

Routine Screening for Canine Lyme Disease

Testing apparently healthy dogs for canine Lyme disease has become quite popular in recent years. While it is sometimes appropriate to test for Lyme disease, a review of published literature provides guidance for routine screening of apparently healthy animals. The following summarizes some key findings from published sources.

Risks associated with routine screening:

Poor predictive value — Positive Lyme titers neither prove active infection nor predict clinical illness related to Lyme disease because:

- Although 90% of humans exposed to Lyme disease show clinical signs, only ~ **5% of dogs exposed to Lyme disease ever show clinical signs.**¹
- In one study, 4.8% of seropositive dogs showed signs of lameness/fever/anorexia, but so did 4.6% of seronegative dogs.¹ Because 90% of dogs in some Lyme-endemic areas test positive for Lyme exposure, a positive Lyme titer may not be a significant finding and may not indicate whether a dog is currently sick because of Lyme disease or predict whether it will become ill from Lyme disease in the future.¹

Overdiagnosis – In asymptomatic dogs, this high seroprevalence may cause confusion as to whether the disease is actually present. Conversely, in symptomatic dogs, there may be a false sense of security in making a diagnosis of Lyme disease. If 50% of dogs in your area have positive Lyme titers, then just by chance, 50% of dogs with trauma, other infections, immune-mediated disease, cancer, *etc.* will have positive Lyme titers.¹

Overtreatment – Should you treat every antibody positive patient for Lyme disease? In one study, 92.9% of lame dogs tested positive for Lyme exposure, **but so did 89.6% of apparently healthy dogs.** Among the lame dogs, 54% were given antibiotics (mostly tetracycline) while 46% were left untreated. **Limb/joint disorder resolved within 3 weeks in all dogs, regardless of whether treatment was given.**² Further, treating a lot of asymptomatic dogs will cause adverse effects in some and may cause microbial resistance at large.¹

A positive test result doesn't indicate Lyme-related illness – There is a generally accepted 5-step process for diagnosing Lyme disease in dogs. As shown below, a positive titer alone is not enough to diagnose Lyme disease, and Lyme testing is **third** in a list of requirements for diagnosing Lyme disease:

1. History of exposure to Ixodid ticks in endemic areas
2. Clinical signs with known association with *B. burgdorferi*
3. Supportive *B. burgdorferi* titers
4. Rule out other differentials
5. Rapid response to therapy for Lyme arthritis (usually 1–2 days)¹

NOTE: Even a rapid response to therapy doesn't necessarily "prove" Lyme disease was present. It may mean that the patient has spontaneously improved due to time (see "Overtreatment"), or the patient is responding to Doxycycline because the clinical signs were due to a co-infection with a doxycycline-sensitive organism.

Treatment may not help – *B. burgdorferi* spreads via tissue migration in the dog. No evidence exists that giving antibiotics to asymptomatic animals will prevent the development of protein-losing nephropathy in dogs.¹ In fact, **numerous studies have found that although antibiotic therapy seems to reduce the load of *B. burgdorferi* organisms, it may fail to eliminate the infection.**^{3,4,5,6,7} In at least one study, antibody levels declined during a 4 week treatment course in 100% of dogs studied, but began to rise again in 83% of dogs tested up to 6 months post-treatment.⁵

Not appropriate everywhere — **95% of human cases of Lyme disease occurred in just 12 states** (listed in order of incidence): New York, Connecticut, Pennsylvania, New Jersey, Massachusetts, Wisconsin, Minnesota, Rhode Island, Maryland, New Hampshire, Maine and Delaware.⁸ Since most states have a relatively low risk for Lyme disease, it may not be appropriate to "screen" apparently healthy dogs for Lyme exposure, especially in non-endemic or low prevalence areas.

What does a positive Lyme test mean?

- Indicates outdoor activity/tick exposure.
- Patient had natural exposure to the organism and may still be a carrier of *B. burgdorferi*, but **may or may not get sick** from it.
- May be **false positive**, especially in non-endemic areas.
- Allows veterinarians to monitor seroprevalence.

If you have a Lyme-positive result:

And the dog is symptomatic:

- Run a CBC and serum chemistry panel to rule out other differentials.
- Run a complete urinalysis including microalbuminuria test and/or urine protein/creatinine ratio.
 - If proteinuric, then treatment, monitoring and additional tests are recommended.
 - If not proteinuric, treat as symptoms and/or diagnosis dictate; monitor for proteinuria.
- Advise pet owner regarding preventives. In Lyme-endemic areas, dogs should be protected with a topical tick control (e.g., Frontline®, K9 Advantix®) and/or tick collar (Preventic® collar).

And the dog is asymptomatic:

- Run a CBC and serum chemistry panel.
- Monitor for proteinuria.
- **Advise pet owner regarding preventives.** In Lyme-endemic areas, dogs should be protected with a topical tick control (e.g., Frontline, K9 Advantix) and/or tick collar (Preventic collar).

References

- ¹ Littman MP. Canine borreliosis. *Vet Clin North Am Small Anim Prac* 2003;33(4):827-862.
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- ³ Straubinger RK, Summers BA, Change YF, et al. Persistence of *Borrelia burgdorferi* in experimentally infected dogs after antibiotic treatment. *J Clin Microbiol* 1997;35(1):111-116.
- ⁴ Straubinger RK, Straubinger AF, Summers BA, et al. Status of *Borrelia burgdorferi* infection after antibiotic treatment and the effect of corticosteroids: an experimental study. *J Infect Dis* 2000;181(3):1069-1081.
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- ⁶ Pahl A, Kuhlbrandt U, Brune K, et al. Quantitative detection of *Borrelia burgdorferi* by real-time PCR. *J Clin Microbiol* 1999;37(6):1958-1963.
- ⁷ Weber K. Treatment failure in erythema migrans — a review. *Infection* 1996;24(1):73-75.
- ⁸ CDC. Notice to readers: final 2002 reports of notifiable diseases. *MMWR* 2003;52(31):741-750.
- ⁹ Littman MP. Lyme disease in dogs. *Standards of Care* 2004;6(5):1-6.



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