

A Guide to the Prevention of Tick-Borne Diseases



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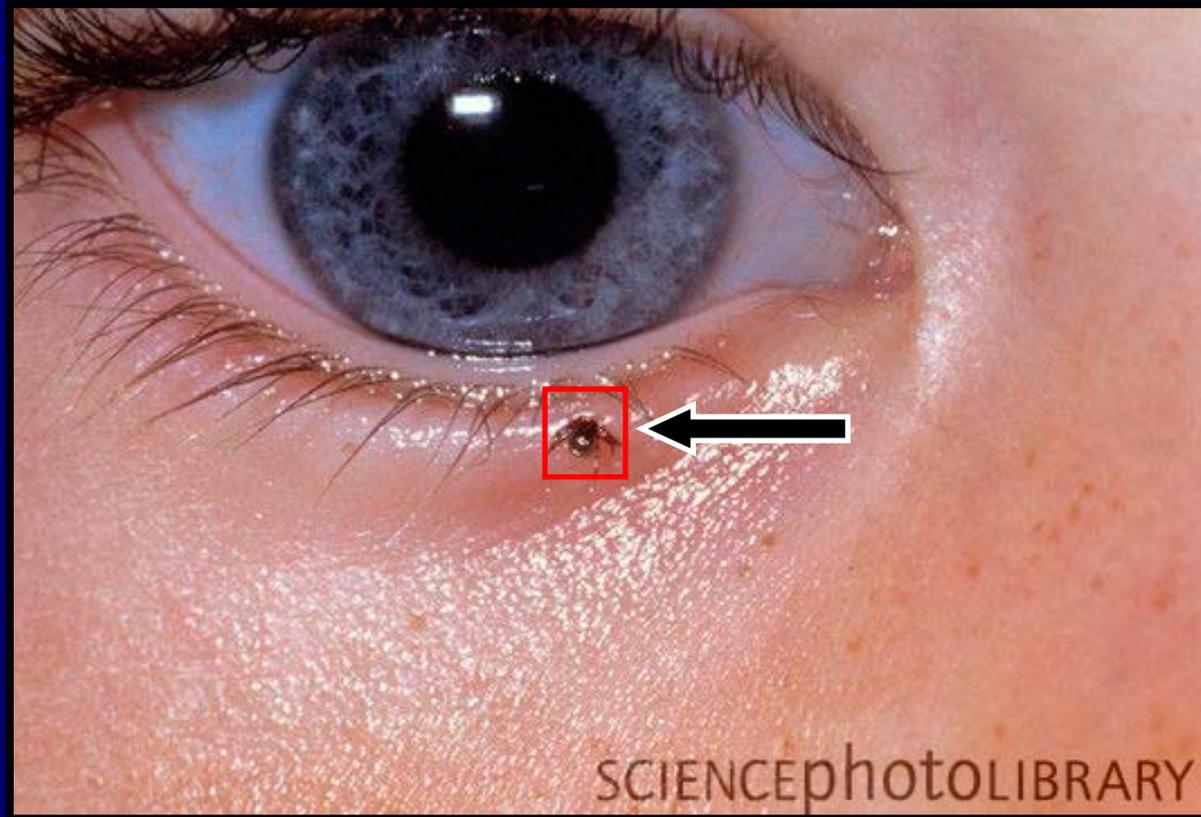


Ticks – What are They?

- Ticks are ectoparasites...feeding on the blood of a large group of animals
 - Mammals
 - Birds
 - Reptiles
 - Amphibians



Ticks – What are They?



Ticks can be very difficult to detect when they bite...basically, they are very sneaky...

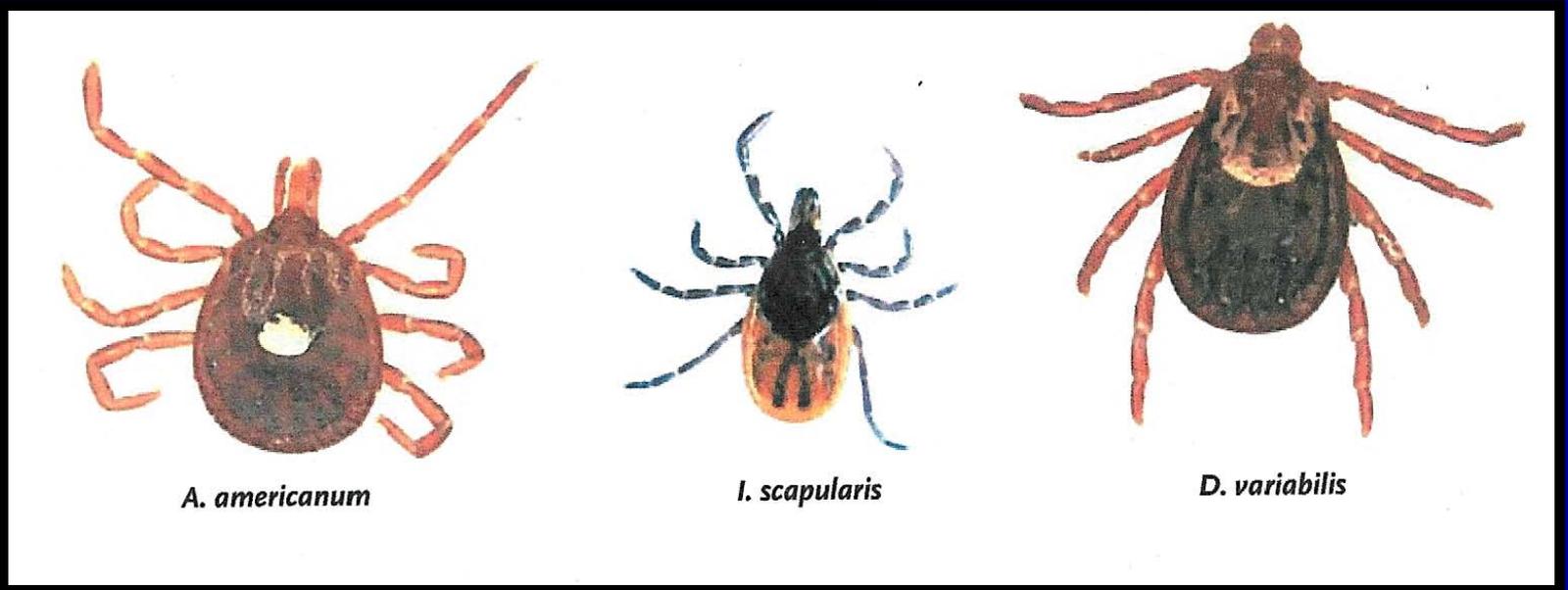
...Ticks Have NO Friends



Bruins Stanley
Cup MVP Tim
Thomas:

