

PROTECTION, PREVENTION, RESEARCH

STOP TICKS

STOP TICKBORNE DISEASE

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NYS Coalition on Lyme and Tick-borne Disease, Member
Coalition for Federal Lyme and Tick-borne Disease Legislation, Member
Public Integrated Pest Management Work Group, Member
NYS Senator Serino's Advisory Board on Lyme and TBD, Co-chair

"What's the problem? Well it's the ticks of course!"



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40 YEAR SUMMARY

Forty years of known Lyme disease:

Plight of patients not changed

No reliable test to determine who is actively infected

Tick - numbers dramatically increase

Tick - geographic spread

***Multitude of virulent pathogens, discovered.**

Percentages of all pathogens increase in ticks.

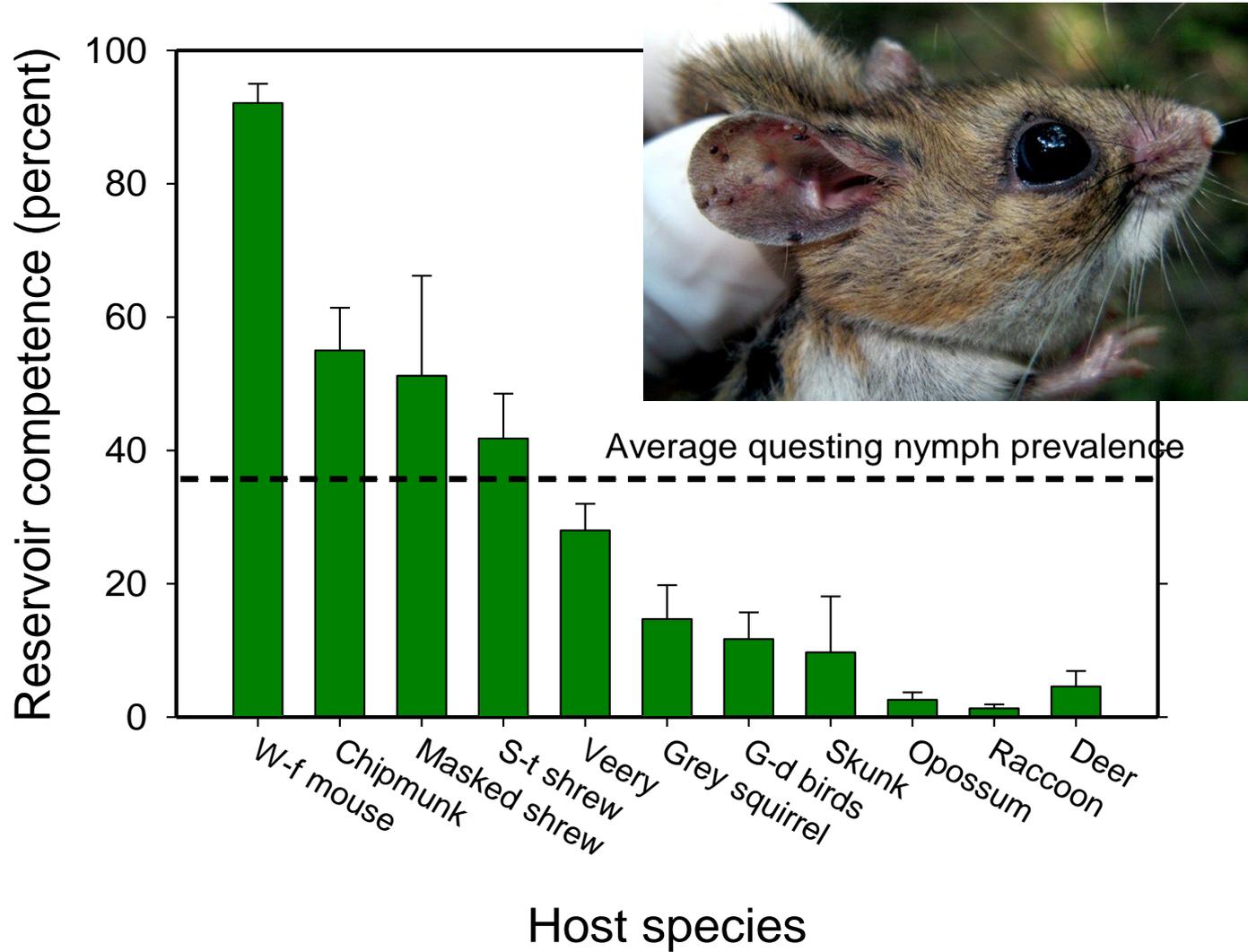
*Babesia, Anaplasma, Ehrlichia, Powassan /Deer Tick Virus, Borrelia miyamotoi, Tularemia, Tick paralysis , Bartonella, Bourbon virus, Heartland virus and others.

