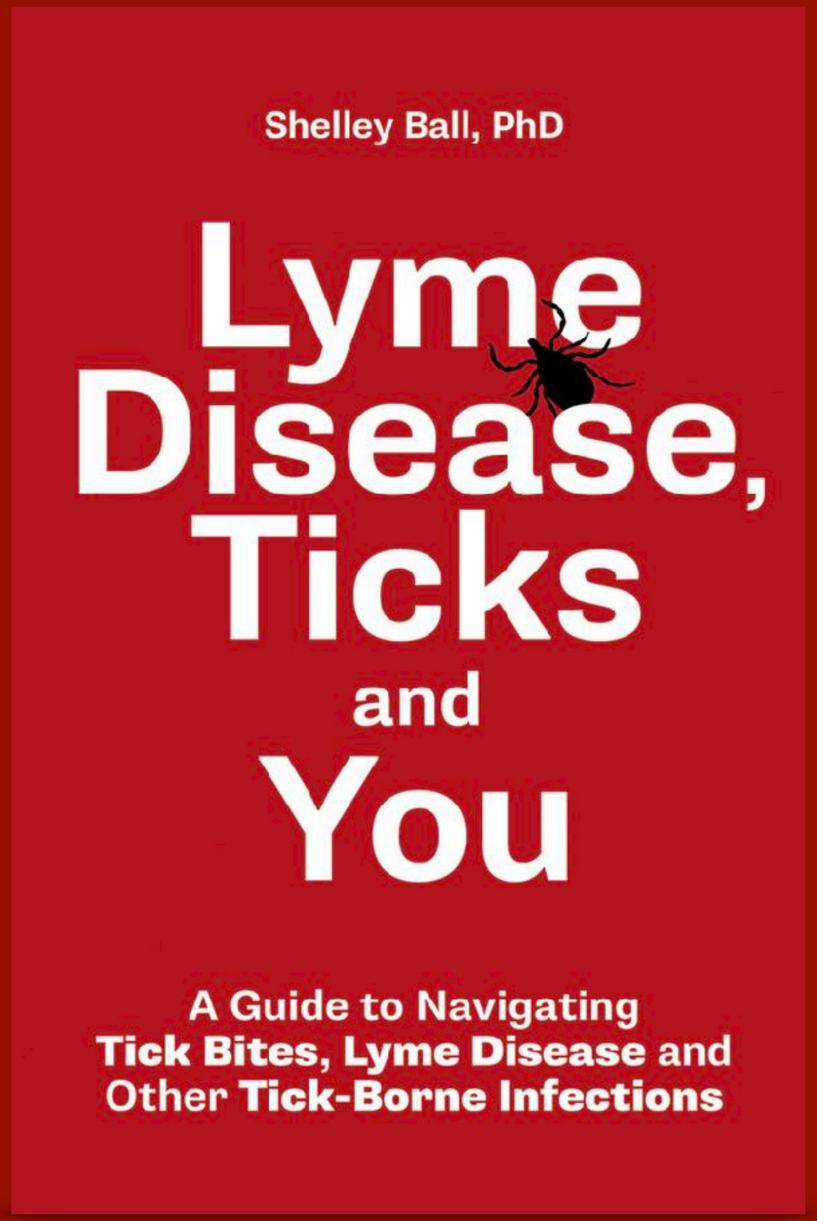
Living with Lyme and other tick borne diseases in eastern Ontario

Shelley Ball, PhD, FRCGS

Disclaimer

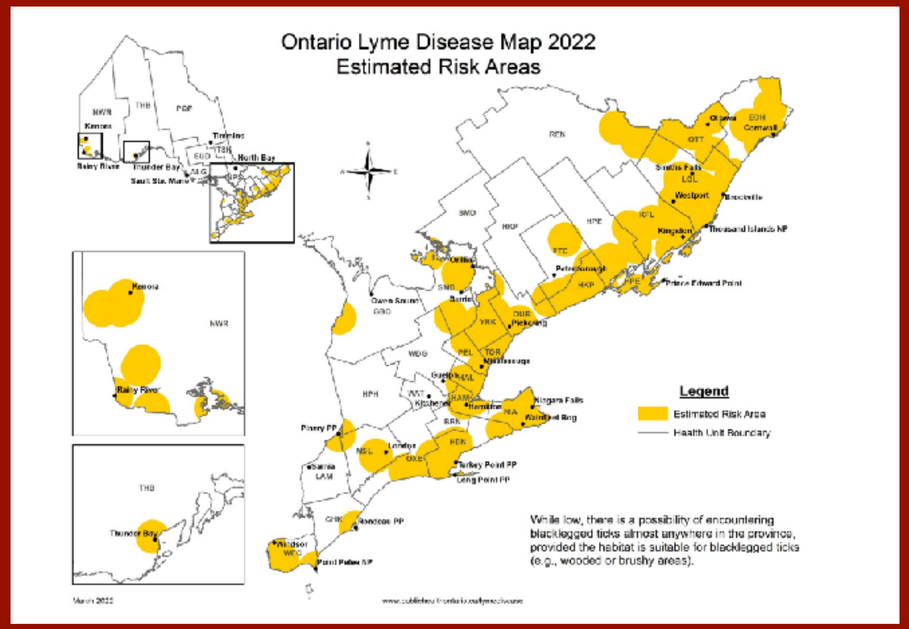
I am not a medical doctor. The information in this presentation and in my book should not be construed as medical advice. This presentation and my book convey my personal experiences with Lyme and tick-borne diseases (TBDs) and summarizes some of the information I have learned about Lyme & TBDs. I do not assume any responsibility or liability surrounding how you use this information. Please consult a physician or other health professional. Never delay in seeking medical treatment.



