

EDITOR'S MESSAGE

Lyme disease in Nova Scotia – an update

The steady rise in Lyme disease cases over the past decade has raised concern among Nova Scotian residents living in endemic areas.¹ With the exception of Cape Breton Island and Guysborough county, the remaining areas of Nova Scotia are now considered higher risk for Lyme disease with the whole province being labelled an at-risk area for culprit ticks.^{2,3} The first case of Lyme disease in Nova Scotia was confirmed in 2002 with recent reports rising to more than 500 cases in 2017.² Results from the 2017 Canadian Pediatrics Surveillance Program indicate that 42% of nationally reported Lyme disease cases in children < 16 years old occurred in Nova Scotia.⁴

Lyme disease was first described in the 1970's as an oligoarticular arthritis in children and adults endemic to three small communities in Connecticut, USA – a presentation now known to be a manifestation of late disseminated disease. The condition was then aptly named after one of these communities where it was first studied; Lyme, Connecticut.⁵ Lyme disease is a vector borne infection caused by the gram-negative spirochete *Borrelia burgdorferi*. In Nova Scotia, this bacterium is transmitted to humans when blacklegged ticks (*Ixodes scapularis*) previously infected from feeding on diseased small mammals, pass on the bacteria to humans.⁶ Transmission of bacteria from the tick saliva occurs as the ticks become engorged. After being bitten by an infected tick the risk of being diagnosed with Lyme disease is estimated to be less than 4% even in an endemic area, with evidence suggesting that attachment >36 hours is necessary for transmission.^{7,8} Overall, the risk rises with increased duration of attachment and the degree of engorgement.⁸

Although patients with Lyme disease may have no symptoms, most cases are classified as early or late disease.⁶ The manifestations of Lyme disease are grouped into three categories: early localized disease (< 30 days), early disseminated disease (< 3 months), and late disseminated disease (> 3 months).¹⁰ Patients presenting early may have localized erythema migrans sometimes accompanied by fever, arthralgias, or headache. If untreated, infection can become disseminated disease including multiple erythema migrans, lymphadenopathy, cardiac abnormalities (AV block, tachyarrhythmias, etc.), and neurologic complications (cranial neuropathy, encephalopathy, encephalomyelitis, etc.).^{9,10}

The diagnosis of Lyme disease differs based on the timing of presentation. Early Lyme disease with local erythema migrans is diagnosed clinically as serological testing has low sensitivity during the first four weeks

of infection. Patients presenting later in the disease course with a compatible clinical picture are more likely to have had an antibody response, and so the pre-test probability of serological testing will be higher. In Nova Scotia a validated serologic testing protocol is used. The first step of the protocol utilizes an enzyme immunoassay screening test to identify antibodies to *B. burgdorferi* protein at the microbiology lab in Halifax. Samples that screen positive or are indeterminate then undergo confirmatory testing at the National Microbiology Laboratory (Winnipeg) where they undergo a two-tier protocol by retesting with an Enzyme-linked immunosorbent assay and Western Blot.¹¹

Tick bite prevention recommendations include wearing long-sleeved shirts and pants with close toed shoes, using insect repellent diethyltoluamide (DEET) or Icaridin, staying on well-travelled or mowed paths, bathing within two hours of being outdoors, and performing full body checks with careful tick removal after outdoor activity.³ Recommendations for antibiotic prophylaxis after a tick bite require patients to meet a set of four criteria. The criteria require that 1) there be an identifiable deer/black legged tick attached for >36 hours, 2) prophylaxis be started within 72 hours of tick removal, 3) the rate of *B. burgdorferi* tick infection in the area is >20% (consider medium-high risk counties in NS), and 4) doxycycline is not contraindicated.¹⁰

Lyme disease treatment varies depending on the stage and population involved and is outlined in the Infectious Diseases Society of America guidelines for the prevention and management of Lyme disease.⁹ Although antibiotic resistance is a concern for other bacterial conditions there is no evidence suggesting *B. burgdorferi* strains are resistant to currently recommended antibiotics.^{12,13} Patients presenting with early localized or early disseminated disease without central nervous system (CNS) involvement (except Bell's palsy) can be treated with doxycycline, amoxicillin, or cefuroxime. Treatment recommendations for Lyme disease with CNS involvement or carditis are subdivided based on early versus late presentation with unique treatment for each.⁹