7 ISSUES

1. **Understanding the environmental tick problem.**
2. **How can you protect your property?**
3. **What Reduces Ticks?**
4. **Research**
5. **Additional Issues**
6. **Gold standard accurate Lyme test and effective treatment is needed.**
7. **STOP the TICKS! To STOP DISEASE!**
 - **block ticks ability to infect us!**
 - **Reduce Tick Populations!**

Understanding the environmental tick problem.

MOUSE MOST RESPONSIBLE
FOR SPREAD OF LYME, INFECTS THE TICKS
and is a prime reservoir for other Tick-borne diseases





MATING

Ixodes scapularis mating.
Thanks to Jim Occi



ADULT FEMALE PREFERRED HOST MATES ON DEER



DROPS OFF INTO BRUSH/LEAVES



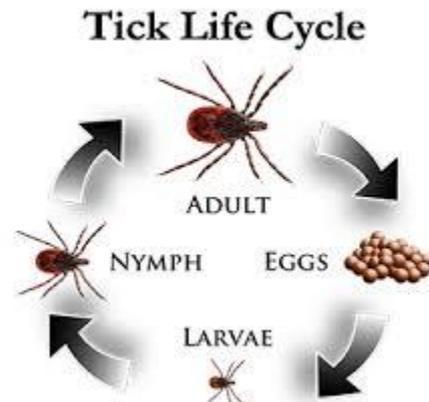
TICKS TRANSMIT INFECTION TO US, & PETS



CYCLE OF DISEASE BEGINS IN NATURE



LAYS 2,000-3,000 EGGS



LARVAL TICKS PICK UP INFECTION

ENVIRONMENTAL PROBLEM

No Resolution Until Scourge of Ticks are Addressed
Protect Us, Pets, and Critters - From Ticks and Diseases



It's **NOT** just Lyme disease: One tick bite may cause multiple infections.

Some are currently **untreatable... and fatal.**

Source: cdc.gov

[CDC](#) > [Ticks Home](#)

Tickborne Diseases of the United States



In the United States, some ticks carry pathogens that can cause human disease, including:

- **Anaplasmosis** is transmitted to humans by tick bites primarily from the blacklegged tick (*Ixodes scapularis*) in the northeastern and upper midwestern U.S. and the western blacklegged tick (*Ixodes pacificus*) along the Pacific coast.
- **Babesiosis** is caused by microscopic parasites that infect red blood cells. Most human cases of babesiosis in the U.S. are caused by *Babesia microti*. *Babesia microti* is transmitted by the blacklegged tick (*Ixodes scapularis*) and is found primarily in the northeast and upper midwest.
- **Borrelia miyamotoi** infection has recently been described as a cause of illness in the U.S. It is transmitted by the blacklegged tick (*Ixodes scapularis*) and has a range similar to that of Lyme disease.
- **Colorado tick fever** is caused by a virus transmitted by the Rocky Mountain wood tick (*Dermacentor andersoni*). It occurs in the the Rocky Mountain states at elevations of 4,000 to 10,500 feet.
- **Ehrlichiosis** is transmitted to humans by the lone star tick (*Amblyomma americanum*), found primarily in the southcentral and eastern U.S.
- **Heartland virus** infection has been identified in eight patients in Missouri and Tennessee as of March 2014. Studies suggest that Lone Star ticks may transmit the virus. It is unknown if the virus may be found in other areas of the U.S.
- **Lyme disease** is transmitted by the blacklegged tick (*Ixodes scapularis*) in the northeastern U.S. and upper midwestern U.S. and the western blacklegged tick (*Ixodes pacificus*) along the Pacific coast.
- **Powassan disease** is transmitted by the blacklegged tick (*Ixodes scapularis*) and the groundhog tick (*Ixodes cookei*). Cases have been reported primarily from northeastern states and the Great Lakes region.
- **Rickettsia parkeririckettsiosis** is transmitted to humans by the Gulf Coast tick (*Amblyomma maculatum*).
- **Rocky Mountain spotted fever (RMSF)** is transmitted by the American dog tick (*Dermacentor variabilis*), Rocky Mountain wood tick (*Dermacentor andersoni*), and the brown dog tick (*Rhipicephalus sanguineus*) in the U.S. The brown dog tick and other tick species are associated with RMSF in Central and South America.
- **STARI (Southern tick-associated rash illness)** is transmitted via bites from the lone star tick (*Amblyomma americanum*), found in the southeastern and eastern U.S.
- **Tickborne relapsing fever (TBRF)** is transmitted to humans through the bite of infected soft ticks. TBRF has been reported in 15 states: Arizona, California, Colorado, Idaho, Kansas, Montana, Nevada, New Mexico, Ohio, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming and is associated with sleeping in rustic cabins and vacation homes.
- **Tularemia** is transmitted to humans by the dog tick (*Dermacentor variabilis*), the wood tick (*Dermacentor andersoni*), and the lone star tick (*Amblyomma americanum*). Tularemia occurs throughout the U.S.
- **364D rickettsiosis** (*Rickettsia phillipi*, proposed) is transmitted to humans by the Pacific Coast tick (*Dermacentor occidentalis* ticks). This is a new disease that has been found in California.