*"The only thing I
hate more than
the Vancouver
Canucks are
TICKS."*

Ticks Encountered on Cape Cod and the Islands



A. americanum

I. scapularis

D. variabilis

Lone Star Tick

Deer Tick

Dog Tick

The Lone Star and American Dog Tick



Lone Star Tick (uncommon) - NO Lyme Disease

- STARI – Southern Tick Associated Rash Infection
- Erlichiosis

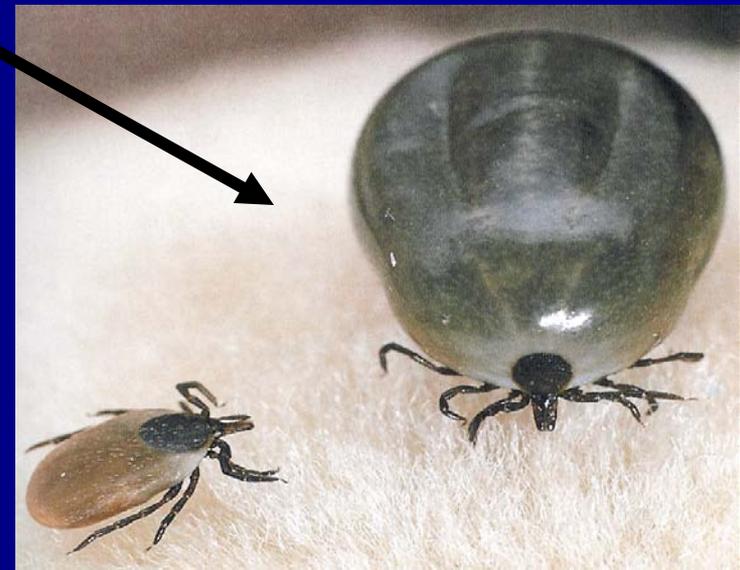
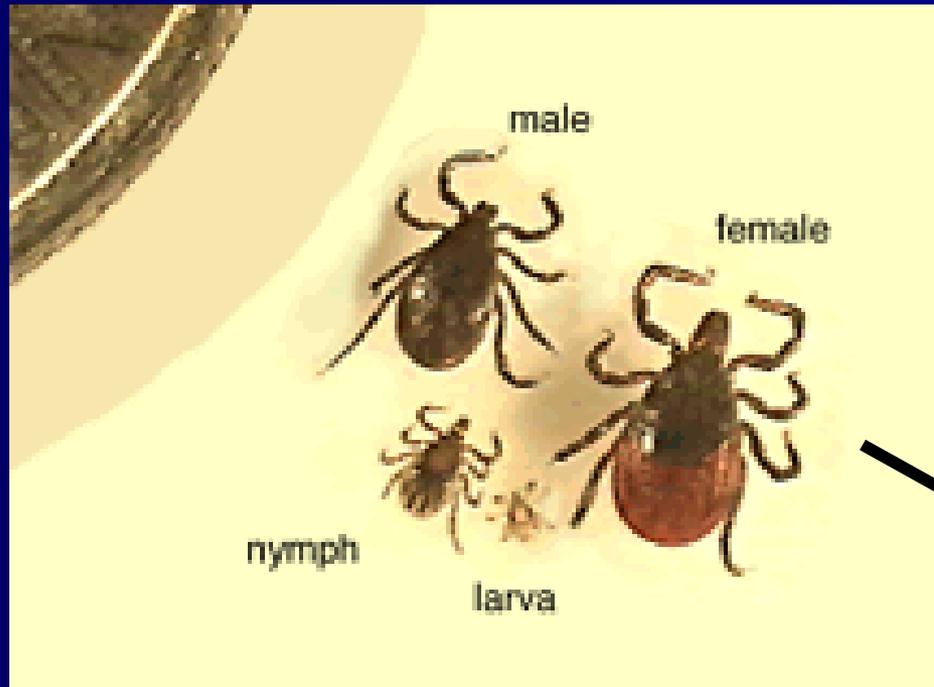


Dog Tick - NO Lyme Disease

- Rocky Mountain Spotted Fever
- Tularemia

Deer Tick Life Stages

1. Four Stages – Egg, Larva, Nymph & Adult
2. Two year life cycle
3. Ticks feed only ONCE as a Larva, Nymph & Adult...3 meals total