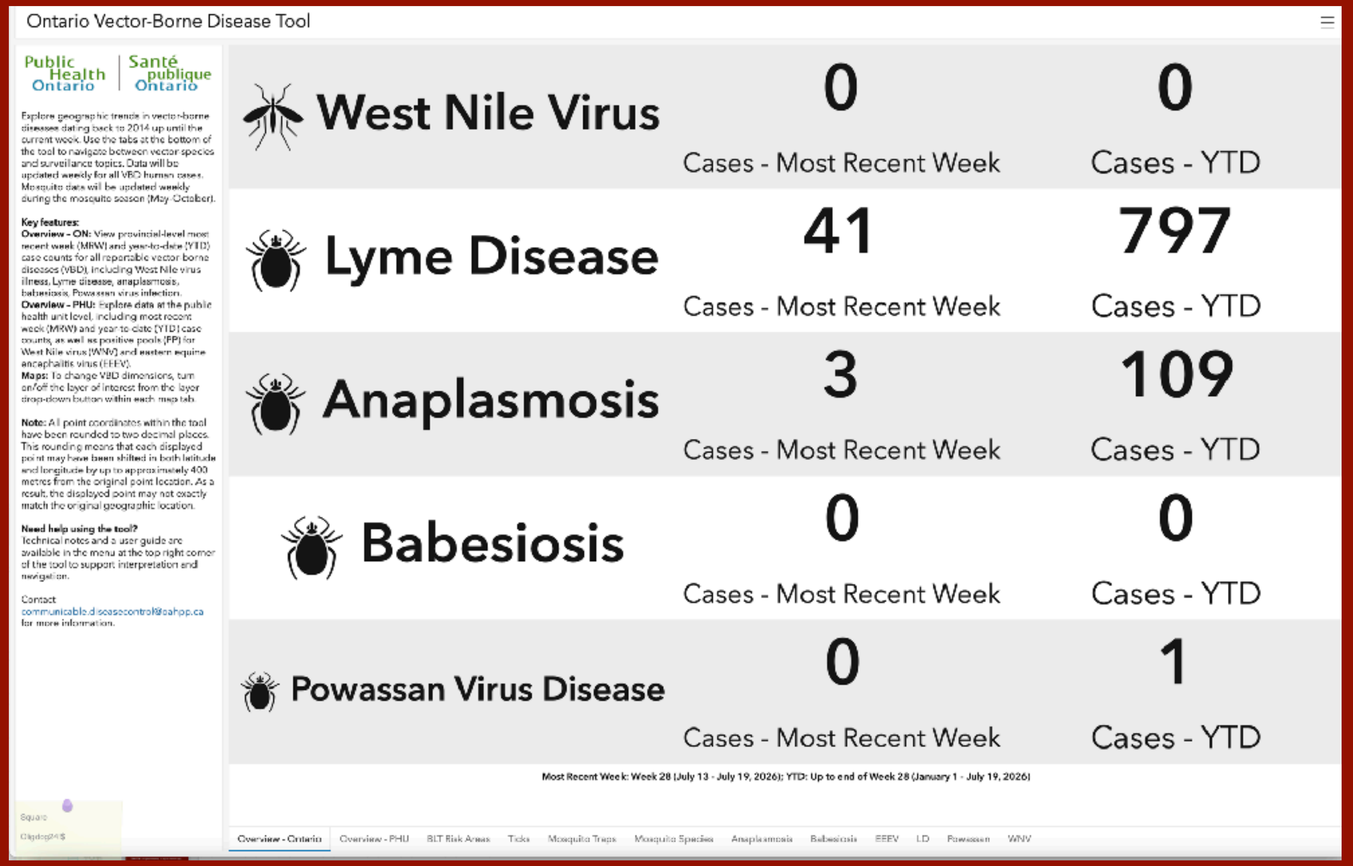
- I am not an MD; I’m a scientist (Ph.D. in biology)
- I have chronic Lyme, Bartonella, and Babesia (also tested +ve for Rocky Mountain Spotted Fever and Q Fever) from a 2019 tick bite
- Book released in May 2021 (based on my experience and reading peer-reviewed scientific literature)