Prepared by H. Ahern MS, MT(ASCP), ahernh@sunyacc.edu; (518) 743-2287

An Environmental Problem

Requires environmental solutions that are not harmful to us and the earth we live on.

The root causes, the TICKS and their reservoirs, must be addressed. Vaccinating the reservoirs is a real step in the right direction to stop the cycle of disease.

Humans are just a dead end in the cycle of progression of TBD. Human vaccination is temporary and does nothing toward a solution.

Without addressing the cause, the escalating diseases caused by tick pathogens will continue increasing, spreading and infecting us and other animals!"

So What Can Be Done

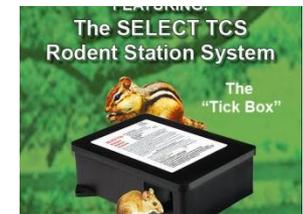
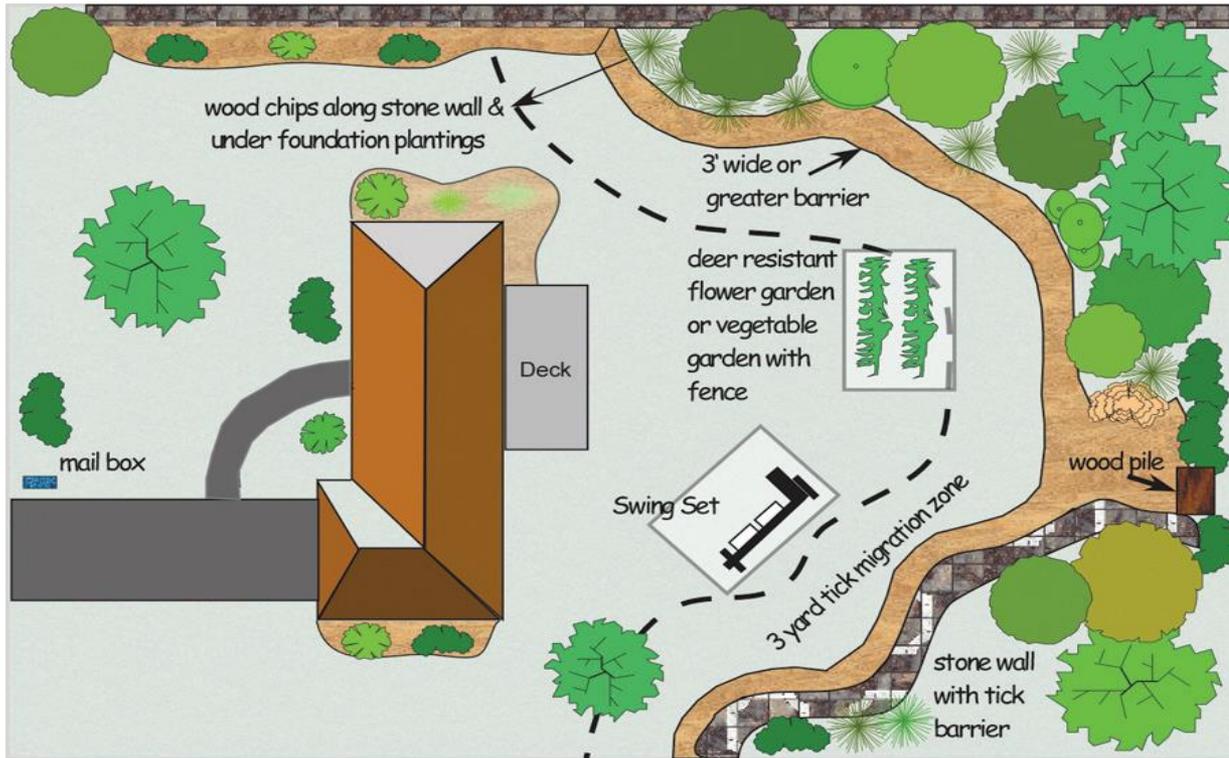
Property Protection