Tick SIZE WISE ? check your bagels

**Adult – Sesame Seed
Sized**

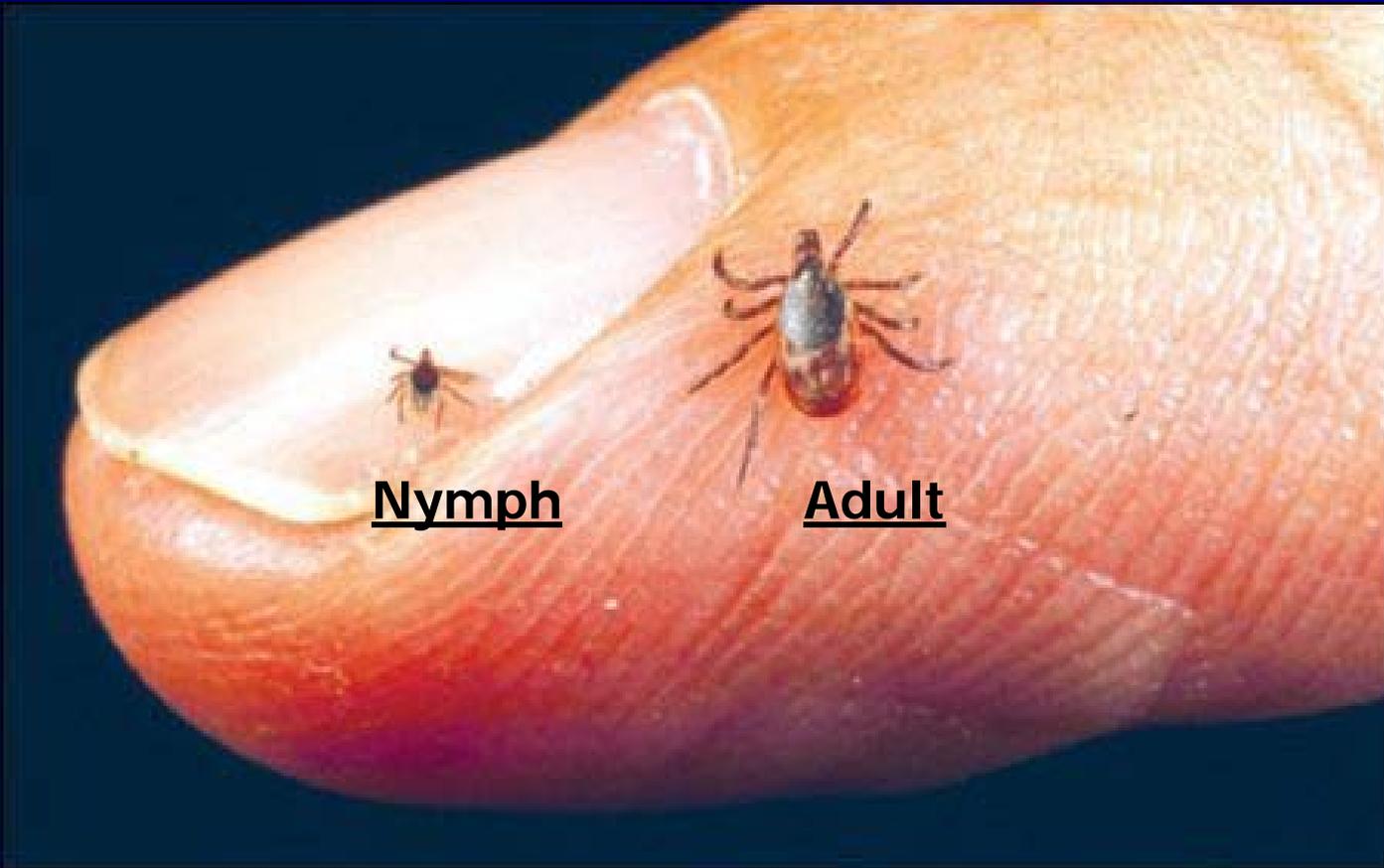
Male (Black)

