

Lyme disease – testing advice for NSW clinicians

Background

Lyme disease (Lyme borreliosis) is a multisystem tick-borne zoonosis caused by spirochaetes of the *Borrelia burgdorferi* genospecies complex. Ticks with *Borrelia burgdorferi* infection are found in temperate forested areas of northern Asia, Europe and North America.

- In Australia, Lyme disease has been detected in returned travellers who have acquired the infection while travelling overseas.
- Although clinical presentations of a Lyme illness, without a history of overseas travel are reported in Australia, the cause of such conditions has not been determined. While locally-acquired Lyme disease cannot be ruled out, there is currently little evidence that it is transmitted in Australia.
- Clinicians should keep an open mind about the possibility of locally-acquired Lyme disease. Constellations of chronic debilitating symptoms require specialist consultation.
- Diagnosis of Lyme disease is based on clinical presentation and history, and laboratory testing performed in an Australian accredited pathology laboratory.

Laboratory testing

Testing should be performed in a **NATA-accredited laboratory** using validated methods. It is important to include relevant clinical history on the request form, particularly travel history, date of any known tick exposure, date of onset of illness and symptoms, and any antibiotic treatment.

Diagnostic tests - serology

The recommended testing strategy follows European and US-CDC guidelines for two-step serological testing with a screening immunoassay and a confirmatory immunoblot for antigens from *Borrelia burgdorferi sensu lato* genospecies (including *B. afzelii*, *B. garinii*).

- The IgG tests are preferred as these are more specific than the IgM tests. Tests for IgM can be considered, depending on the time elapsed since the onset of symptoms.
- If the IgG screening test is negative, and recently acquired Lyme disease is clinically suspected, a second blood sample should be collected 4-8 weeks later for IgG testing.
- If the IgG screening test is positive, the specimen is tested by confirmatory immunoblot for specific IgG. Detection of a specified number of reactive bands is considered diagnostic for *B. burgdorferi sensu lato*.

infection at some time (i.e. recent or past infection).

- Collect a 5-10ml blood sample for serology and send with the relevant clinical information to your usual pathology service for a screening immunoassay.
- If the Lyme disease screening immunoassay is positive, the serum sample will be referred to the specialist laboratories of NSW Health Pathology at; ICPMR-Westmead or NSWHP Royal North Shore Microbiology, for a confirmatory immunoblot.

Diagnostic tests - direct detection testing

Direct detection testing for the organism by nucleic acid testing (PCR) from biopsy specimens of suspected skin lesions is encouraged. This testing is available at NSW Health Pathology-Royal North Shore Microbiology. Other clinical samples for PCR testing should be first discussed with an Infectious Diseases Specialist.

- Aseptically collect a 4mm punch biopsy from the central point of the skin lesion suspicious for Lyme disease and place in a 5 ml sterile container half filled with sterile normal saline. Store and transport the specimen at room temperature.

NSW Health Pathology Contact details for clinicians

Serology

NSWHP-RNSH: 02 9926 4366
NSWHP-ICPMR: 02 8890 6255

Direct detection (PCR)

NSWHP-RNSH: 02 9926 4366

Interpretation of test results

Diagnosis should be made according to the patient's clinical presentation, risk of exposure to infected ticks in an endemic area, and the results from laboratory tests performed in a NATA-accredited laboratory. When interpreting testing results, advice should be sought from a specialist in infectious diseases or clinical microbiology.

The following points should also be considered when interpreting Lyme disease test results:

- An IgM response may be delayed up to 3 weeks after the infection and may not be detected at the onset of symptoms such as rash or skin lesion. It may also persist for months.
- Specific IgG is usually detectable 4-6 weeks after infection and may remain elevated for years after clinical remission. A strong IgG response is usually found in disseminated or late-stage Lyme disease.
- If a patient has a chronic illness (months to years) but is seronegative for Lyme disease antibodies, in that case Lyme disease is unlikely to be the cause of symptoms and other diseases should be considered..
- Antibiotic treatment given early in the course of Lyme disease (e.g. *erythema migrans*) may prevent the development of antibodies and this should also be considered when interpreting negative test results.
- As with any diagnostic test, a positive result is more likely to be a false-positive if the test is performed on a person with a low pre-test likelihood of having the condition, such as testing for Lyme disease in

persons who have not travelled overseas.

- False positive results for Lyme disease antibodies have been reported with other spirochaete infections (such as syphilis, *Treponema denticola* from gum disease, leptospirosis, relapsing fever), and other conditions including EBV infection (infectious mononucleosis), autoimmune diseases (such as rheumatoid arthritis and SLE), bacterial endocarditis, and *Helicobacter pylori* infection.

Additional resources

1. NSW Health [Lyme disease fact sheet](#).
2. [Senate Final Report: Growing evidence of an emerging tick-borne disease that causes a Lyme-like illness for many Australian patients](#), Commonwealth of Australia 30 November 2016
3. Commonwealth Department of Health and Aging [Tick bite diseases and symptoms attributed to tick bites](#)
4. Royal College of Pathologists of Australia (RCPA) Position Statement - [Diagnostic Laboratory testing for Borreliosis \('Lyme Disease' or similar syndromes\) in Australia and New Zealand. March 2016](#)
5. Stanek G et al. [Lyme borreliosis: Clinical case definitions for diagnosis and management in Europe](#). Clin Microbiol Infect 2011;17; 69-79
6. CDC. [Notice to Readers: Recommendations for test performance and interpretation from the Second National Conference on Serologic Diagnosis of Lyme Disease](#). MMWR 1995;44(31);590-591.
7. CDC. [Notice to readers: Caution regarding testing for Lyme Disease](#). MMWR Weekly2005;54(05); 125.
8. Feder HM et al. [A Critical Appraisal of "Chronic Lyme Disease"](#). N Engl J Med 2007;357:1422-30.

For further information please call your local Public Health Unit on **1300 066 055**.