- CDC estimates there are upwards of 500,000 cases of Lyme in the U.S. each year
- Statistics for Canada much less clear due to unrealistic case definition
- Canadian govt estimates sit around 7,105 in 2025. In reality, the number of cases is easily 10x this
- Vast majority (96%) of cases occur in Ontario, Quebec and Nova Scotia (Manitoba, BC, Alberta increasing)

Lyme Risk Maps - Ontario



March 2022



It’s Not Just Lyme Anymore

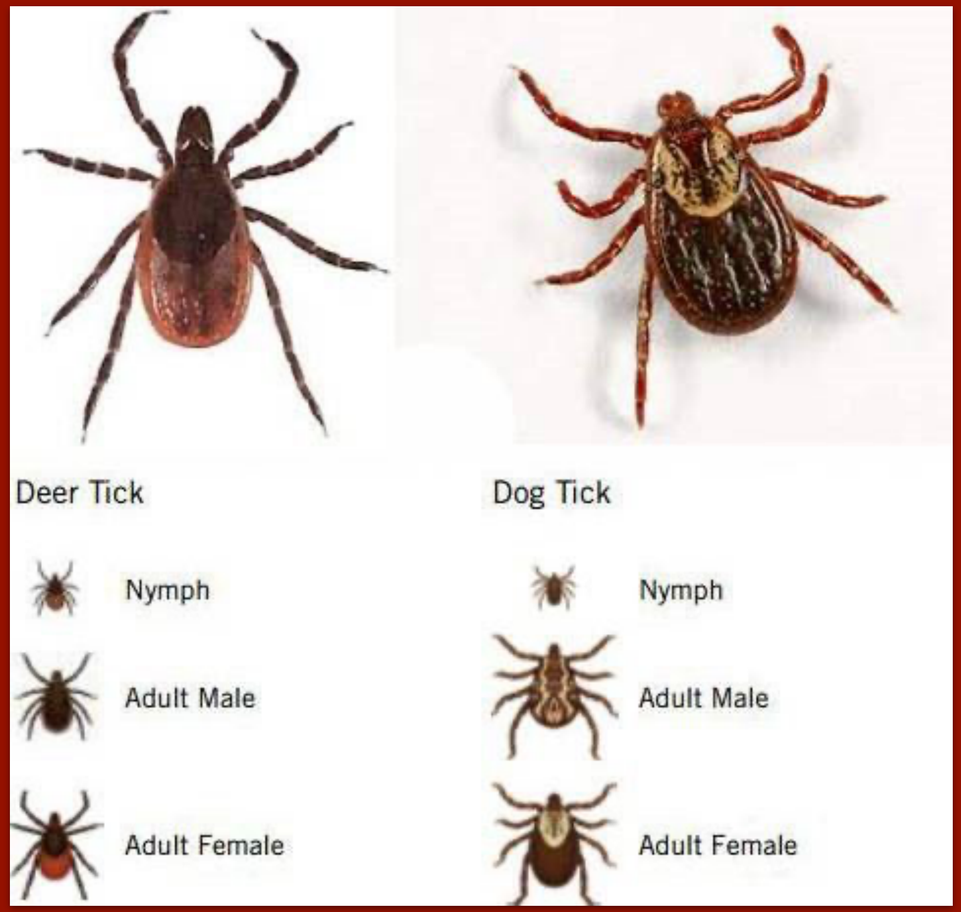
- *Borrelia burgdorferi* (senso stricto)*
- *B. miyamotoi* (relapsing fever; no bullseye)*
- 23 Borrelia genospecies east of the Rockies (including *B. garinii, B. afzelii*)*
- *Babesia odocoilei* & *B. microti* (Babesiosis - similar to malaria)
- *Bartonella henslae* (Bartonellosis/Cat Scratch disease)
- *Anaplasma phagocytophilum* (Anaplasmosis)*
- Powasson Virus

*** denotes bacterial infection**

Ticks in Ontario

Black-legged Tick
(*Ixodes scapularis*)

