

Diagnostic Testing for Canine Lyme Disease: How Testing Can Influence Diagnosis and Treatment

Overview

Infection with *Borrelia burgdorferi*, the causative agent of canine Lyme disease, is being more widely detected throughout the country, resulting in increased interest in managing this often subclinical disease.

IDEXX's diagnostic tests for detecting Lyme disease, the SNAP® 3Dx® Test, SNAP® 4Dx® Test and Lyme Quant C₆® Test, use the C₆ antigen, a unique, synthetic peptide derived from an outer-surface portion of *Borrelia burgdorferi*. The SNAP 3Dx and SNAP 4Dx tests provide patient-side identification of Lyme-positive dogs, and the Lyme Quant C₆ Test, a reference laboratory test, supplies a quantitative C₆ antibody level (similar to a titer), which allows you to evaluate the infection so you can determine whether treatment is warranted as well as monitor response to treatment.

Research shows that the C₆ antibody is detectable earlier in infection, is specific, will not cross-react with vaccination or other tick-borne infections and, most interestingly, declines rapidly and significantly after successful treatment.¹⁻³ The combination of these C₆ assays allows you to identify infection and use valuable, measurable information to decide on a therapeutic plan and to monitor your treatment choice.

Lyme Testing Can Influence Your Therapeutic Plan

What are the benefits of screening clinically healthy dogs for Lyme disease?

- Potentially dangerous diseases, such as Lyme-associated nephropathy, may be prevented if a dog who is Lyme-positive is treated before the development of proteinuria.
- Lyme-associated nephropathy may be detected before clinical illness develops by screening and monitoring seropositive dogs for proteinuria.
- Clinical signs of canine Lyme disease can be vague, and sometimes there is a response to treatment in dogs that were originally perceived as being without clinical signs.
- Clients can be educated on tick-prevention programs.
- Knowing if the dog is seropositive can aid in vaccination decisions.

What does it mean when the SNAP® test remains positive for Lyme after treatment, and what should I do?

This just means that the C₆ antibody level is still above the detection limit of the SNAP test. The animal still may have been effectively treated. To determine this, a Lyme Quant C₆ Test should be performed.

How do I use the follow-up Lyme Quant C₆ Test after treatment to determine if a dog was successfully treated?

- A $\geq 50\%$ drop in C₆ level indicates successful treatment even if the level remains ≥ 30 U/mL. This follow-up C₆ level is the dog's new baseline for evaluating a future Lyme Quant C₆ screening test.
- A $\leq 50\%$ drop in C₆ level may indicate noncompliance with treatment, ineffective treatment or reinfection. Consider retreating the dog and rechecking the C₆ level in 6 months.

How do I use the new baseline C₆ level to help me interpret future C₆ screening tests?

- If the dog's 6-month post-C₆ level is $< 50\%$ from the original pretreatment level, but still ≥ 30 U/mL, the dog will likely remain positive for some time on future SNAP 3Dx screening tests.
- If the C₆ level remains the same on future Lyme Quant C₆ Tests, and even if the results are ≥ 30 U/mL, then the animal has not been reinfected and does not require retreatment.
- If the C₆ level has increased from the posttreatment baseline value on future Lyme Quant C₆ Tests, reinfection is likely and retreating the dog should be considered with a follow-up C₆ level six months posttreatment.

Why is it beneficial to run the Lyme Quant C₆ Test rather than treat all dogs that are Lyme-positive on the SNAP test?

- Having a C₆ level can help determine whether treatment is warranted in the first place.
- Following the drop in C₆ level posttreatment helps you determine whether treatment was successful.
- Since many dogs' C₆ levels do not become negative after treatment, the SNAP test may remain positive and stay positive for years. In that case, you would not be able to tell the owner if the dog had been successfully treated, resulting in unnecessary retreatment of the pet and unnecessary owner concern.
- For the reasons stated above, not having a baseline and a posttreatment C₆ level can create confusion for monitoring treatment success and interpreting future C₆ screening tests.

Using the IDEXX-recommended protocol for screening and monitoring response to therapy allows you to determine whether a dog has been infected with *Borrelia burgdorferi* and whether treatment is recommended. It also allows you to determine whether treatment was effective and guides you in interpreting subsequent C₆ screening or follow-up tests.

