, Kentucky and Michigan.”

The author’s findings suggest “annual testing of dogs in these states, as well as North Dakota and bordering Canadian provinces is strongly warranted.” Other regions might benefit from annual tests, as well. For example, in 2015, 606 of 57,785 test results reported in South Carolina were positive for *B. burgdorferi*, according to Watson.

An annual *B. burgdorferi* seroprevalence study of our dogs could highlight the potential risks for both dogs and humans in acquiring a tick-borne illness.

More: [New map shows where dogs are more likely to get Lyme disease](#)

References:

1. Watson SC, Liu Y, Lund RB, et al. A Bayesian spatio-temporal model for forecasting the prevalence of antibodies to *Borrelia burgdorferi*, causative agent of Lyme disease, in domestic dogs within the contiguous United States. PLoS One. 2017;12(5):e0174428.

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