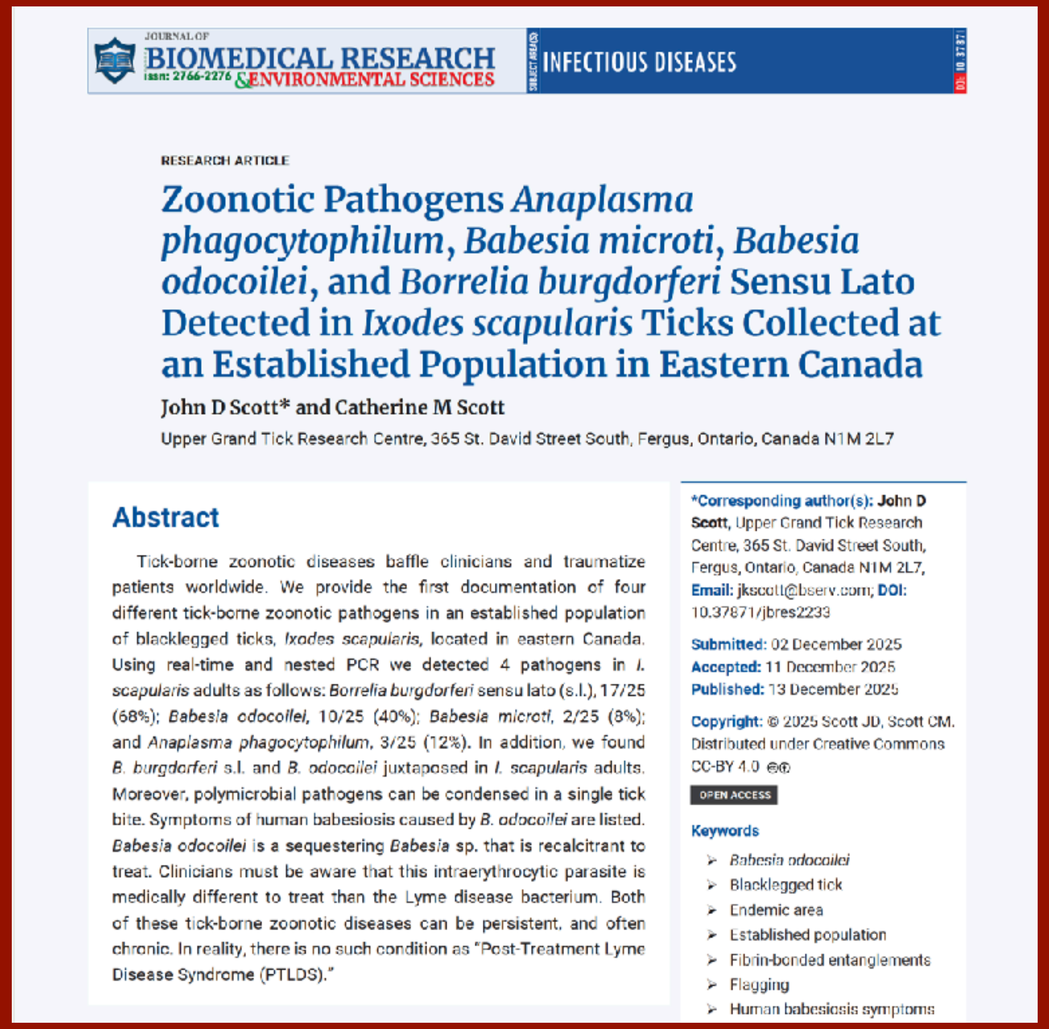
American Dog Tick
(*Dermacentor variabilis*)



Rocky Mountain Spotted Fever
(*Rickettsia rickettsii*)

Tularemia (*Francisella tularensis*)

Tickborne Diseases In Our Area



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RESEARCH ARTICLE

Zoonotic Pathogens *Anaplasma phagocytophilum*, *Babesia microti*, *Babesia odocoilei*, and *Borrelia burgdorferi* Sensu Lato Detected in *Ixodes scapularis* Ticks Collected at an Established Population in Eastern Canada

John D Scott* and Catherine M Scott

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Abstract

Tick-borne zoonotic diseases baffle clinicians and traumatize patients worldwide. We provide the first documentation of four different tick-borne zoonotic pathogens in an established population of blacklegged ticks, *Ixodes scapularis*, located in eastern Canada. Using real-time and nested PCR we detected 4 pathogens in *I. scapularis* adults as follows: *Borrelia burgdorferi* sensu lato (s.l.), 17/25 (68%); *Babesia odocoilei*, 10/25 (40%); *Babesia microti*, 2/25 (8%); and *Anaplasma phagocytophilum*, 3/25 (12%). In addition, we found *B. burgdorferi* s.l. and *B. odocoilei* juxtaposed in *I. scapularis* adults. Moreover, polymicrobial pathogens can be condensed in a single tick bite. Symptoms of human babesiosis caused by *B. odocoilei* are listed. *Babesia odocoilei* is a sequestering *Babesia* sp. that is recalcitrant to treat. Clinicians must be aware that this intraerythrocytic parasite is medically different to treat than the Lyme disease bacterium. Both of these tick-borne zoonotic diseases can be persistent, and often chronic. In reality, there is no such condition as "Post-Treatment Lyme Disease Syndrome (PTLDS)."