Research to

- Reduce Tick Populations
- Block Ability of Ticks to Transmit Disease

Personal Protection – Ira Next Presentation

Protect Your Property



Recommended web sites
www.tickcounter.org/prevention

The Tick Management Handbook
<http://www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf>
www.stopticks.org prevention and calendar (support groups, calendar of events)

Source: "Tick Management Handbook" by Kirby C Stafford III, PhD CT Agricultural Station

It's Lyme Time!

Be Tick Aware!



1 Walk in the middle of trails; avoid sitting on logs and leaning on trees.

2 Wear a hat, tuck in hair, if possible.

3 Wear a long-sleeved shirt fitted at the wrist.

4 Wear shoes, no bare feet or sandals.

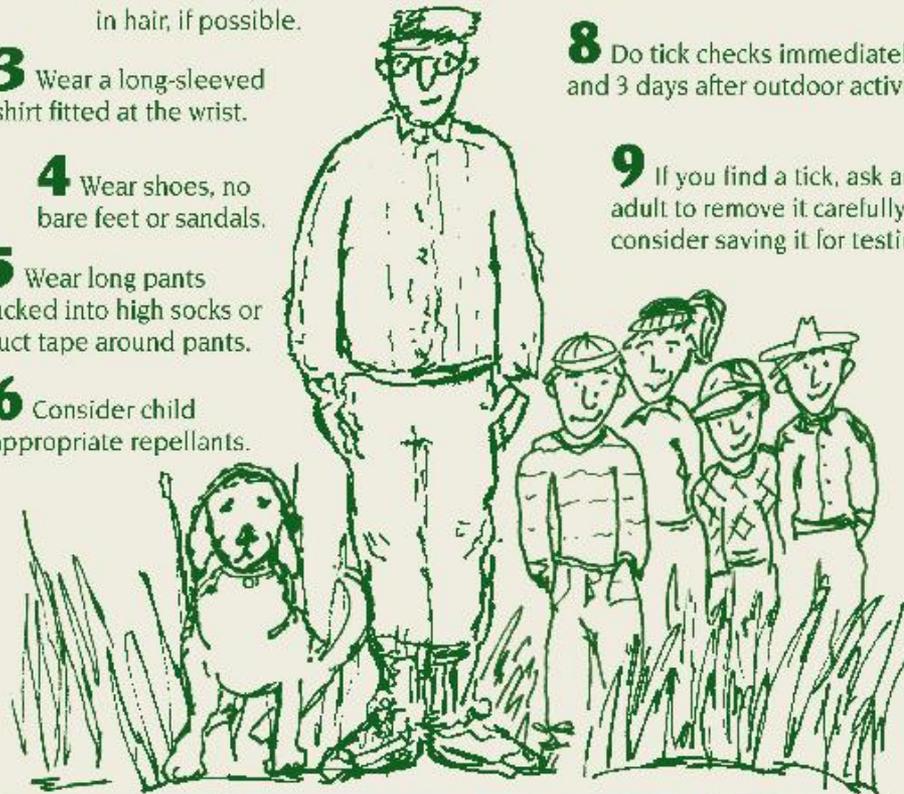
5 Wear long pants tucked into high socks or duct tape around pants.

6 Consider child appropriate repellants.

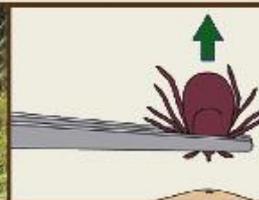
7 Wear white or light-colored clothing to make it easier to see ticks.

8 Do tick checks immediately and 3 days after outdoor activity.

9 If you find a tick, ask an adult to remove it carefully and consider saving it for testing.



Lyme Disease is transmitted by a tiny tick, most often the size of a poppy seed.