*Female (Black/Red)
Photo at right*

**Nymph - Poppy
Seed Sized**

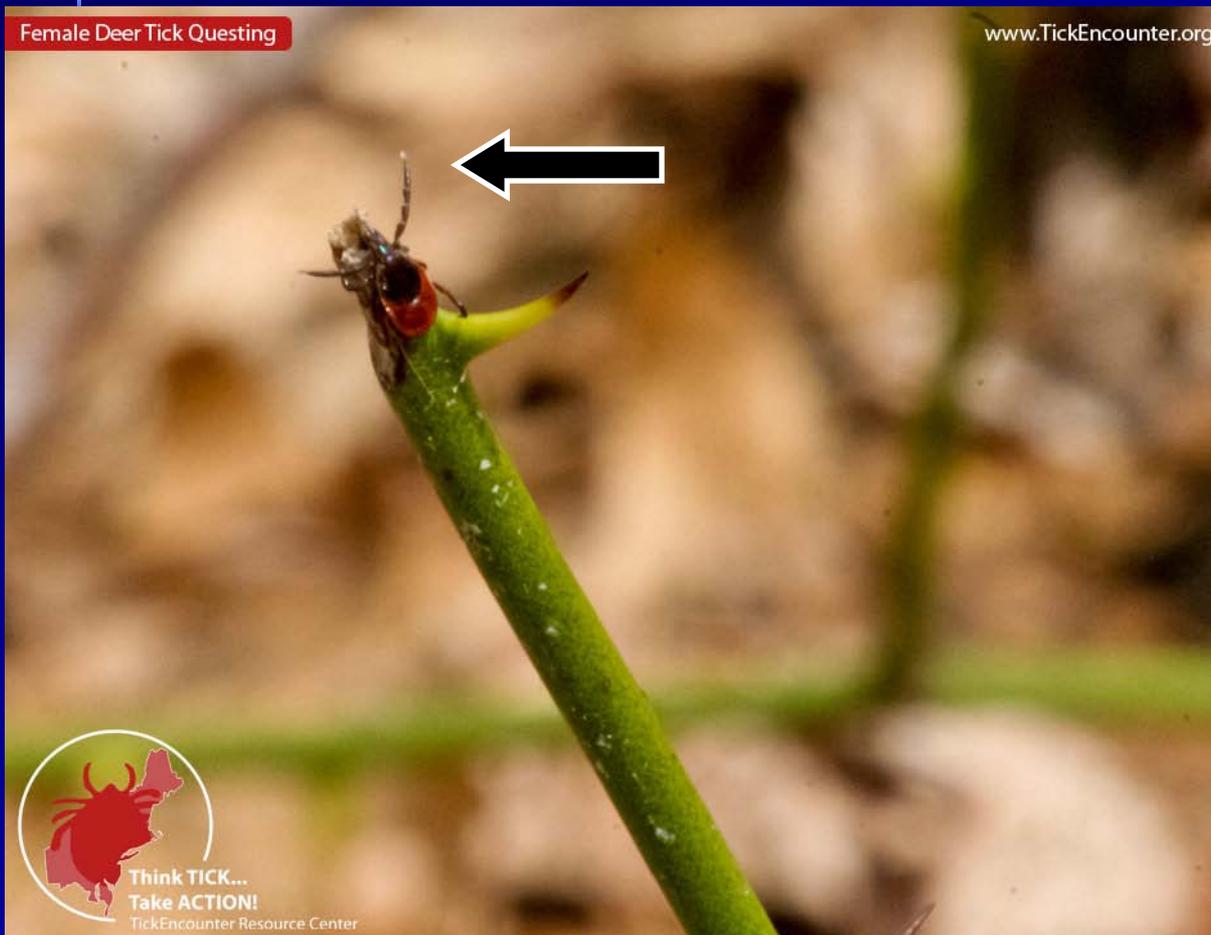


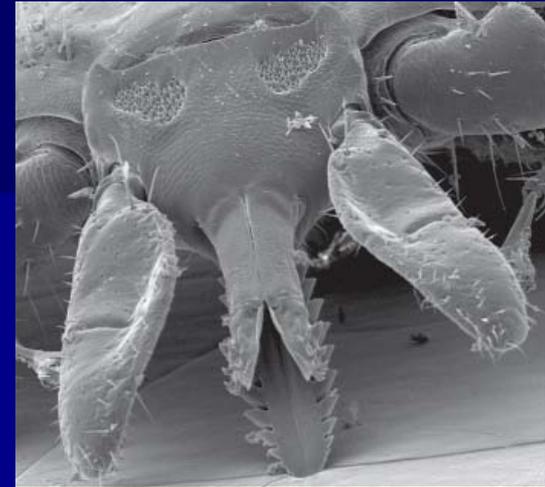
Deer Tick Size



Tick Ambush Behavior – Questing

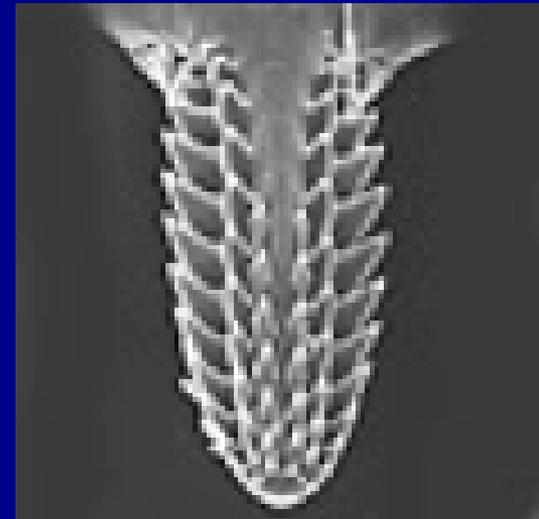
...Designed to latch onto any creature that brushes up against it





Unlike mosquitoes that feed quickly, ticks are designed to stay a while.

These barbed hooks on their mouthpart called a hypostome, are the reason why ticks cannot just be brushed off.



So, WHAT IS LYME DISEASE ?

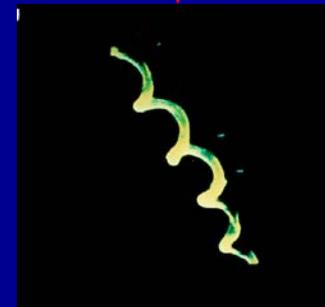
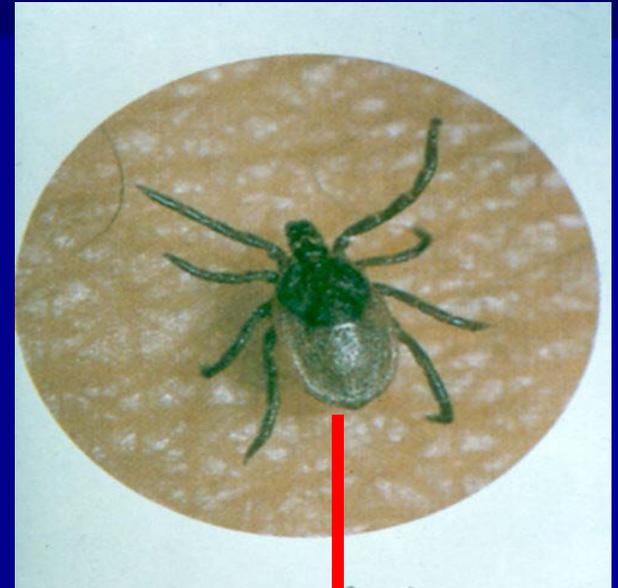


Lyme Disease

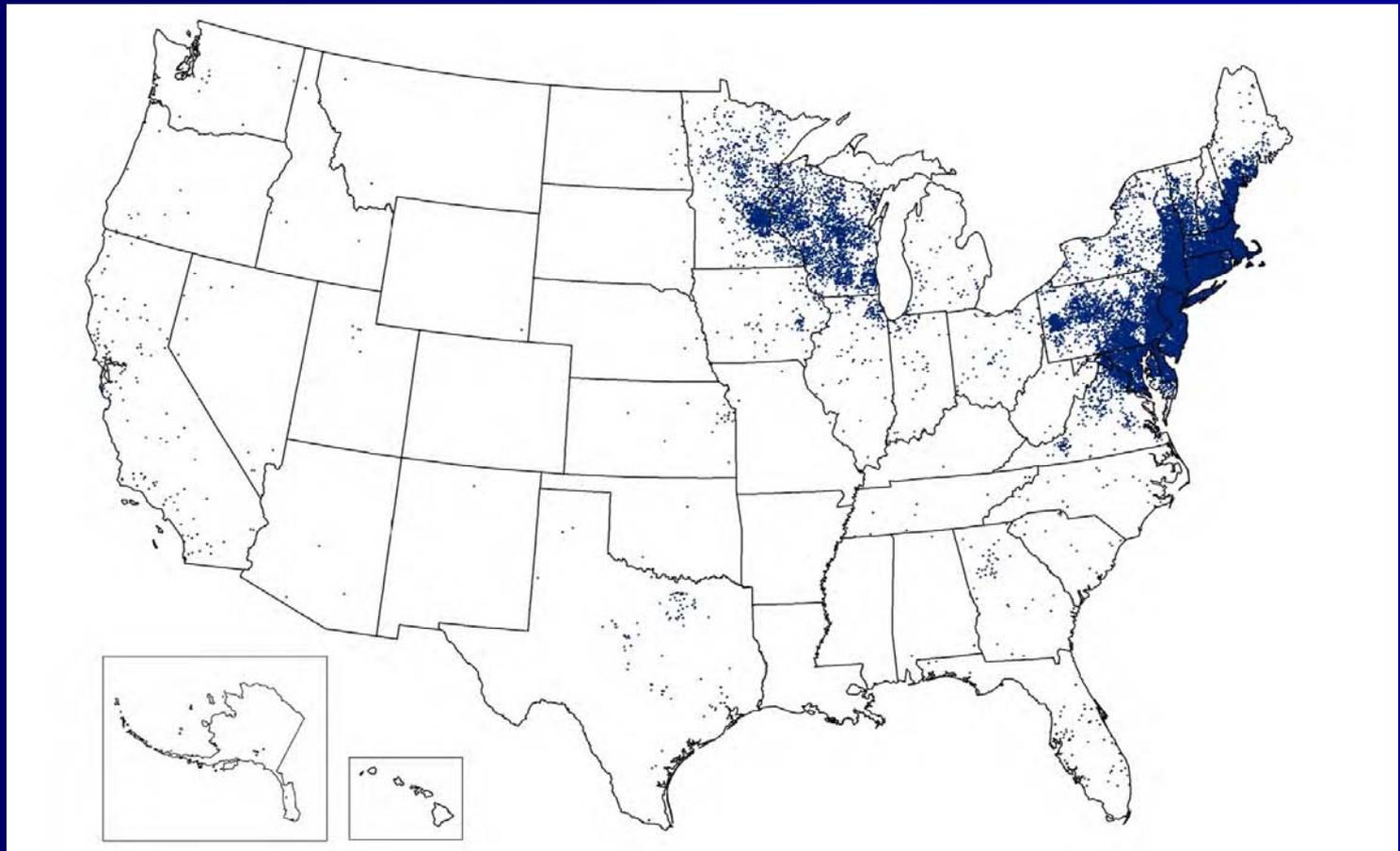
Lyme disease is a bacterial illness, caused by *Borrelia burgdorferi* and is transmitted by the bite of an infected deer tick.