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OPEN ACCESS

Keywords

- *Babesia odocoilei*
- Blacklegged tick
- Endemic area
- Established population
- Fibrin-bonded entanglements
- Flagging
- Human babesiosis symptoms

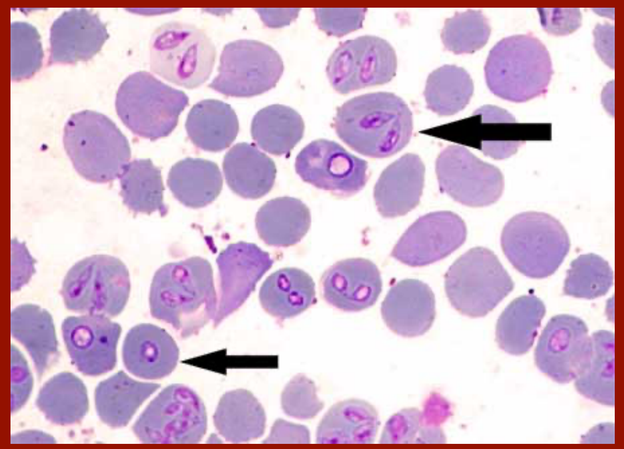
- In spring 2025 I collected Black-legged Ticks from my property on Christie Lake Road (Lanark Co.)
- 25 individual Black-legged Ticks collected (99 American Dog Ticks)

Results:

- 4 different pathogens detected
- 68% of ticks carrying Lyme bacteria (*B. burgdorferi*)
- 40% carrying *Babesia odocoilei*
- 8% carrying *Babesia microti*
- 12% carrying *Anaplasma phagocytophilum*

Tickborne Diseases In Our Area

- 40% carrying *Babesia odocoilei*
- 8% carrying *Babesia microti*



Symptoms of Babesiosis

- none to severe
- sweats (especially night sweats)
- air hunger
- high fever
- chills
- crushing fatigue
- muscle and joint ache
- headache
- nausea

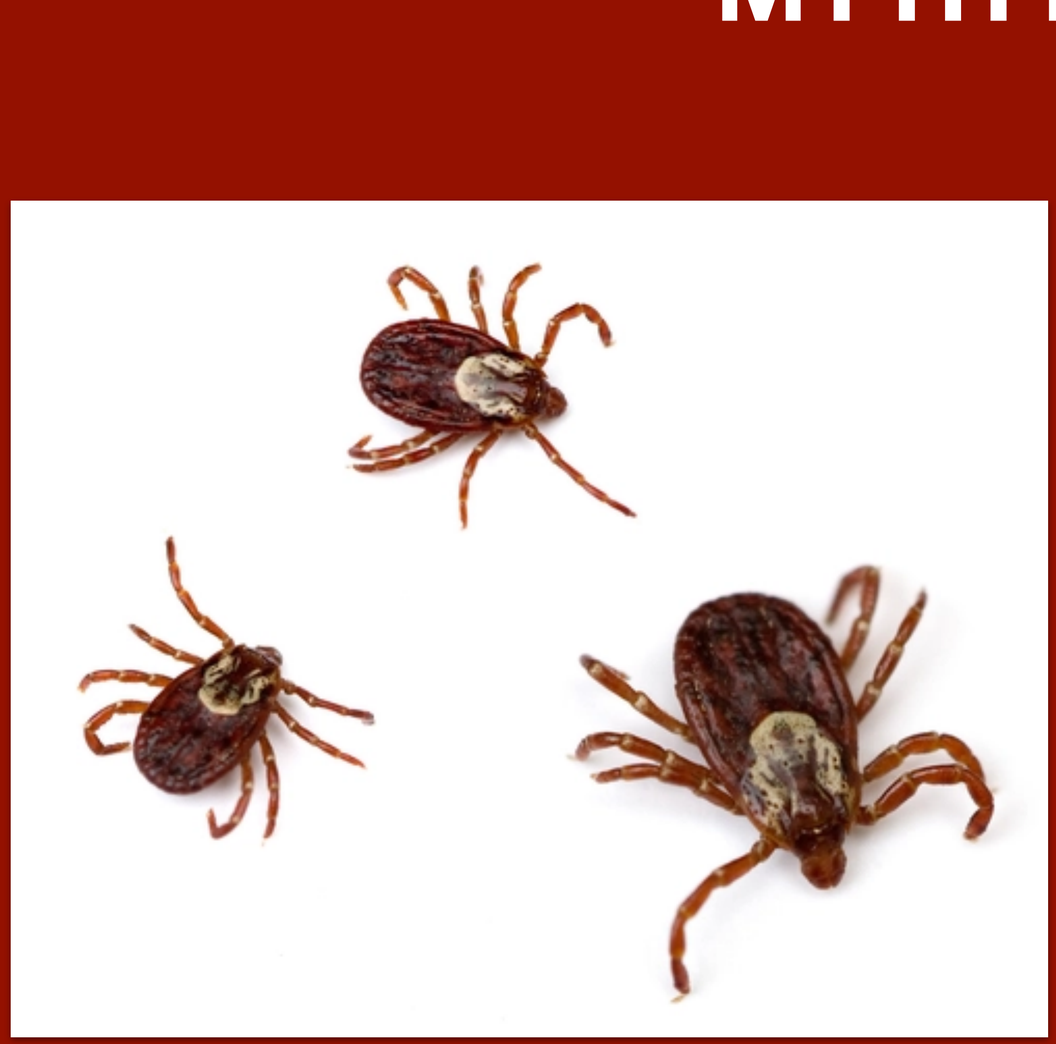
How To Continue To Enjoy The Outdoors!

