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Tick Bites and Single-Dose Doxycycline as Prophylactic Treatment for Lyme Disease

In November 2006, the Infectious Disease Society of America (IDSA) updated their guidelines for the clinical assessment, treatment, and prevention of Lyme disease. These guidelines are available through the Centers for Disease Control and Prevention website (<http://www.cdc.gov/ncidod/dvbid/lyme/index.htm>). Under certain circumstances, the IDSA suggests the use of antimicrobial prophylaxis following a tick bite. Since the publication of the guidelines, the New Hampshire Department of Health and Human Services (NH DHHS) has received questions about the prophylactic treatment regimen and the conditions required for its full effectiveness. This document is intended to clarify for healthcare providers in New Hampshire the conditions under which single-dose prophylactic treatment is recommended and resources available to assist in determining if conditions are met.

Per the IDSA recommendations, a full course of antimicrobial treatment, as used in the treatment of active Lyme disease (i.e., 10-14 days), is NOT recommended for prevention of Lyme disease after a recognized tick bite in the absence of clinical symptoms. A single dose of doxycycline (200 mg) may be offered to adult patients and to children ≥ 8 years of age (4 mg/kg up to a maximum dose of 200 mg) when ALL of the following conditions exist.

1. **The attached tick is a black-legged tick (deer tick, *Ixodes scapularis*).** Tick identification is most accurately performed by an individual trained in this discipline. However, black-legged ticks are very common in southeastern and central New Hampshire and there are many images available to help in general identification.

Centers for Disease Control and Prevention (CDC) Lyme Page
http://www.cdc.gov/ncidod/dvbid/lyme/ld_transmission.htm

University of Rhode Island – Tick Encounter Resource Center
http://www.tickencounter.org/education/tick_identification/

NH DHHS Lyme disease website
<http://www.dhhs.nh.gov/DHHS/CDCS/lymedisease.htm>

Ticks can be submitted to the NH Department of Agriculture, Markets and Food for free tick identification for New Hampshire residents. Given inherent delays in shipping and identification, providers should not wait for results before considering prophylaxis.
<http://www.dhhs.nh.gov/DHHS/CDCS/lymedisease.htm>

2. **The tick has been attached for at least 36 hours.** This determination is most reliably made by an entomologist, but simply asking the patient about outdoor activity in the time before the tick bite was

noticed can often lead to an accurate estimate of attachment time. Unengorged (unfed) black-legged ticks are typically flat. Any deviation from this "flatness," which is often accompanied by a change in color from brick red to a gray or brown, is an indication that the tick has been feeding.

3. **Prophylaxis can be started within 72 hours of the time that the tick was removed.** This time limit is suggested because of an absence of data on the efficacy of prophylaxis for tick bites following longer time intervals after tick removal.
4. **Doxycycline treatment is not contraindicated.** Doxycycline is contraindicated in pregnant women and children less than 8 years old. The other common antibiotic treatment for Lyme disease, amoxicillin, should **NOT** be used for prophylaxis because of an absence of data on an effective short-course regimen for prophylaxis and the likely need for a multiday regimen and its associated adverse effects.
5. **The geographic site where the tick was acquired has a local black-legged tick infection rate with *Borrelia burgdorferi* of at least 20%.** Preliminary studies suggest that greater than 20% of black-legged ticks in central and southeastern NH are infected with *Borrelia burgdorferi*. Due to low tick numbers, NH DHHS does not currently have sufficient data to estimate infection rates in other parts of the State. It is important to note, that infectivity rates can vary widely, even across short geographic distances, and in the same location over time.

Based on the above, the NH DHHS is recommending that if conditions 1-4 above are present, physicians consider use of single-dose prophylaxis according to the table below:

<i>County of Probable Tick Exposure</i>	<i>Single-Dose Prophylaxis?</i>
Hillsborough, Merrimack, Rockingham, Strafford	Single-dose prophylaxis should be considered , as described above
All other counties not listed above	Given inadequate data at this time, NH DHHS is unable to make a recommendation for prophylaxis

Note that single-dose doxycycline is not 100% effective for prevention of Lyme disease; consequently, patients who receive this therapy should monitor themselves for the development of Lyme disease as well as other tick-borne diseases including anaplasmosis and babesiosis. Testing of ticks for tick-borne infectious agents is not recommended for guiding individual patient's prophylaxis or treatment decisions.

Personal protection remains the most reliable method of tick-borne disease prevention. Please continue to recommend personal protective measures to your patients. These include the use of protective clothing and tick repellents, checking the entire body for ticks after outdoor activities, and prompt, proper removal of attached ticks before transmission of pathogens can occur. These steps are especially important during the period of greatest risk (May through August), when the nymph (juvenile) stage of the black-legged tick is active; nymphs are very small (< 2mm) and often go unnoticed while attached to people. Additional information and educational materials can be found at <http://www.dhhs.nh.gov/DHHS/CDCS/lymedisease.htm>.