Discovered in 1975 in Lyme, Connecticut. It was known as a "condition" since the late 1800's.

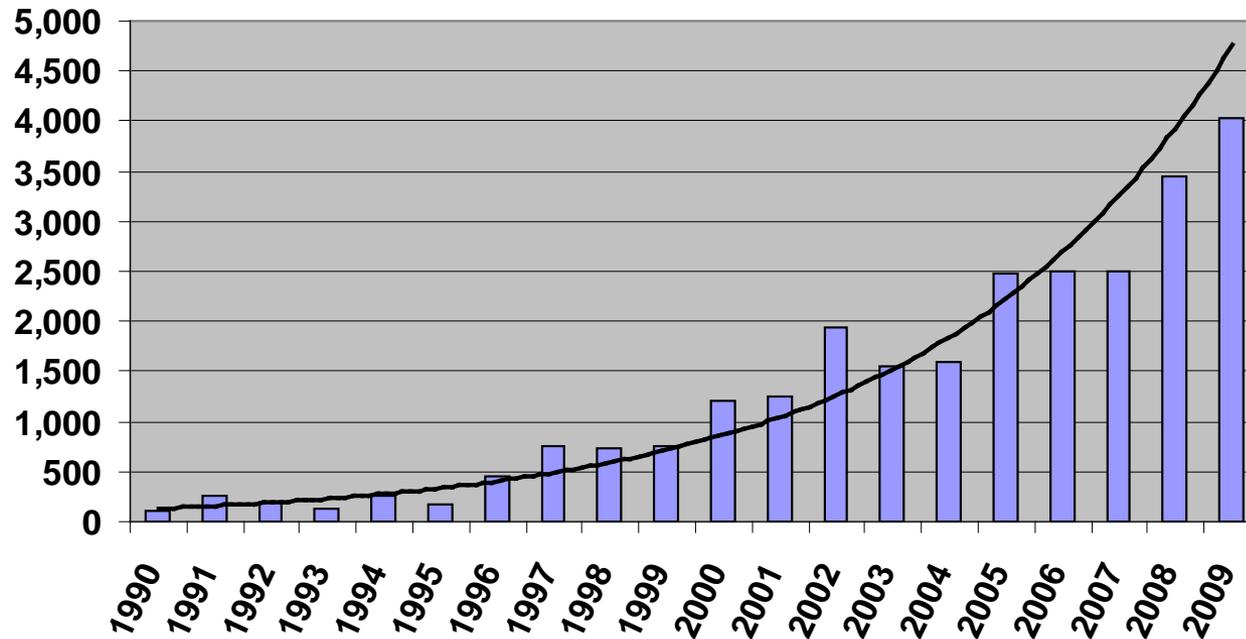
The shape of this bacteria gives it the classification of a Spirochete.



Reported Cases of Lyme Disease 2009 Centers for Disease Control...only Hawaii has not had a confirmed case



Massachusetts Confirmed Lyme Disease Cases



Massachusetts Department of Public Health

Note, Lyme is the second most prevalent infectious disease in MA...only Hepatitis C is higher...

The Lyme Disease Cycle

1. Larval ticks acquire the disease from an infected host such as a mouse or a bird
2. Nymph ticks retain and transmit the disease back to mice and birds
3. Deer and other larger vertebrates provide the blood meal for adult female ticks to lay 2,000+ eggs