- Apply icaridin-based repellant (Pi Active)***
- Frequent full body tick checks
- Shower/bathe after outdoor activities
- Place clothes in dryer on high for 20 min.
- Treat your pets (e.g., Advantix II)
- Move your bird feeders
- Be vigilant, not paranoid





MYTH BUSTING



The best way to help ourselves is to be armed with knowledge

MYTH: If the tick is feeding on me for less than 24 hours I shouldn't worry.

TRUTH: Scientific evidence that Lyme can be transmitted via a bite in under an hour. ANY TIME THE TICK IS FEEDING ON YOU IS BAD! GET IT OFF ASAP AND SAVE THE TICK. (Evidence Babesia and Anaplasma transmission takes MINUTES).

- Partially engorged ticks transmit Lyme faster
- Ticks carrying Lyme are less prone to dehydration, have higher fat stores (higher survival), more cold tolerant, move faster, and eat larger blood meals



MYTH: I will get a bulls-eye rash if I'm bitten by a tick carrying Lyme bacteria.

TRUTH: Research shows the bulls-eye appears in fewer than 10% of cases of Lyme (relapsing fever Lyme does not form a rash).



Lyme rashes are most often mistaken for spider bites

Examples of Lyme Disease Rashes



As you can see from the above photos, rashes from a *Borrelia*-infected tick have a wide variety of forms. They include disseminated lesions, blistering lesions, uniformly red lesions, blue-red lesions, oval lesions and oddly-shaped lesions, among others. You can see more examples of Lyme disease rashes by scanning the QR code or visiting cdc.gov/lyme/signs_symptoms/rashes.html

MYTH: A negative Lyme test means I don’t have Lyme.

TRUTH: No! You absolutely can have Lyme disease and a negative test result.

Blood Tests



Canada uses a 2-tier testing method for Lyme

1. **ELISA**
2. **Western Blot**

Standard 2-tier testing
Detective rate (on average) = 54%

→

1. **ELISA**
2. **ELISA**

Modified 2-tier testing (2024)

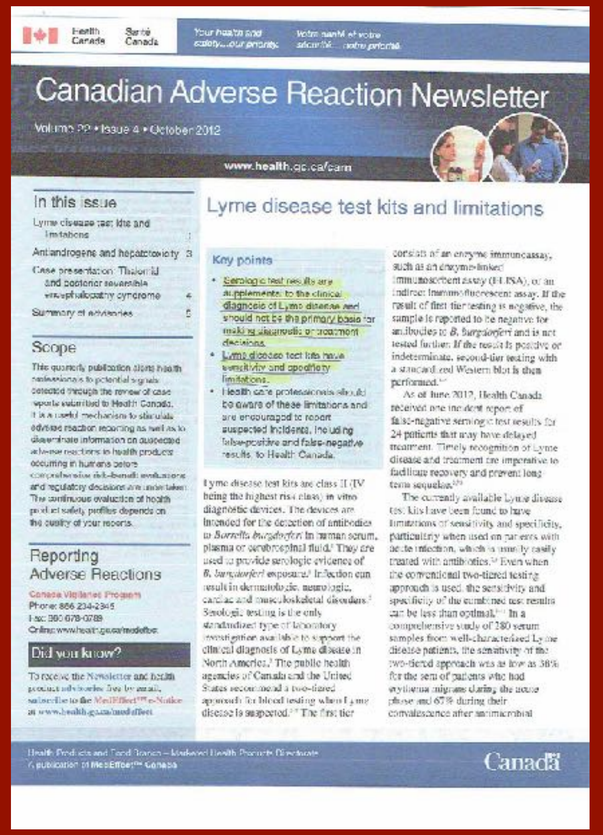
- Both tests are based on the detection of antibodies to the Lyme bacteria
- Both testing methods lack sensitivity (ability to detect Lyme) in first 2 weeks of infection (most important period for killing Lyme bacteria)