Remove tick with tweezers. Pull straight out as close to the skin as possible. Save tick in container and call doctor.



Buyer Beware

- There are businesses that sell you products that **may NOT be effective** and yet advertise to you that it protects you from ticks on your property, or is a personal repellent or helps you in some other manner. Some may even believe their product works. Far too many have **not been scientifically researched and may not work!**
- Examples: Cedar Oil, Fertilizer
- **Use provided scientific websites**
- **So, while you think you are protected you are being subjected to unknown harm that causes you to become the victim of a tick!**
Remember you do not easily see the minuscule ticks that bite you and transmit disease pathogens to you!

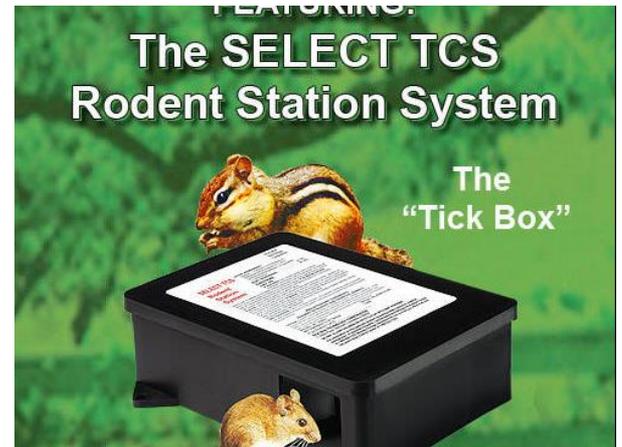
TICK REDUCTION



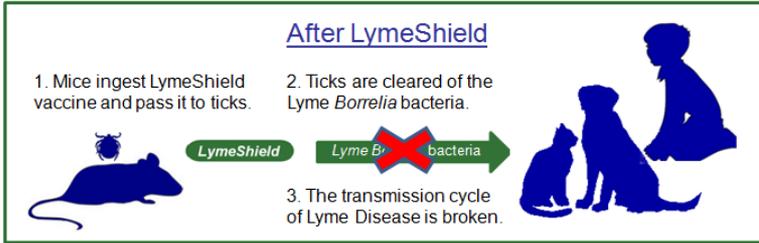
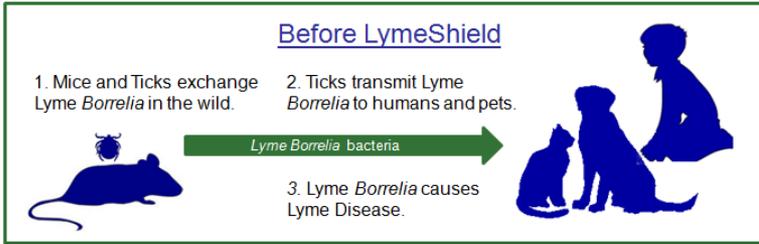
**Untreated vs Treated
reduce billions of ticks from hatching**



Low, controlled spray kills ticks

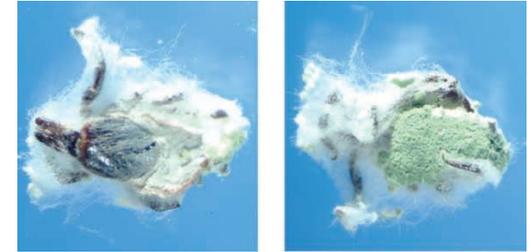


kills ticks on mice



Tick Bait Vaccine

A disease prevention platform that can address multiple diseases



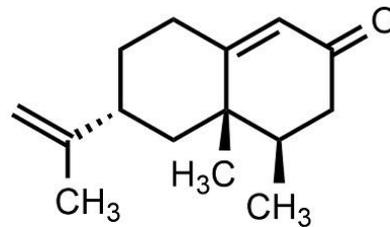
Natural fungus kills ticks



Cotton Balls to Nest Kills Ticks



Tick Bot



(+)-nootkatone

Grapefruit, Alaska Yellow Cedar



Cull Deer Herds

BLOCK TRANSMISSION OF TICK BORNE DISEASES

The Most Promising Field of Science to Produce Solutions Ignored
Receives a Pittance in Funding – Time to Prioritize

Lack of Funding for Anti-tick vaccine

Ticks would not remain attached.