About Tick Hosts

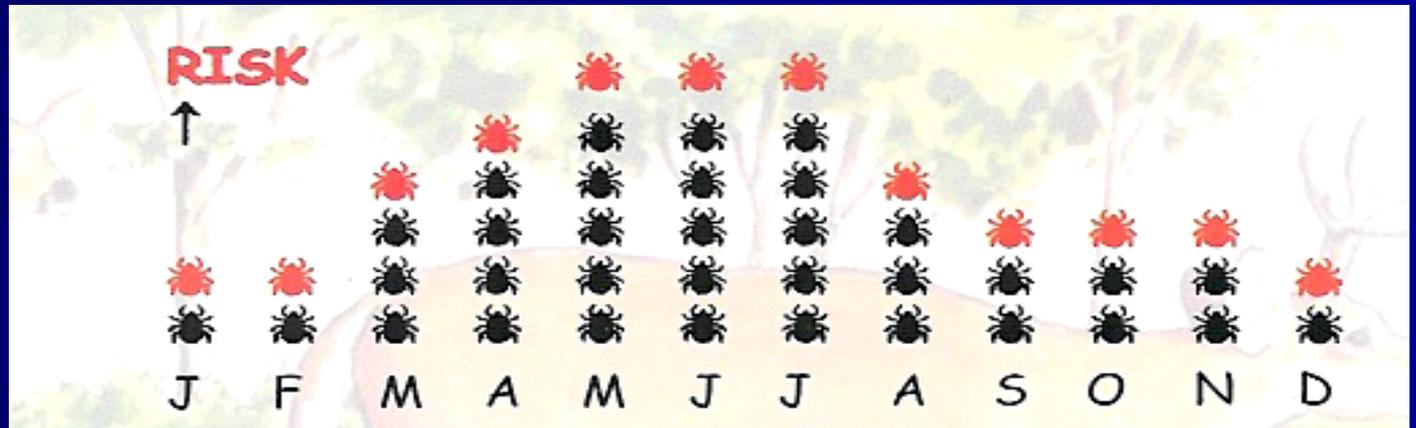
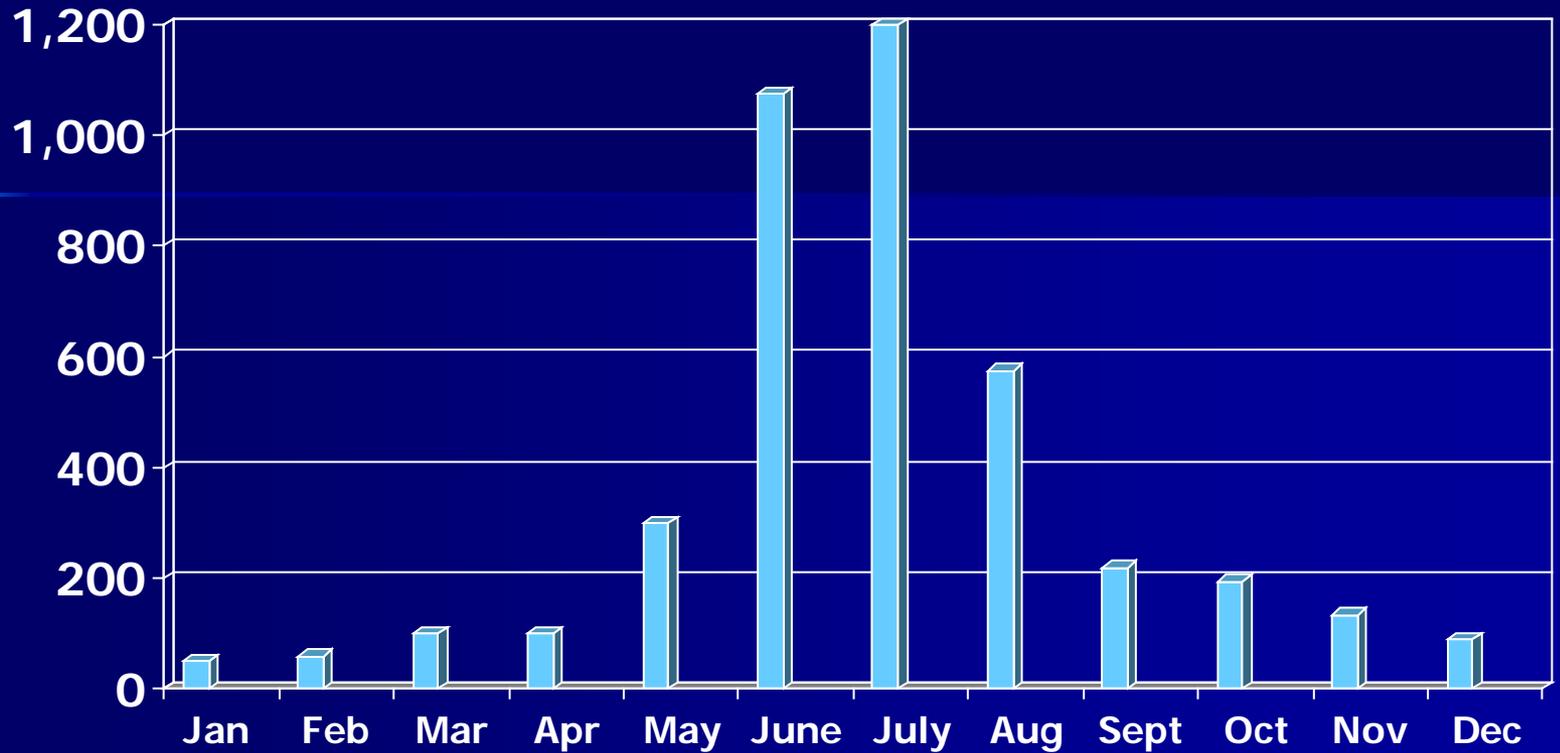
More than 100 vertebrate species play a role in the disease pathogen-host ecosystem

Rodents like the white foot mouse are key host reservoirs for disease microbes

Hosts that are not good reservoirs for the disease microbes, like squirrels are still important contributors for overall tick populations

A number of bird species play an important role in disease transmission and the movement of ticks

2009 Massachusetts Cases of Lyme by Month



The greatest risk of infection...

is NOT from the deer tick adults

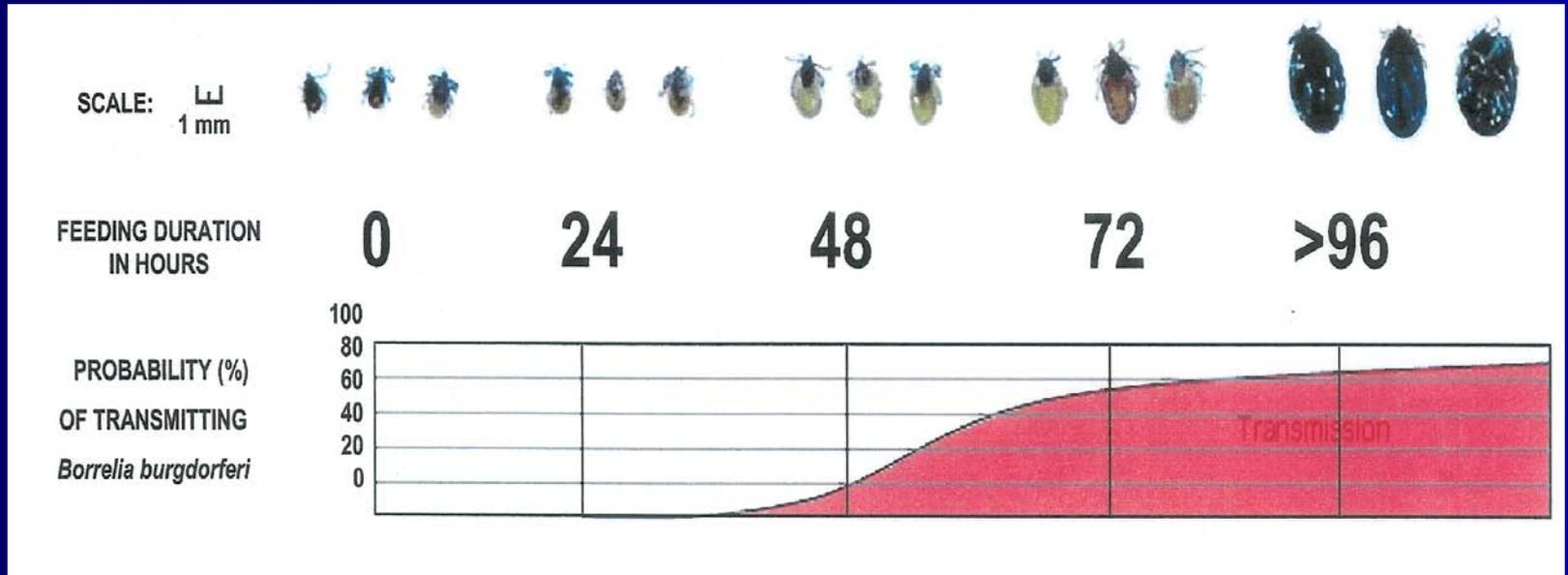
- Most active Fall and Spring
- About 50% carry Lyme
- Attach and feed 6-7 days
- Bite is more likely to be detected