Diagnosing Lyme Disease

In 2012, Health Canada stated: *“Serologic test results are supplemental to the clinical diagnosis of Lyme disease and should not be the primary basis for making diagnostic or treatment decisions. Lyme disease test kits have sensitivity and specificity limitations.”*

Clinical diagnosis includes:

- suite of symptoms & their duration and onset
- history of tick bite (~ 60% no tick was seen)
- outdoor activity
- risk of exposure (live/visit a ‘Lyme endemic’ area)
- prevalence of Lyme (% of ticks carrying Lyme)



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Canadian Adverse Reaction Newsletter

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www.healthycanada.ca/cars

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Case presentation: Thalomid and posterior reversible encephalopathy syndrome 4

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Scope

This quarterly publication alerts health professionals to potential signals detected through the review of case reports submitted to Health Canada. It is a useful mechanism to stimulate adverse reaction reporting as well as to disseminate information on suspected adverse reactions to health products occurring in humans since comprehensive risk-benefit evaluations and regulatory decisions are undertaken. The continuous evaluation of health product safety profiles depends on the quality of your reports.

Reporting Adverse Reactions

Canada Vigilance Program

Phone: 866 234-2345

Fax: 866 678-6789

Online: www.hc-sc.gc.ca/medeff-en

Did you know?

To receive the Newsletter and health product advisories 24x by e-mail, subscribe to the MedEffect™ e-Notice at www.healthycanada.ca/medeffect

Lyme disease test kits and limitations

Key points

- Serologic test results are supplemental to the clinical diagnosis of Lyme disease and should not be the primary basis for making diagnostic or treatment decisions.
- Lyme disease test kits have sensitivity and specificity limitations.
- Health care professionals should be aware of these limitations and are encouraged to report suspected incidents, including false-positive and false-negative results, to Health Canada.

Lyme disease test kits are class II/IV being the highest risk class, in vitro diagnostic devices. The devices are intended for the detection of antibodies to *Borrelia burgdorferi* in human serum, plasma or cerebrospinal fluid. They are used to provide serologic evidence of *B. burgdorferi* exposure. Infection can result in dermatologic, neurologic, cardiac and musculoskeletal disorders.[1] Serologic testing is the only standardized type of laboratory investigation available to support the clinical diagnosis of Lyme disease in North America.[2] The public health agencies of Canada and the United States recommend a two-tiered approach for blood testing when Lyme disease is suspected.[3,4] The first tier consists of an enzyme immunoassay, such as an enzyme-linked immunosorbent assay (ELISA), or an indirect immunofluorescent assay. If the result of first tier testing is negative, the sample is reported to be negative for antibodies to *B. burgdorferi* and is not tested further. If the result is positive or indeterminate, second-tier testing with a standard 2nd Western blot is then performed.[3,4]

As of June 2012, Health Canada received one incident report of false-negative serologic test results for 24 patients that may have delayed treatment. Timely recognition of Lyme disease and treatment are imperative to facilitate recovery and prevent long term sequelae.[5,6]

The currently available Lyme disease tests kits have been found to have limitations of sensitivity and specificity, particularly when used on patients with acute infection, which is most easily treated with antibiotics.[7] Even when the conventional two-tiered testing approach is used, the sensitivity and specificity of the combined test results can be less than optimal.[8,9] In a comprehensive study of 330 serum samples from well-characterized Lyme disease patients, the sensitivity of the two-tiered approach was as low as 36% for the sera of patients who had erythema migrans rash, the acute phase, and 67% during their convalescence after antimicrobial

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Canada

MYTH: If I'm bitten by a tick, a single dose of doxycycline (2 x 100 mg pills) will prevent infection with Lyme.

TRUTH: There is NO credible science to support this treatment policy.