The challenges for primary care clinicians involve identifying a variety of Lyme disease presentations, understanding the utility of serological testing, and knowing when to offer prophylaxis or treatment for their patients. With the incidence of Lyme disease in Nova Scotia rising it is important that clinicians stay up to date with current diagnostic and treatment protocols to provide patients with appropriate and timely care

(<https://www.canada.ca/en/public-health/services/diseases/lyme-disease/health-professionals-lyme-disease.html>).

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References

1. Smith, Emma. "South shore residents, visitors urged to do daily tick checks" CBC News. (13 May 2018) <<https://www.cbc.ca/news/canada/nova-scotia/municipality-of-district-of-lunenburg-black-legged-ticks-lyme-disease-1.4661029>> (22 Aug 2018).
2. Doctors Nova Scotia. "What you really need to know about Lyme disease in Nova Scotia." (06 Jul 2018) <<https://www.yourdoctors.ca/blog/general/what-you-really-need-to-know-about-lyme-disease-in-nova-scotia>> (22 Aug 2018).
3. Nova Scotia Department of Health and Wellness. "Lyme Disease." Communicable Disease Prevention and Control. <<https://novascotia.ca/dhw/CDPC/lyme.asp>> (22 Aug 2018).
4. Lyme disease: An emerging infectious disease in Canada. Langley J. Canadian Paediatric Society Annual Conference, Vancouver, in June 2017 (oral presentation)
5. Steere AC, Malawista SE, Snyderman DR, Shope RE, Andiman WA, Ross MR, et al. Lyme arthritis: an epidemic of oligoarticular arthritis in children and adults in three connecticut communities. *Arthritis rheum* 1977;20(1):7-17.
6. Infectious Disease Expert Group. "Statement for managing Lyme disease in Nova Scotia." Department of Health and Wellness. (09 Apr 2018) < https://novascotia.ca/dhw/cdpc/documents/statement_for_managing_LD.pdf> (22 Aug 2018).
7. Shapiro ED, Gerber MA, Holabird ND, Berg AT, Feder HM, Bell GL, et al. A controlled trial of antimicrobial prophylaxis for Lyme disease after deer-tick bites. *N Engl J Med* 1992;327(25):1769-73.
8. Nadelman RB, Nowakowski J, Fish D, Falco RC, Freeman K, McKenna D, et al. Prophylaxis with single dose doxycycline for prevention of Lyme disease after an Ixodes scapularis tick bite. *N Engl J Med* 2001;345(2):79-84.
9. Wormser GP, Dattwyler RJ, Shapiro ED, Halperin J, Steere AC, Klempner MS, et al. The clinical assessment, treatment, and prevention of Lyme disease, human granulocytic anaplasmosis, and babesiosis: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis* 2006;43(9):1089-1134.
10. Hatchette TF, Davis I, Johnston BL. Lyme disease: clinical diagnosis and treatment. *Can Commun Dis Rep* 2014;40(11):194-208.
11. Hatchette TF, Johnston BL, Schleihauf E, Mask A, Haldane D, Drobot M, et al. Epidemiology of Lyme Disease, Nova Scotia, Canada, 2002-2013. *Emerg Infect Dis* 2015;21(10):1751-1758.
12. Hunfeld K, Kraiczy P, Kekoukh E, Schäfer V, Brade V. Standardised in vitro susceptibility testing of *Borrelia burgdorferi* against well-known and newly developed antimicrobial agents – possible implications for new therapeutic approaches to Lyme disease. *Int J Med Microbiol* 2002;291(Suppl 33):125-137.
13. Hunfeld K, Ruzic Sabljic E, Norris DE, Kraiczy P, Strle F. In vitro susceptibility testing of *Borrelia burgdorferi* sensu lato isolates cultured from patients with erythema migrans before and after antimicrobial chemotherapy. *Antimicrob Agents Chemother* 2005;49(4): 1294-1301.



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