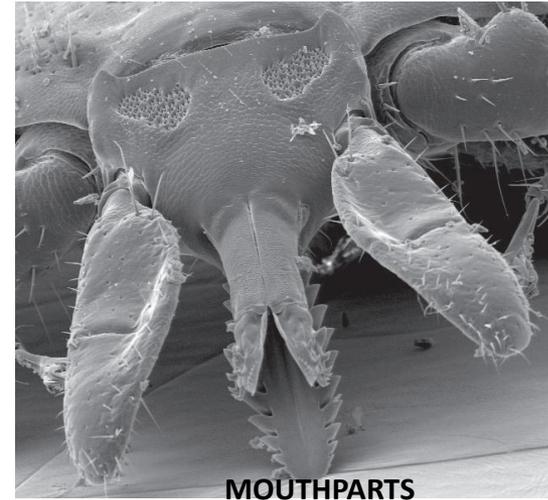
Prevent ticks ability to transmit all or almost all
disease organisms to humans.

Bio-warfare threat

Armed services also interested to protect
troops

NIH discontinued funding, OUCH!

No common sense; penny wise, pound foolish!



MOUTHPARTS



FEMALE LAYS EGGS, LARVAE, NYMPH ADULTS: FEMALE & MALE

REVIEW

STOP DISEASE TRANSMISSION and REDUCE TICKS

Select TCS – Kills Ticks on Mice, Chipmunks and Shrews - Schools, Recreation areas, Homes

4 Poster Deer Station – DEC not allowed in NYS - Woodlands

Acaricide/insecticide spraying - (Pyrethroid based - other titles) -

Oral Tick Bait Vaccine for Mice – research by USBiologic and others -

Damminex, Fungus, Nookotone, Culling Deer Herds, Deer Fencing, Pheromones

Anti-tick Vaccine - if ticks can not remain attached disease transmission can not occur. NIH funding discontinued, reestablish research . Ticks a bioterrorism threat agent? -

ADDITIONAL ISSUES

RASH

NUMBERS OF CASES

COST

COST TO SOCIETY

FUNDING vs NUMBERS

THREAT TO BLOOD SUPPLY

TESTS/SEROLOGY

DIFFERING STANDARDS OF CARE

Lyme “EM” Rashes

No Rash in 30% of cases



This Classic Bullseye Rash
Is the least common appearance



1990-2014

CDC 1990-2014 Total Lyme cases*: USA – 530,450 New York State - 112,107
CDC underreporting factor of 10 “ - **5,304,500** “ “ “ - **1,121,070**

CDC: **10 to 20%** treated patients have **lingering symptoms**. Other sources : **up to 50%**

Controversy over diagnosis and treatment protocols - simple vs complex

Cost to NYS and US is staggering: healthcare, loss of productivity at work, unemployment, public disability systems, cost of schooling sick children at home by taxpayers. As these sick people lose their ability to function physically, intellectually, and emotionally these additional stresses, even lead to breakups of families.

* Source: Data compiled from CDC published data (MMWR)

The **burden** of tick-borne illness, in terms of cost to both individuals and society, is astronomical and **only getting worse.**

Annual Cost of Lyme disease in the United States

Annual Cases of Lyme Disease The CDC raised case estimates based on national survey data by a factor of 10X in 2013

300,000

* **Lyme Disease Cost Per Case**

Direct Medical Costs, Indirect Medical Costs, Lost Income, Lost Taxes, and Related Lyme Disease Costs Per Case and adjusted for 2014 dollars

X \$10,769

Total Annual Cost Burden

\$3,230,700,000

*Source: Zhang, X., Meltzer, M.I., Pena, C.A., Hopkins, A.B., Wroth, L., and Fix, A.D. (2006) Economic Impact of Lyme Disease, Emerging Infectious Diseases, 12(4), 653 – 660. Adj. for inflation 2006 - 13)

Chronic Illness is a Huge Cost Burden to Society

Chronic illness consumes **84% healthcare costs.** **

LD survey *

- 79% productivity loss (work, school)
- 25% on disability
- most reported improvement with retreatment.

Two NIH Human Studies

47% Lyme research patients had a duration of illness **>10 yrs**

*Lorrane Johnson,JD, MBA "LD: Financial Burden of Illness

**"Chronic Care:Making the Case For Ongoing Care 2010 Robert Wood Johnson Foundation

www.rwjf.org/pr/product.jsp?id=50968

While case numbers go **UP**, federal funding for research is going **DOWN**.