Lyme Testing Can Benefit Your Clients and Patients

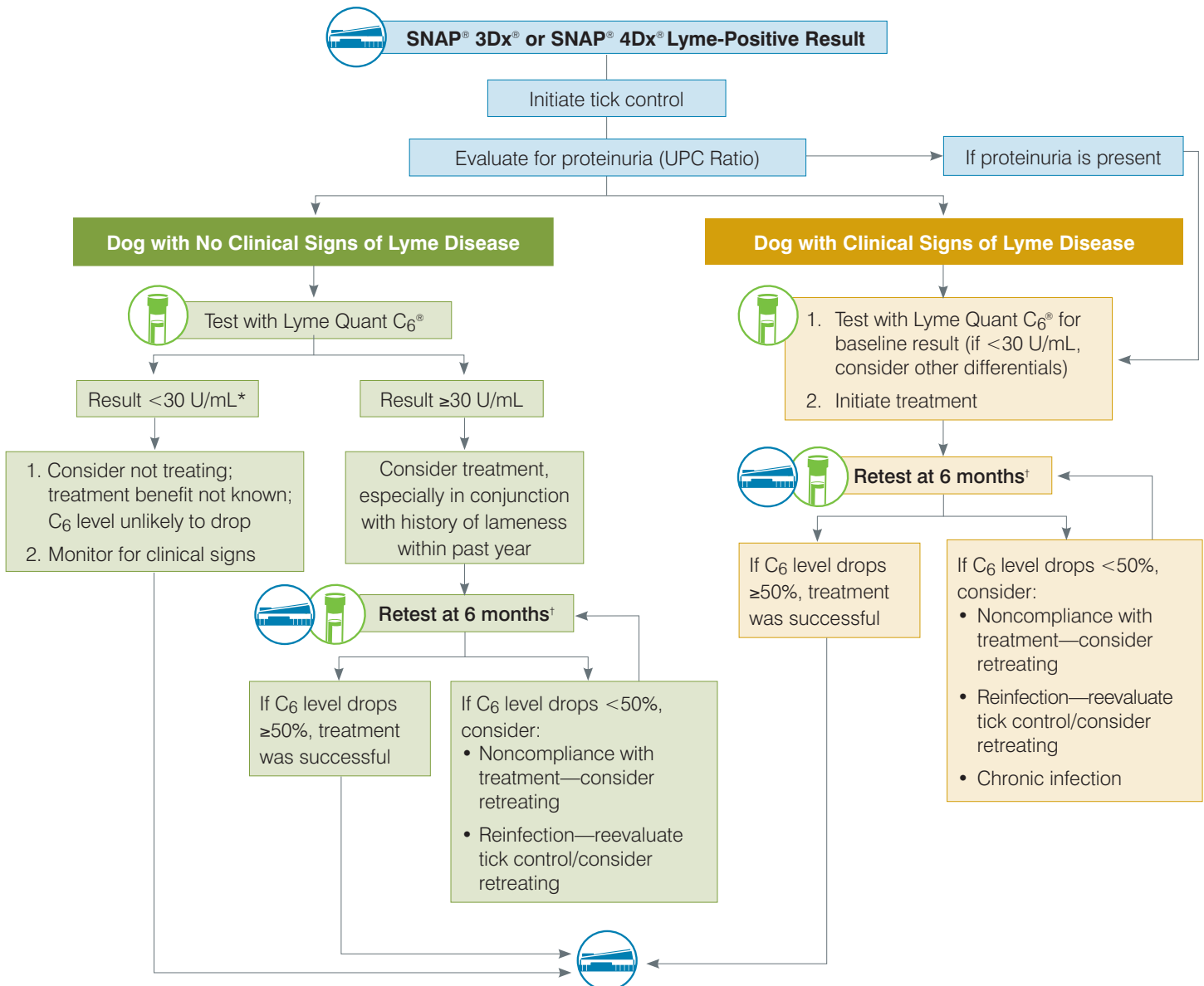
Having a well-defined and trusted protocol for Lyme screening, treatment and follow-up will instill confidence in your pet owners. This will help them to better understand the benefits of:

- Routine screening
- Complying with treatment recommendations
- Posttreatment follow-up
- Tick prevention programs
- Vaccination, if this is part of your Lyme prevention program

This peace of mind and confidence should lead to better owner compliance and understanding of this disease. Your clients can be reassured they are doing their best to prevent this potentially devastating disease.

1. Liang FT, Steere AC, Marques AR, et al. Sensitive and specific serodiagnosis of Lyme disease by enzyme-linked immunosorbent assay with peptide based on an immunodominant conserved region of *Borrelia burgdorferi* VlsE. *J Clin Microbiol.* 1999;37(12):3990-3996.
2. O'Connor TP, Esty KJ, Hanscom JL, Shields P, Philipp MT. Dogs vaccinated with common Lyme disease vaccines do not respond to IR₆, the conserved immunodominant region of the VlsE surface protein of *Borrelia burgdorferi*. *Clin aDiagn Lab Immunol.* 2004;11(3):458-462.
3. Philipp MT, Bowers LC, Fawcett PT, et al. Antibody response to IR₆, a conserved immunodominant region of the VlsE lipoprotein, wanes rapidly after antibiotic treatment of *Borrelia burgdorferi* infection in experimental animals and humans. *J Infectious Dis.* 2001;184(7):870-878.

SNAP® 3Dx®/SNAP® 4Dx®/Lyme Quant C₆® Testing



Annual Lyme disease screen recommended, starting with the SNAP® 3Dx® and SNAP® 4Dx® Test

*If the patient has had tick exposure in the past month and could be in the process of seroconverting, consider retesting in 6–8 weeks.

†If upon retest, the SNAP 3Dx or SNAP 4Dx result is negative, treatment was successful; if the Lyme result is positive, quantify with the Lyme Quant C₆ Test.