



NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**

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Division of Public Health

Date: 10 April 2019
To: North Carolina Clinicians
From: Alexis M. Barbarin, MEd, PhD, Public Health Entomologist
Through: Jean-Marie Maillard, MD, MSc, Medical Director
Subject: Annual Update on Diagnosis and Surveillance for Tickborne diseases

Introduction

Tickborne illnesses continue to cause significant morbidity in North Carolina. This update is intended to encourage patient education about prevention of tickborne illness, as well as to provide a reminder about diagnosis, treatment and reporting.

Surveillance for Tickborne Illnesses

Per North Carolina law (10A NCAC 41A .0101), clinicians are required to report confirmed or suspected cases of spotted fever group rickettsiosis (including Rocky Mountain spotted fever), ehrlichiosis, anaplasmosis and Lyme disease to their local health department. Laboratory diagnostic tests demonstrating isolation or identification of the pathogens are also reportable by laboratories to the Division of Public Health. North Carolina CDC determined case definitions for each of the tickborne infections, which establish uniform criteria for disease reporting to accurately monitor trends, take action to reduce disease, and improve public health.

Actions for North Carolina Clinicians

- Report cases of tickborne infections to your local health department promptly.
- Remind patients to take preventive steps, including recognizing and avoiding tick habitats; using insect repellent in likely tick habitats; removing attached ticks promptly; and creating tick-safe zones in their yard.
- Ask about tick exposure when evaluating patients with febrile illness with or without a rash.
- Familiarize yourself with the laboratory assays available to diagnose tickborne illness.
 - **Serologic testing for Spotted Fever Group Rickettsia and Ehrlichia**
 - Indirect immunofluorescence antibody (IFA) testing of at least two serum samples collected 2–4 weeks apart during acute and convalescent phases of illness is recommended for serologic confirmation of spotted fever group rickettsioses, ehrlichiosis and anaplasmosis.
 - Over 95% of reported spotted fever group rickettsiosis cases are not confirmed due to the absence of convalescent serum collection. Collection of convalescent sera would aid in better characterization of illness.
 - Serologic sensitivity is poor during the early stages of infection. Serologic testing in the first 1 to 7 days of illness onset is unlikely to generate a titer. If it does, a positive titer may indicate the presence of non-pathogenic, closely related rickettsia. However, if serology is negative in patients with possible early infection, repeating serology 3 to 4 weeks later may demonstrate seroconversion.
 - **PCR Testing for Ehrlichia**
 - PCR amplification of DNA extracted from whole blood specimens collected during the acute stage of illness is particularly useful for confirming infection with *Ehrlichia spp.*
 - **Two tier testing for Lyme disease**
 - A two-tier approach for *Borrelia burgdorferi* infection using a sensitive ELISA (EIA) followed by an IgG and IgM Western Blot is recommended. All specimens positive or equivocal by EIA should be reflexed for a Western Blot. Specimens negative by EIA need not be tested further.
 - As autochthonous transmission of Lyme disease has expanded throughout Virginia we are seeing increased transmission in portions of northern North Carolina. However, location of acquisition cannot be ascertained in persons with a travel history to a high incidence state (CT, DE, ME, MD, MA, MN, NH, NJ, NY, PA, RI, VT, VA, WI).

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LOCATION: 225 N. McDowell St. Raleigh, NC 27603
MAILING ADDRESS: 1902 Mail Service Center, Raleigh, NC 27699-1902
www.ncdhhs.gov • TEL: 919-733-3419 • FAX: 919-733-0490

Treatment for Tickborne Illness

Regardless of the ultimate cause of infection, if ehrlichiosis, anaplasmosis or spotted fever group rickettsioses is suspected, patients of all ages, including children, should be treated promptly and appropriately with doxycycline. Ehrlichiosis, anaplasmosis and spotted fever group rickettsioses are potentially fatal. Since laboratory confirmation of infection may take weeks, therapy should not be delayed pending diagnosis.

Additional Information

- CDC guide for health care professionals: <https://www.cdc.gov/mmwr/volumes/65/rr/rr6502a1.htm>
- CDC Lyme disease guidelines: <https://www.cdc.gov/lyme/treatment/index.html>
- Research on doxycycline and tooth staining: <https://www.cdc.gov/rmsf/doxycycline/index.html>

Summary data for all reportable condition is available here: <https://epi.publichealth.nc.gov/cd/diseases.html>