Disease	New cases (annual)	NIH funding
Hepatitis C 2012	1,300	\$112 million
West Nile Virus 2012	5,700	\$29 million
HIV/AIDS 2012	56,000	\$3 billion (11% total NIH budget)
Influenza 2012	73,000	\$251 million
Lyme disease 2012	312,000	\$25 million
Lyme disease 2013	363,070	\$20 million

“ We won’t make progress until these dynamics change and without tests to diagnose and monitor Lyme and other tick-borne diseases. I have some trouble understanding how we could rapidly mobilize scientists to develop tests for MERS (Middle East Respiratory Syndrome), SARS (Severe acute respiratory syndrome), and Ebola, but have made little progress on Lyme over decades. ”

Judy Stone, “Ticked Off – What we Don’t Know about Lyme Disease,” Forbes Magazine, June 2015

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Tick-borne microbes (bacteria, protozoa, and viruses) are adapted to live in human blood. Some are now in the blood supply and transmitted by transfusion.



“ But the true scope of Babesia’s grasp on the country is unknown, and the government as well as blood centers are quick to admit it.

First, the CDC relies on states to compile and report cases to the government. But states aren’t required to participate — and not all of them do. (Lyme disease has a similar problem with vast underreporting; 10 times the reported cases likely exist.)

“So far 31 states have participated, and the disease has been reported from 36 states,” Sanjai Kumar, who studies pathogens for the FDA, said during the agency’s most recent blood safety committee meeting on May 13, 2015.”

Source: <http://www.businessinsider.com.au/babesia-parasite-increasing-threat-blood-donations-fda-test-2015-8>

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Current laboratory tests for Lyme disease are poor disease indicators; there are **NO diagnostic tests** available for the majority of other diseases caused by tick-borne microbes.

Deadly Heartland Virus Is Much More Common Than Scientists Thought



It's called the Heartland virus disease. Since it was first detected in 2009, there have been only nine reported cases in the Midwest, including two deaths.

So scientists thought the Heartland virus was limited to a small region.

That assumption was wrong.

A team at the Centers for Disease Control and Prevention has now found signs that Heartland virus is circulating in deer, raccoons, coyotes and moose in 13 states — from Texas to North Carolina and Florida to Maine.

"It was not only in these states, but it was fairly common," says biologist [Nick Komar](#), who led the study. "It's very possible there have been many other cases that have been overlooked."



“The underlying message of this story is there are new pathogens out there. Our society is changing so quickly — and even the climate — that it allows for new things to develop. And we have to be on the lookout for those new things so we can protect the public health.”

Source: <http://www.npr.org/sections/health-shots/2015/09/16/440595392/deadly-heartland-virus-is-much-more-common-than-scientists-thought>

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EARLY TREATMENT CRITICAL



Would 17 year old Joseph be alive ?

Prime tick season, prime endemic area, a 2 week outdoor program at Brown University, an otherwise healthy 17 year old boy became ill. Joseph's pediatrician never diagnosed or treated him.

About 3 weeks later, he died of disseminated Lyme disease.

He's in a grave and his parents grieve.