...it's from the nymph stage

- Late May into August
- About 20% carry Lyme
- Attach and feed 4-5 days
- Bite is difficult to detect



Lyme Disease Transmission is Not Immediate



Lyme Disease Symptoms

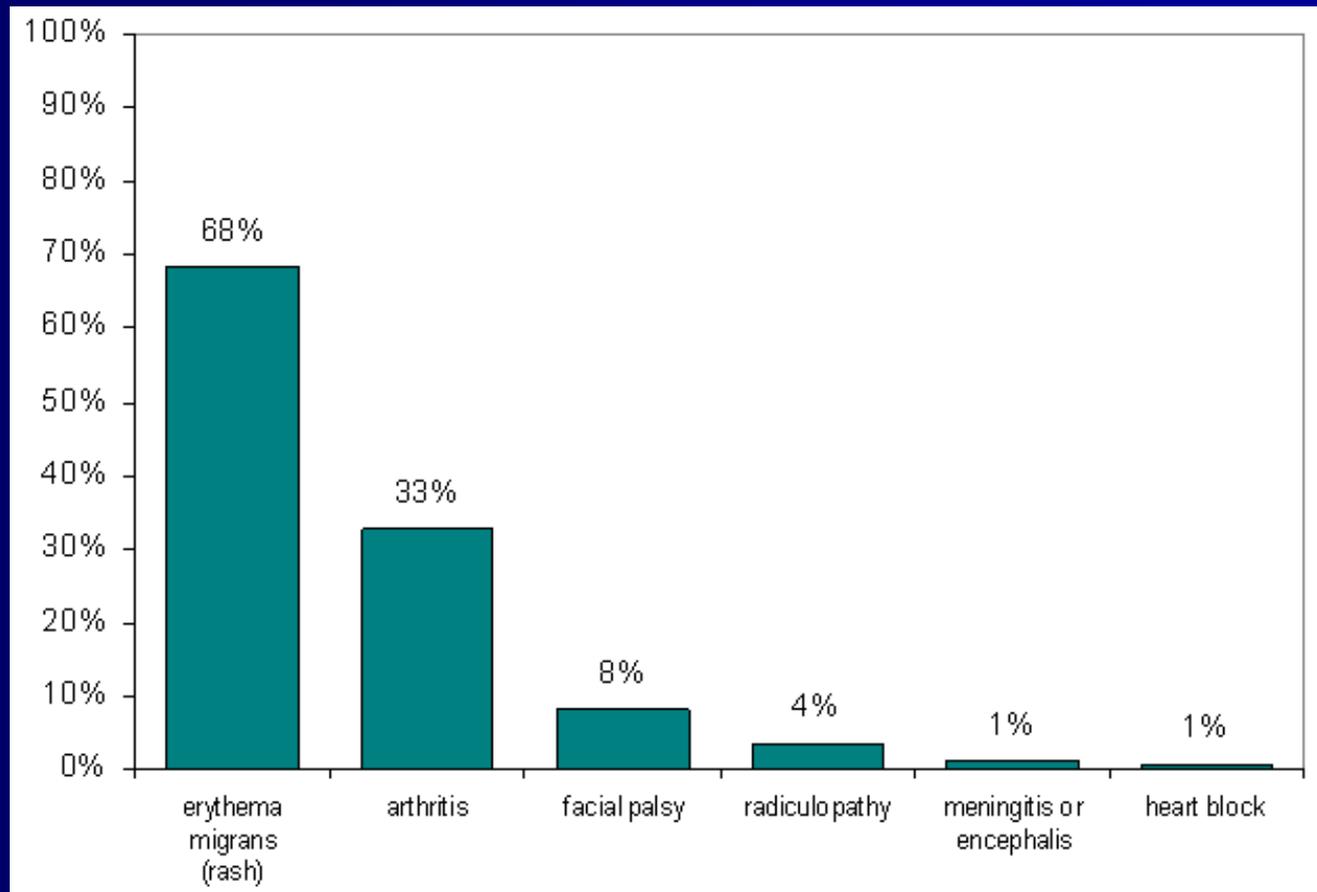
“Bulls-Eye” Rash

Seen in about 60% of all cases

“Flu-like” aches, fever, chills, fatigue



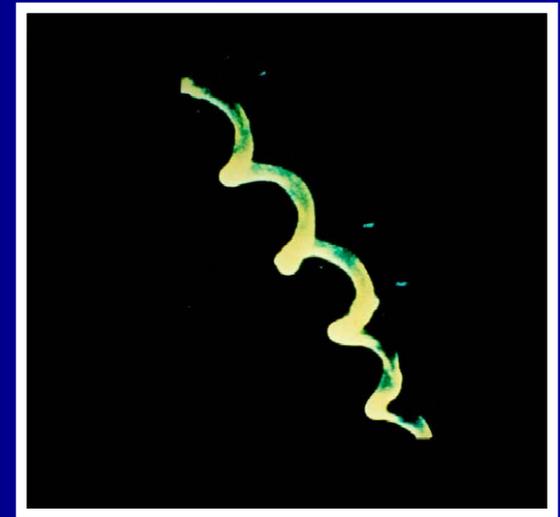
Symptoms Associated with Confirmed Cases of Lyme Disease 2009 – Centers for Disease Control (CDC)



Lyme disease bacteria take cover in lymph nodes

June 16, 2011 *University of California*

- Lyme disease bacteria "hide" in the lymph nodes
- Makes the lymph nodes less effective in fighting infection
- May explain why people can get repeated infections

