

Lyme Disease: The Year in Review



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The year 2016 saw its share of excellent tick-borne disease articles as well as the usual stinkers. Here is a short list of good and bad articles from the past year.

Good articles are based on scientific evidence that is current and unbiased. The articles generally undergo objective peer review and are published in independent journals. Bad articles are based on expert opinion or evidence that has been refuted by newer studies. The articles generally undergo “like-minded” peer review and are often published in specialty society journals.

Here is a sample of good articles with their conclusions:

1. Jasik KP, Okła H, Słodki J, Rozwadowska B, Słodki A, Rupik W. **Congenital Tick- Borne Diseases: Is This An Alternative Route of Transmission of Tick-Borne Pathogens In Mammals?** Vector Borne Zoonotic Dis. 2015 Nov;15(11):637-44.

The article cautiously concludes that various bacteria including Lyme and relapsing fever spirochetes, Babesia, Rickettsia, Anaplasma, Bartonella and other tick-borne organisms may cross the placenta during pregnancy. Transplacental transfer of these pathogens, congenital diseases caused by them, and the risk of maternal infection to the fetus require further study.



2. Scott JD. **Studies abound on how far north Ixodes scapularis ticks are transported by birds.** Ticks Tick Borne Dis 2016 Mar;7(2):327-8.

Tick-borne diseases are thought to be rare in Canada. This article points out that 22 species of ticks have been identified on wild birds in Canada as far north as the Yukon, and the majority of these tick species are not indigenous to Canada. Some of these songbird-transported ticks originate from as far south as Brazil. Migrating songbirds transport ticks long distances into Canada during northward spring migration, increasing the risk of tick-borne diseases across Canada.

3. Pritt BS, Mead PS, Johnson DK, et al. **Identification of a novel pathogenic Borrelia species causing Lyme borreliosis with unusually high spirochaetaemia: a descriptive study.** Lancet Infect Dis. 2016;16:556-64.

The Mayo Clinic tested 100,545 clinical specimens by polymerase chain reaction (PCR) from 2003 to 2014. Six samples from Minnesota and Wisconsin yielded a novel Borrelia species

with unusually high levels of spirochetes in blood samples (spirochetemia). The novel pathogenic *Borrelia* species has been named *Borrelia mayonii*, and clinically it resembles the relapsing fever group of spirochetes. The study shows how little we know about Lyme disease spirochetes.

4. Eisen RJ, Eisen L, Beard CB. **County-scale distribution of *Ixodes scapularis* and *Ixodes pacificus* (Acari: Ixodidae) in the continental United States.** *J Med Entomol.* 2016 Mar;53(2):349-86.

The deer tick, *Ixodes scapularis*, that transmits Lyme disease in the eastern and central USA has now been found in 1,420 (45.7%) of the 3,110 continental counties. The Western blacklegged tick, *Ixodes pacificus*, that transmits Lyme disease in the western USA has been found in 111 (3.6%) of these counties. Combined, these vectors of *B. burgdorferi* and other tick-borne disease agents have been identified in 1,531 counties (49.2%) spread across 43 states in the continental USA. Thus, the range of Lyme disease appears to be much broader than previously thought.

5. Biggs HM, Behravesh CB, Bradley KK, et al. **Diagnosis and management of tickborne rickettsial diseases: Rocky Mountain spotted fever and other spotted fever group rickettsioses, ehrlichioses, and anaplasmosis - United States.** *MMWR Recomm Rep.* 2016 May 13;65(2):1-44

Tick-borne rickettsial diseases such as Rocky Mountain spotted fever continue to cause severe illness and death despite the availability of low-cost, effective antibacterial therapy. This report includes information on the epidemiology, clinical assessment, treatment, laboratory diagnosis, and prevention of rickettsial diseases across the USA. The distribution of tick-borne rickettsial diseases appears to be broader than Lyme disease and less predictable.

6. Stricker RB, Johnson L. Lyme disease: **the promise of Big Data, companion diagnostics and precision medicine.** *Infect Drug Resist.* 2016 Sep 13;9:215-9

This forward-looking analysis points to the need for more Big Data studies of tick-borne diseases, such as the online MyLymeData registry. For example, a study of more than 52,000 Lyme disease patients from Johns Hopkins Medical Center found that 36-63% of people infected with *B. burgdorferi* will fail conventional 30-year-old antibiotic therapy for Lyme disease. Improved diagnostic tests for tick-borne diseases using available and emerging techniques need to be implemented, and precision treatment of Lyme disease

using targeted therapies could be modeled on successful “designer drug” treatment for HIV/AIDS and hepatitis C virus (HCV) infection.



And now for a sample of bad articles:

1. Berende A, ter Hofstede HJ, Vos FJ, et al. **Randomized trial of longer-term therapy for symptoms attributed to Lyme disease. PLEASE Study.** N Engl J Med. 2016 Mar 31;374(13):1209-20.

By far the worst study of the year, this “controlled” trial of chronic Lyme treatment from the Netherlands had no true control group because all of the patients in the study received an additional two weeks of intravenous ceftriaxone therapy. Patients had significantly lower quality-of-life scores than the general population, and even though the additional intravenous antibiotic treatment improved their quality of life, these chronic Lyme patients remained significantly less healthy than the general population. The inadequate oral antibiotic regimens following intravenous treatment failed to improve the poor quality of life in these undertreated patients.

2. Hu LT. **Lyme disease.** Ann Intern Med. 2016 May 3;164(9):ITC65-ITC80

This review points out that chronic Lyme disease most commonly refers to persistent

symptoms of fatigue, myalgia, arthralgia, memory loss, and headache after antibiotic therapy for Lyme disease. The author questions whether chronic Lyme disease is a legitimate clinical entity and opines that this disease affecting more than 300,000 patients per year according to the Centers for Disease Control and Prevention (CDC) has become “highly controversial.”

3. Moore A, Nelson C, Molins C, Mead P, Schriefer M. **Current guidelines, common clinical pitfalls, and future directions for laboratory diagnosis of Lyme disease, United States.** Emerg Infect Dis. 2016 Jul; 22(7): 1169-1177.

This report from the CDC starts by dismissing the CDC acknowledgment that two-tiered Lyme testing (a screening serological test followed by a confirmatory “Western blot”) is not intended for patient diagnosis. According to the authors, two-tiered Lyme testing is meant to aid the diagnosis of individual patients in the clinical setting, and the two-tiered approach is currently the diagnostic test of choice for all patients with signs of Lyme disease. The poor sensitivity of two-tiered Lyme testing, which misses more than half of Lyme cases, and the availability of better testing is ignored by the authors.

In conclusion, lots of good work is being done on tick-borne disease epidemiology and pathogenesis, but lots of work needs to be done on tick-borne disease diagnosis and treatment. The “Lyme denialist” controversy continues.

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Editor’s note: Any medical information included is based on a personal experience. For questions or concerns regarding health, please consult a doctor or medical professional.