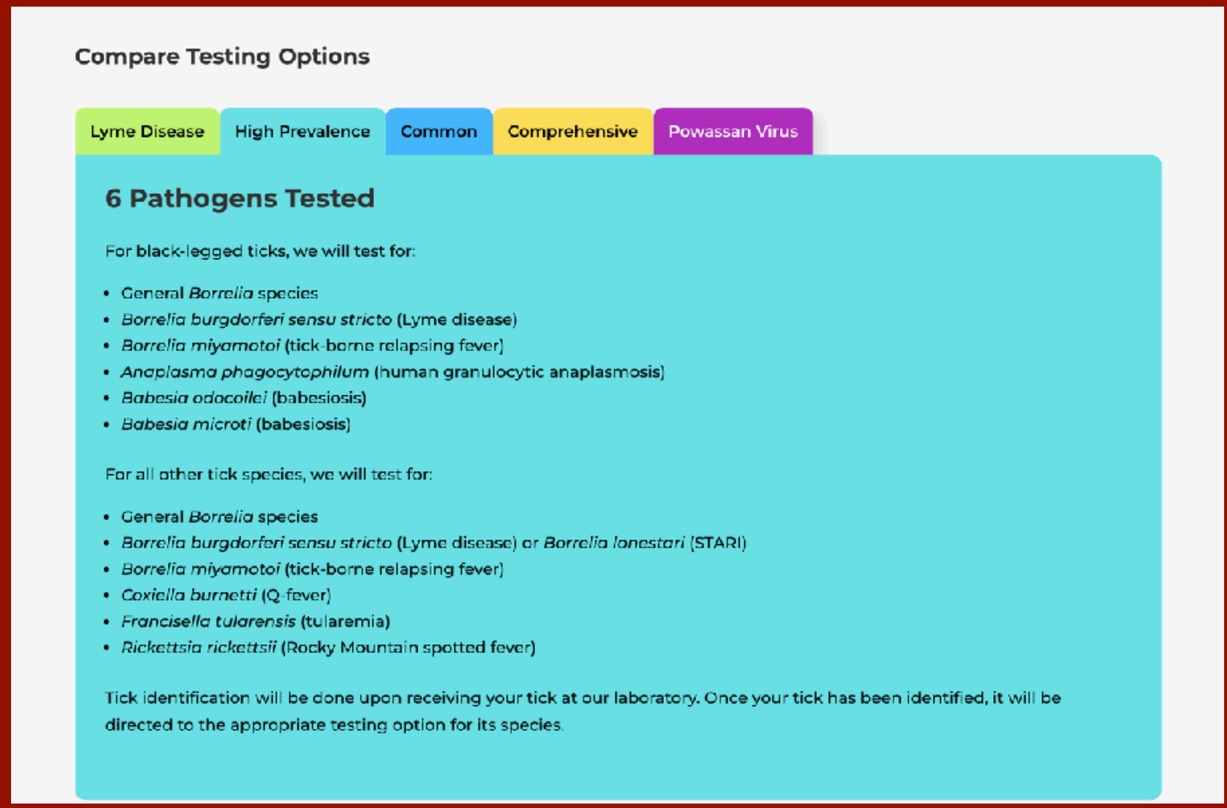
In fact, that single dose *may* do more harm than good by increasing the likelihood a false-negative test result AND by killing off the easy to kill bacteria, leaving more resistant or persister bacteria.

What If I'm Bitten?

TEST THE TICK!

NEVER, EVER THROW THE TICK AWAY!





What If I'm Bitten?

- Go to your GP or local ER; preferably find a Lyme-literate MD or ND
- Suggest self-advocate for 4 weeks of doxycycline (ILADS Guidelines)
- If you can't get antibiotics from an MD, consider using herbal antimicrobials prescribed by Naturopathic Doctor (ND)
- Mark date of bite on your calendar and keep a daily symptoms diary
- Get the tick tested! If it is positive, it may be your only means to access antibiotic treatment

Extremely risky to let your doctor suggest that you wait to treat with antibiotics if you develop symptoms…

Once symptoms develop, the infection has already begun to disseminate and antibiotic treatment is significantly less effective

How To Continue To Enjoy The Outdoors!

- Apply icaridin-based repellant (Pi Active)***
- Frequent full body tick checks
- Shower/bathe after outdoor activities
- Place clothes in dryer on high for 20 min.
- Treat your pets (e.g., Advantix II)
- Move your bird feeders
- Be vigilant, not paranoid





Final Thoughts

- **Do not hide inside; not a solution**
- Make prevention a DAILY HABIT
- If bitten, test the tick and advocate for 4 weeks antibiotics or herbal antimicrobials from a naturopath
- Possible that tick populations are declining

Questions?