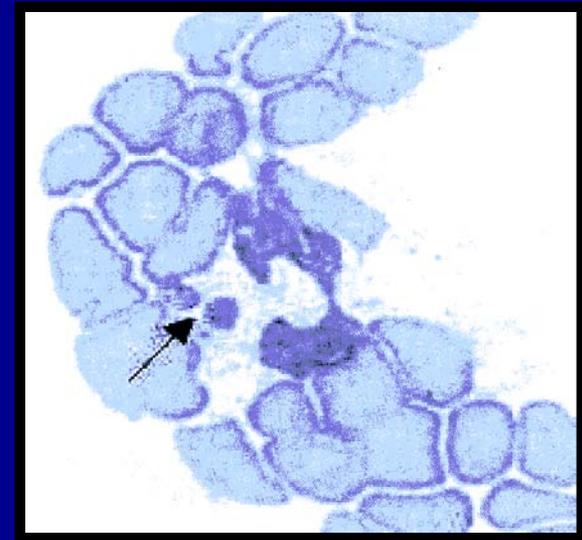


**But Wait...Lyme is
only one part of a
disease complex...**



Other Diseases Transmitted by Deer Ticks

- **Anaplasmosis (HGA)**
 - **Rickettsial type pathogen**
 - **Invades White Blood Cells**
 - **Symptoms include fever, nausea, malaise- indistinct**



Other Diseases Transmitted by Deer Ticks

- o **Babesiosis**
 - o Protozoan type pathogen
 - o Invades Red Blood Cells (malarial-like)
 - o Symptoms include fever, chills, sweats, muscle pain, gastrointestinal distress, respiratory distress, severe anemia



The New York Times

Once Rare, Infection by Tick Bites Spreads

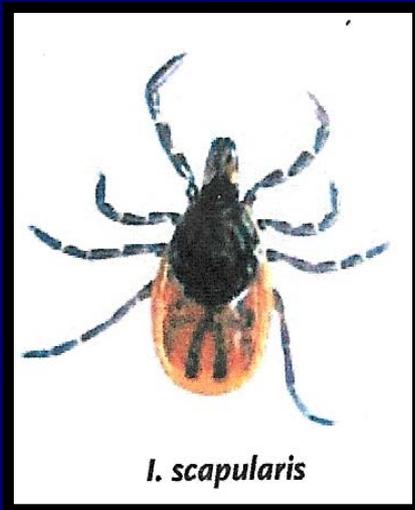
By LAURIE TARKAN

Published: June 20, 2011

A potentially devastating infection caused by tick bites has gained a foothold in the Lower Hudson Valley and in coastal areas of the Northeast, government researchers have found.

The condition, called **babesiosis**, is a malaria-like illness that results from infection with *Babesia microti*, a parasite that lives in red blood cells and is carried by deer ticks. Though far less common than Lyme disease, babesiosis can be fatal, particularly in people with compromised immune systems.

Deer ticks can transmit at least 3 diseases. Results of adult stage ticks collected from the Cape & the Islands - 2007



Borrelia (Lyme) 50%

Babesia 15%

Anaplasma 35%

More than one 20%

All three 5%

2011 Update - This is an active research project being conducted by Cape Cod Cooperative Extension in collaboration with UMass – Amherst. A strong focus is on Nymph Stage Ticks in addition to Adults.

2009 Cases	Lyme	Babesiosis	Anaplasmosis
Massachusetts	4,028	78	61
Barnstable Cty	184	21	
Dukes Cty	28	10	
Nantucket Cty	43	16	8

Note: Over half of the confirmed cases of Babesiosis in MA occurred on the Cape & Islands



Tick-Borne Disease Prevention Game Plan:

- 1) Protect Yourself
- 2) Protect Your Pets
- 3) Protect Your Yard



Protect Your Yard

- See Cape Cod Extension Yard Management Plan
 - Wildlife and habitat management
 - Perimeter sprays are an option



Protect Your Pets

Daily Tick Check

Products such as Advantix, Frontline are available...as with all pesticides, Read the Label

A vaccine is available for dogs



**Protect Yourself...All families & friends
can use a little advice on the
prevention of tick-borne diseases from
time to time**



Protect Yourself

- Tick Checks

- Choose Proper tool for removal



A
NO



C
NO



YES...pointy tweezers



B
NO



D
NO

Protect Yourself

■ Proper Clothing

- Long pants tucked into socks
- Light colors...easier to see ticks
- Shower and tumble-dry clothes for 20 minutes
- Deet containing products on exposed skin



Tick/Insect Repellent Clothing – Do-it-Yourself Treatment



Permethrin products
available retail and on-
line

Fabric only...not exposed
skin. Active after 6
washings.



Sold under a variety of
brand names.

– *Permanone, Repel,
Sawyers & Duranon*



Note, Permethrin is an insecticide
that repels and kills ticks. Read the
Label...

Tick/Insect Repellent Clothing



- Insect Shield, LLC developed technology to incorporate Permethrin into fabric
- Clothing sold under many brands
- 70 Washings EPA Claim
- Customers include outdoor enthusiasts as well as professionals in the Oil/Gas/Forestry industries

Permethrin Facts

- Permethrin more than 2,250 times more toxic to ticks than humans
- EPA: Reasonable certainty that permethrin-treated clothing poses no harm to infants or children
- If put directly on skin, absorption is less than 1%
- Exposure risk of permethrin-treated clothing to toddlers is 27 times below EPA Level of Concern (LOC)
- A 140-pound person would have no adverse health effects if exposed to 32 grams of permethrin per day. There is less than 1 gram of permethrin in one container of clothing treatment spray

From: www.tickencounters.org University of Rhode Island

SUMMING UP

- Three tick species occur on Cape Cod & the Islands...deer tick can transmit three important diseases
- These include Lyme in addition to Babesiosis and Anaplasmosis
- There is risk of deer tick transmitted disease all year long
- The NYMPH stage poses the greatest risk due to its small size and is most active from late May into early August



Tick-Borne Disease Resources



- www.capecodextension.org
 - Larry Dapsis 508-375-6642
ldapsis@barnstablecounty.org
- www.ma.gov Dept. of Public Health
- www.cdc.gov Centers for Disease Control and Prevention
- www.tickencounter.org University of Rhode Island