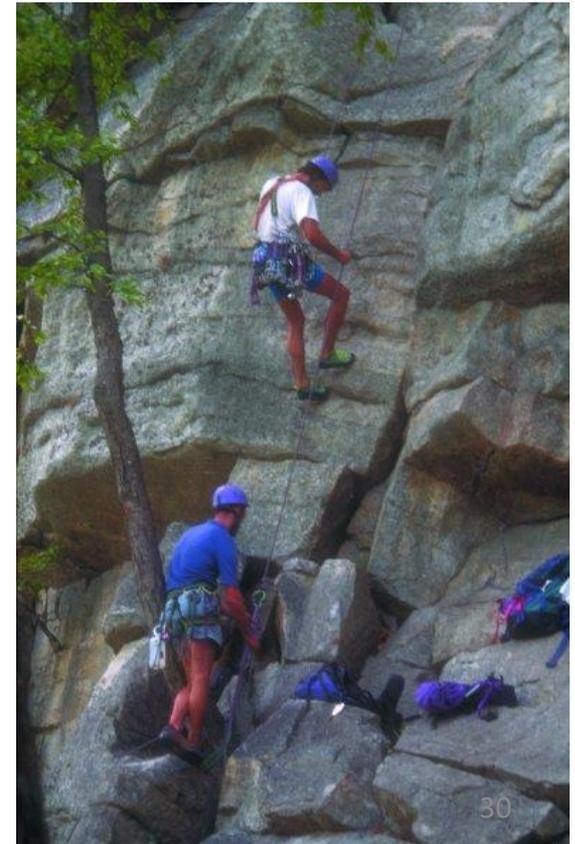
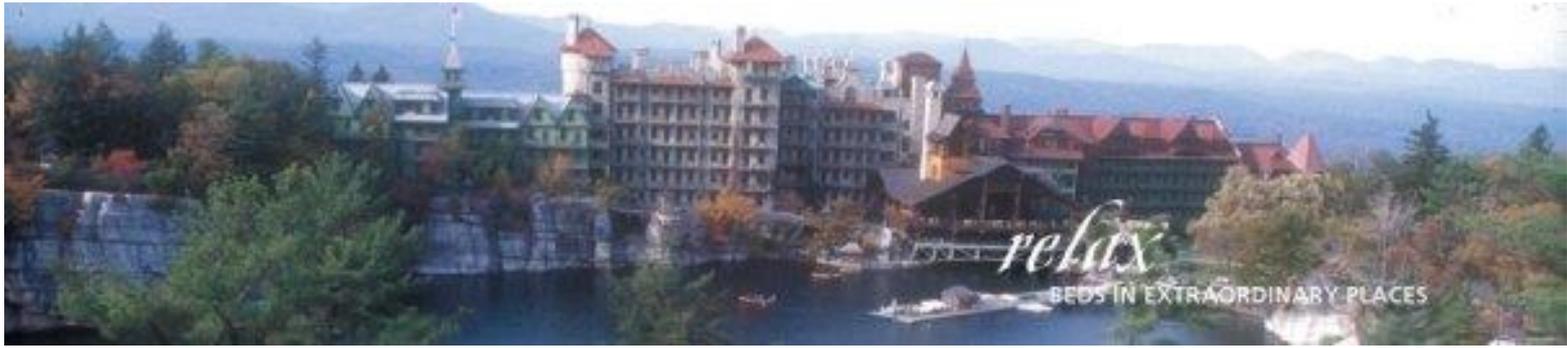
An Accurate Lyme Disease Test Would Have Prevented His Death

Almost 40 Years and still no accurate test

TICKS DO NOT DISCRIMINATE



It Could Be You, Your Loved One, or Child Next!



A 3 year old has 32 nymphal ticks removed after visiting a local park



Our only tick free park



**Children ages 5-9
the most at risk age.**

**I look forward to the day
when children can roll in
the grass and the leaves
as I was once able to do!**

**They should not get sick
by merely going outside
to play!**

Prevention Web Sites

- Tick Encounter by Thomas N. Mather, PhD, University of RI
www.tickencounter.org/prevention
[www.tickencounter.org/prevention/how to remove a tick video](http://www.tickencounter.org/prevention/how_to_remove_a_tick_video)
[www.tickencounter.org/resources/how to videos](http://www.tickencounter.org/resources/how_to_videos)
- Tick Management Handbook” by Kirby C Stafford III, PhD CT Agricultural Station
www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf
- Prevention: brief and simple; calendar: area support groups, and events
www.stopticks.org
- EPA site of repellants (be certain to increase it to 100 views per page then there are about 7 pages – notice list is for ticks and mosquitoes).
http://cfpub.epa.gov/oppref/insect/search_results.cfm?Rangetime=&hidSelected=3&ProductName=&Ingredient=null&Company=null&Registration=&Submit=Search

Information Web Sites

- Free tick testing

www.bayarealyme.org/lyme-disease-prevention/tick-testing/

- Downloadable and Printable

www.lymediseaseassociation.org/index.php/resources/lda-materials/lda-printables

[LymeR Primer](#), [Tickmarks-Bookmarks](#), [ABC's of Lyme](#) & [TickCard](#)

- Printable : [Top Ten Facts About Lyme](#), [Lyme Signs & Symptoms](#), [Prevention Guy](#), [Protect Yourself](#), [LDA Pet Fact Sheet](#), [Blood Supply](#)

- Local Presentations

www.co.dutchess.ny.us/CountyGov/Departments/Legislature/19425.htm

<https://www.nysenate.gov/newsroom/video/sue-serino/senator-serino-hosts-community-lyme-disease-forum>

What Research is Required

Address Ticks

Accurate Test

Effective Treatment

Balanced Education

PROTECT, PREVENT, CURE

and

**STOP TICKS AND DISEASES
DEAD IN THEIR TRACKS!**

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