

## LYME DISEASE: Notes about the Disease

Lyme disease (LD), a tick-borne disorder caused by *Borrelia burgdorferi*, takes its name from its original recognition in Lyme, Connecticut in the mid-1970s. Currently, it is still very much a regional disease, with the great majority of reported cases occurring in coastal areas of the northeast and in the north central states of Minnesota and Wisconsin.

Clinically, in the majority of cases, LD begins with erythema migrans (EM), an expanding reddish macule or papule at the site of a tick bite that eventually forms a large round lesion. There may be clearing in the center, yielding a "bull's-eye" appearance. If treated at this stage with the proper antibiotic, LD is almost always curable. Untreated early LD can progress to late involvement of the musculoskeletal, nervous, and/or cardiovascular systems.

*B. burgdorferi* is transmitted by the black-legged (deer) tick, *Ixodes scapularis*. The scarcity of true LD in the southeast, despite the presence of *I. scapularis* here, is a reflection of the intertwined life cycles of the LD spirochete and its arthropod vector. While in the northeastern US the larval and nymphal stages of the black-legged tick preferentially feed on certain rodents, amplifying infection rates to as high as 25%, in the southeast it feeds primarily on lizards. In the lizard species in which it has been tested, *B. burgdorferi* cannot survive, and this may account for the much lower positivity rate of this microorganism in the small populations of black-legged ticks found in the southeast. Also, even when present in an area in NC, these ticks tend not to attach to humans."

Adding to the confusion about LD here is the presence of another tick-borne disease, southern tick-associated rash illness (STARI). STARI is clinically characterized by the presence of EM and mild flu-like symptoms following attachment of a lone star tick (*Amblyomma americanum*). The etiologic agent for this disease has been tentatively identified as a spirochete, *Borrelia lonestari*, but Koch's postulates have not yet been completely fulfilled. STARI is known to exist in NC,<sup>3</sup> and because the CDC case definition allows for reporting of case patients whose sole objective evidence of LD is the presence of EM, it may well account for the majority of reported LD cases here.

The public health importance of true LD in NC is thus many magnitudes lower than in states like Connecticut. However, abetted by the presence of STARI and the inherent difficulty of accurately diagnosing a disease with variable clinical presentations resembling many others in an area of low incidence, laboratory confirmed cases of LD are not common here, and a considerable amount of confusion and misdiagnosis exists. The public health community should do its best to present the facts about LD as it attempts to correct misinformation about this disease."

1. AC Steere, J Coburn, and L Glickstein, "The Emergence of Lyme Disease," *J Clin Invest* 113 (2004): 1093-1101, [www.pubmedcentral.gov/picrender.fcgi?artid=385417&blobtype=pdf](http://www.pubmedcentral.gov/picrender.fcgi?artid=385417&blobtype=pdf).
2. C Apperson, B Engber, and M Waldvogel, "Residential, Structural and Community Pests: Ticks and Tick-Borne Diseases in North Carolina," *NC State University, Department of Entomology, North Carolina Cooperative Extension*, [www.ces.ncsu.edu/depts/entlnotes/Urban/pdf/ticks.pdf](http://www.ces.ncsu.edu/depts/entlnotes/Urban/pdf/ticks.pdf).
3. KB Kirkland, et al., "Erythema Migrans-Like Rash Illness at a Camp in North Carolina: A New Tick-Borne Disease?" *Arch Intern Med* 157 (1997): 2635-41, <http://archinte.ama-assn.org/cgi/content/abstract/157/22/2635>.
4. LH Sigal LH, "Misconceptions about Lyme Disease: Confusion Hiding Behind Ill-Chosen Terminology," *Ann Intern Med* 136 (2002): 413-9, [www.annals.org/cgi/reprint/136/5/413.pdf](http://www.annals.org/cgi/reprint/136/5/413.pdf).