



North Carolina Department of Health and Human Services  
Division of Public Health

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Date: 1 APR 2015  
To: NC Medical Providers  
From: Dr. Megan Davies, State Epidemiologist   
Subject: Annual Update on Surveillance for Lyme disease in North Carolina (2 pages)

### Lyme disease Introduction:

Lyme disease (LD) is caused by infection with the bacterium *Borrelia burgdorferi* sensu stricto transmitted by the bite of an infected *Ixodes scapularis* tick. The North Carolina Division of Public Health (DPH) would like to ensure that health care providers consider the possibility of LD when appropriate. The diagnosis of LD should be based on a combination of symptoms, physical findings, the possibility of exposure to infected ticks, and laboratory results.

### Surveillance for Lyme disease

Per North Carolina law, LD is reportable by health care providers to their local health department. Laboratory diagnostic tests demonstrating isolation or identification of *B. burgdorferi* are also reportable by laboratories to the Division of Public Health. [1] Surveillance for LD is based on the national case definition, which establishes uniform criteria for disease reporting in order to monitor trends, take action to reduce disease, and improve public health. [2] During 2014, a total of 172 (28 confirmed, 144 probable; provisional data) cases of LD were reported in NC. Since 2008, when the probable case classification was introduced, the number of reported confirmed cases of LD has remained relatively constant with an average of 24 cases per year. In contrast the number of reported probable cases has increased over four times from 31 to 144. (Figures 1& 2)

### Endemic County

As of March 2015, five counties (Alleghany, Guilford, Haywood, Wake and Wilkes) are designated, for surveillance purposes, as **endemic**. Counties are designated as endemic if at least two laboratory confirmed cases of early LD (characterized by erythema migrans, EM) are identified in persons who did not travel outside of their county of residence during the incubation period, 30 days. [2] In these situations, it is assumed that LD was acquired in the county of residence. A designation of endemic is not meant to imply a greater risk of transmission of *B. burgdorferi*, but is used to assist in classification of cases for surveillance. In counties classified as endemic, cases of EM alone, with no exposure to tick habitat outside of the endemic county of residence, are classified as confirmed. (Table 1)

### Serologic Testing for Lyme disease

If LD is suspected in a patient, DPH requests that appropriate laboratory tests be ordered to support a surveillance diagnosis. Serologic testing is insensitive in the acute phase (the first two weeks) of infection and may be falsely negative, so should not be used for clinical decision-making in the acute phase. If laboratory testing is not supportive of a surveillance diagnosis, please consider reordering convalescent testing two weeks later. [3] All late manifestations of LD (musculoskeletal, cardiac, and nervous) and early LD with exposure in a non-endemic county must also be accompanied by appropriate laboratory testing to fulfill the surveillance case definition requirements. Although testing for LD serology is not currently available at the NC State Laboratory of Public Health, samples submitted to the laboratory will be forwarded to CDC for testing. When ordering serologic tests be sure to request a total EIA (screening) test with an automatic reflex to IgG and IgM western blot if the EIA is positive or equivocal. (Figure 3)

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## Erythema Migrans rash in NC

There are multiple differential diagnosis for EM, including STARI (southern tick associated rash illness), ringworm, cellulitis and others. [4] STARI can occur after the bite of the lone star tick (*Amblyomma americanum*), the most common tick in North Carolina, which is not a known vector for *B. burgdorferi*. [5] The etiologic agent for STARI is unknown and there is no diagnostic test. STARI is an EM like skin lesion and a confounder for LD surveillance and the primary reason why all cases of EM should be accompanied by laboratory evidence of infection, to confirm diagnosis, particularly in areas where LD and STARI may coexist. In the southern United States, it has been recommended that EM rashes be treated presumptively as early LD, regardless of what the true cause of the rash may be. [6] However, where the incidence rate of LD is low, and the probability that an EM rash due to infection with *B. burgdorferi* is low, it has also been recommended that patients be observed, as opposed to receiving empiric treatment, to avoid complications of treatment. [7] Treatment for (potential) LD should be initiated on the best judgment of the attending clinician.

## Education of patients, prevention of disease:

We encourage all providers to educate their patients about personal protective measures to minimize their risk of acquiring tick borne illness. Lyme disease prevention materials are available from the CDC. Please visit our website (<http://epi.publichealth.nc.gov/cd/diseases/ticks.html>) or contact Carl Williams or Jodi Reber at 919-733-3419 with any questions or concerns that you have regarding surveillance of Lyme disease. Your time and consideration on this topic are greatly appreciated.

Figures 1 & 2:

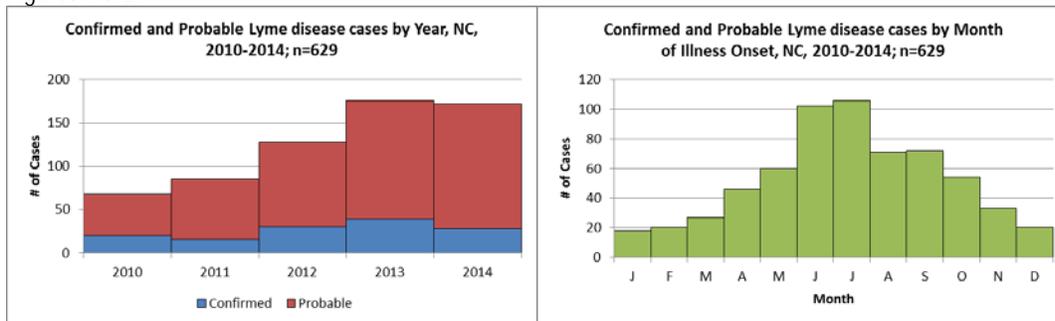


Table 1: Requirements to confirm (for surveillance) a case of LD based on county of residence & clinical presentation:

	EM Rash $\geq 5$ cm	Objective Late Manifestation(s)
Endemic County	Confirmed if known exposure occurred in a county endemic for LD ( <i>DPH encourages laboratory evidence be obtained to support case classification</i> )	Laboratory evidence required for confirmation
Non Endemic County	Laboratory evidence required for confirmation	Laboratory evidence required for confirmation

## References:

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- Stromdahl, et. al. Borrelia burgdorferi not confirmed in human-biting Amblyomma americanum ticks from the southeastern United States. J Clin Microbiol. 2015 Mar 18.
- Blanton, et. al. Southern Tick Associated Rash Illness: Erythema Migrans is not always Lyme disease. Southern Medical Journal 2008;101(7):759-760
- Lantos, et. al. Empiric Antibiotic Treatment of Erythema Migrans-Like Skin Lesions as a Function of Geography: A Clinical and Cost Effectiveness Modeling Study. Vector Borne and Zoonotic Diseases 2013;13(12):877-83

Figure 3:

