



# Deer Ticks ...*One bite can change your life...*



## Garden Club of Buzzards Bay October 20, 2016

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# Everyone hates ticks !!!



- *"I love everything in the world... except for ticks..."*



“Actually, NFL Commissioner Roger Goodell is TIED with ticks on my list of the unworthy...”







Reported Cases of Lyme Disease -- United States, 2014



1 dot placed randomly within county of residence for each confirmed case

Reported Cases of Lyme Disease -- United States, 2001



1 dot placed randomly within county of residence for each reported case

**CDC - 30,000 Cases per Year???**

# Incidence Rate Lyme: 2014

## *State Ranking*

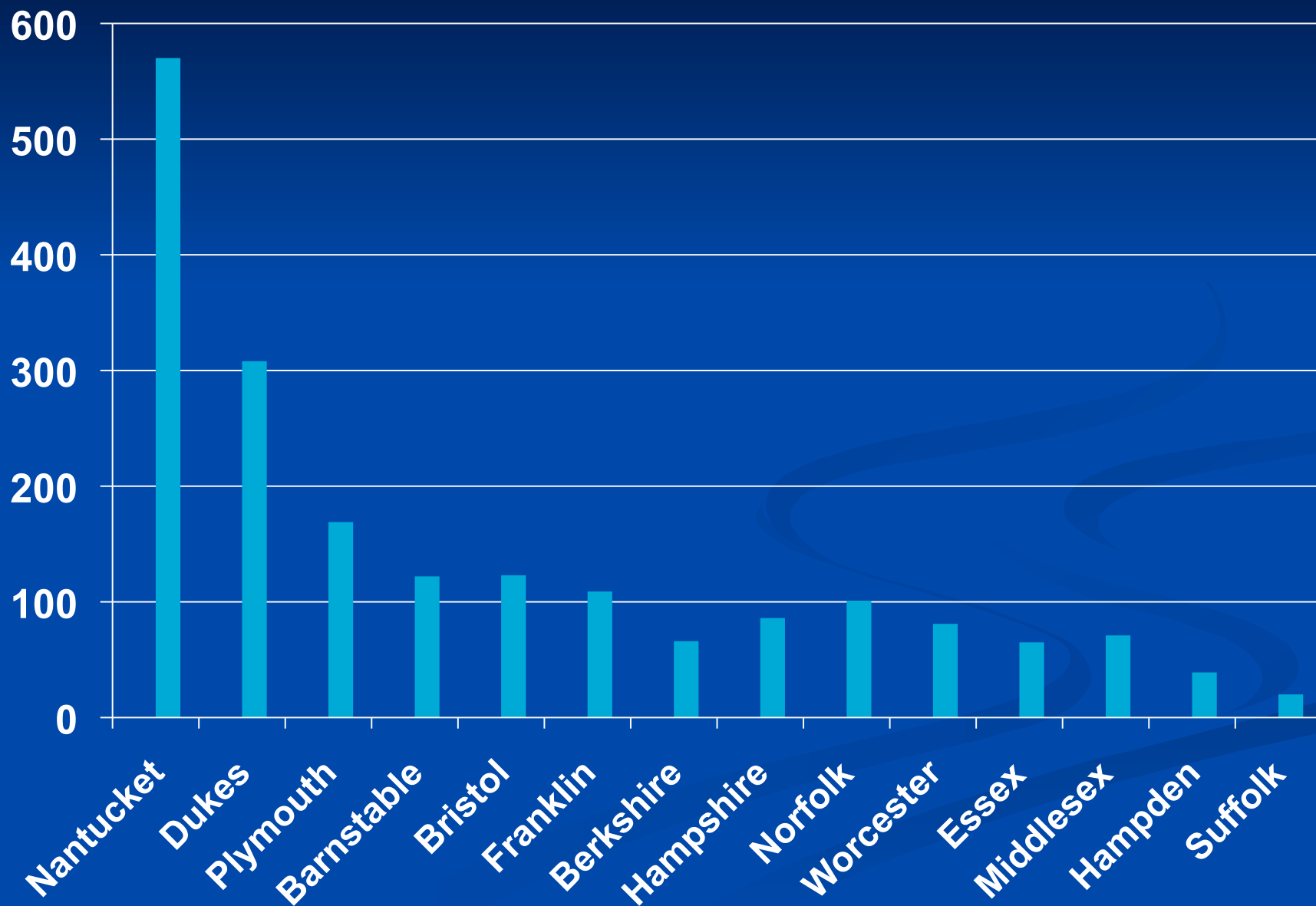


<b>1 – Maine</b>	<b>88*</b>
<b>2 – Vermont</b>	<b>71</b>
<b>3 – Massachusetts</b>	<b>54</b>
<b>4 – Rhode Island</b>	<b>54</b>
<b>5 – Pennsylvania</b>	<b>51</b>
<b>6 – Connecticut</b>	<b>48</b>
<b>7 – New Hampshire</b>	<b>47</b>

**U.S.** **8**

**\* Confirmed cases  
Per 100,000**

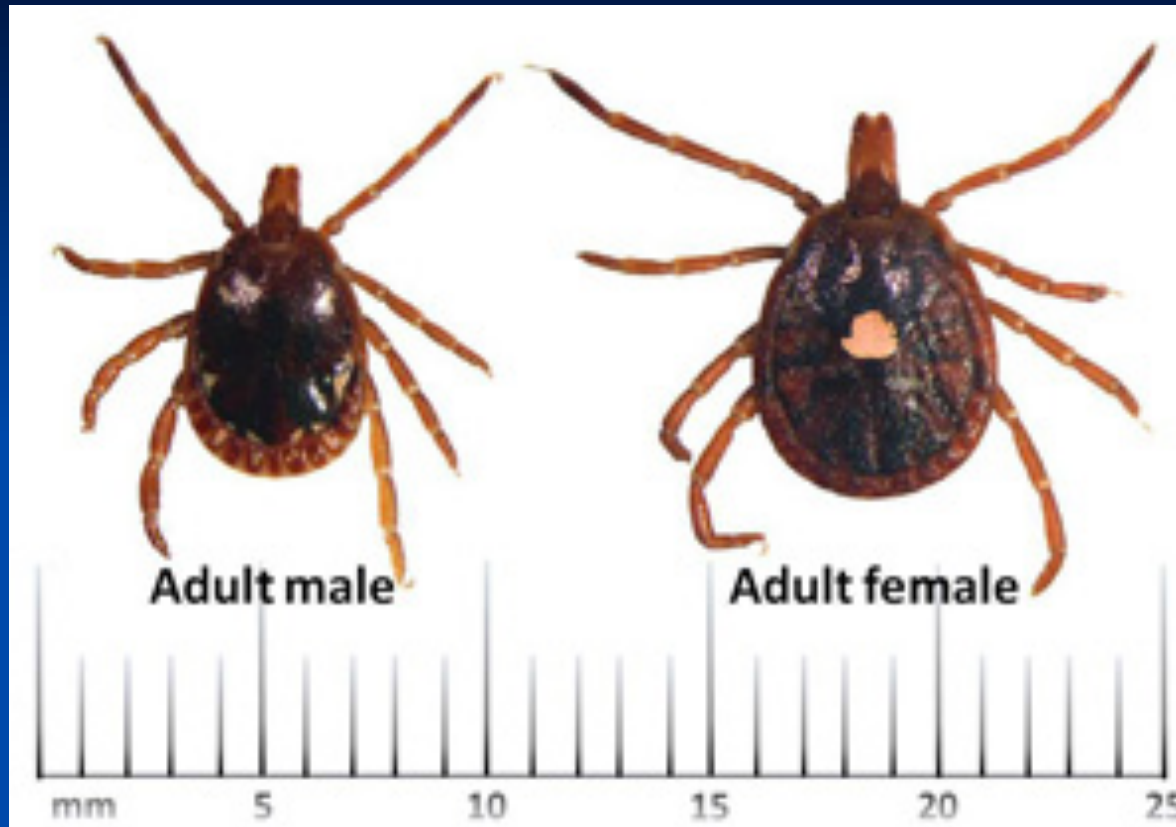
## 2014 - MA Lyme Incidence per 100,000



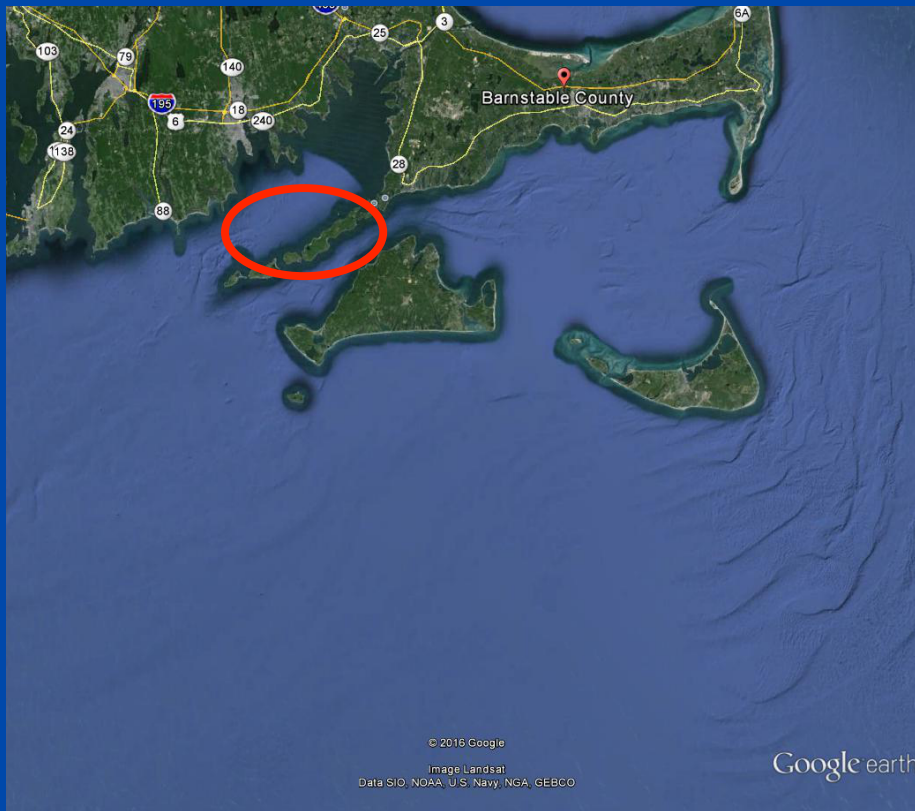
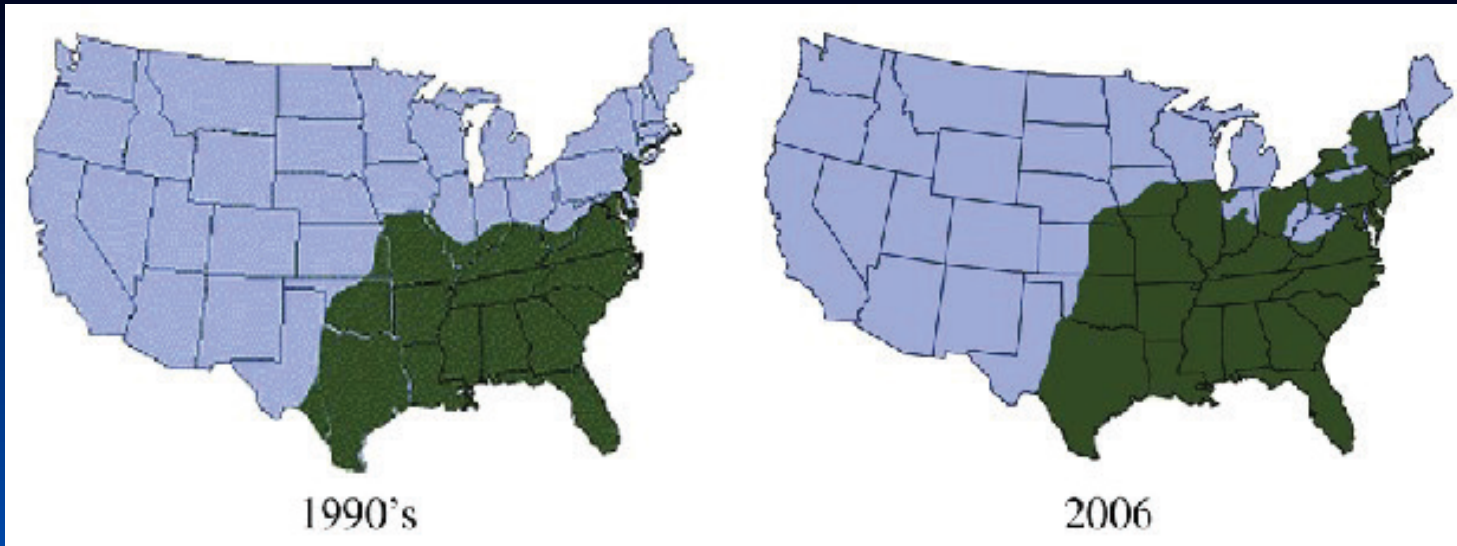




**American Dog Tick**  
***Dermacentor variabilis***



**Lone Star Tick**  
***Amblyomma americanum***



- **Cuttyhunk & Naushon Islands**



# Lone Star Tick

- ***Aggressive biter***
  - Erlichiosis
  - STARI\*
    - *Falmouth*
  - Tularemia



**Bite can trigger allergy to red meat consumption**

**Beef, Pork, Lamb and by-products...gelatin**

# Deer Tick, or Blacklegged Tick



# Massachusetts Winters: *Kill Ticks?*





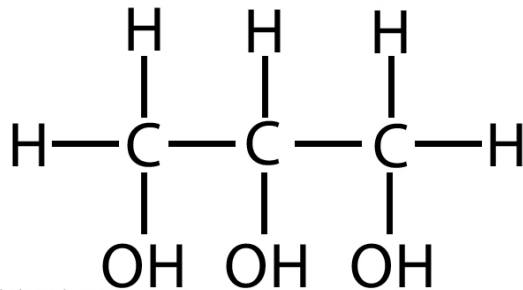
*A Wisconsin*  
❄️❄️❄️❄️❄️  
**Winter**



OCTOBER 1, 2011

## *The Lyme disease spirochete feasts on tick antifreeze*

Glycerol (Glycerin)



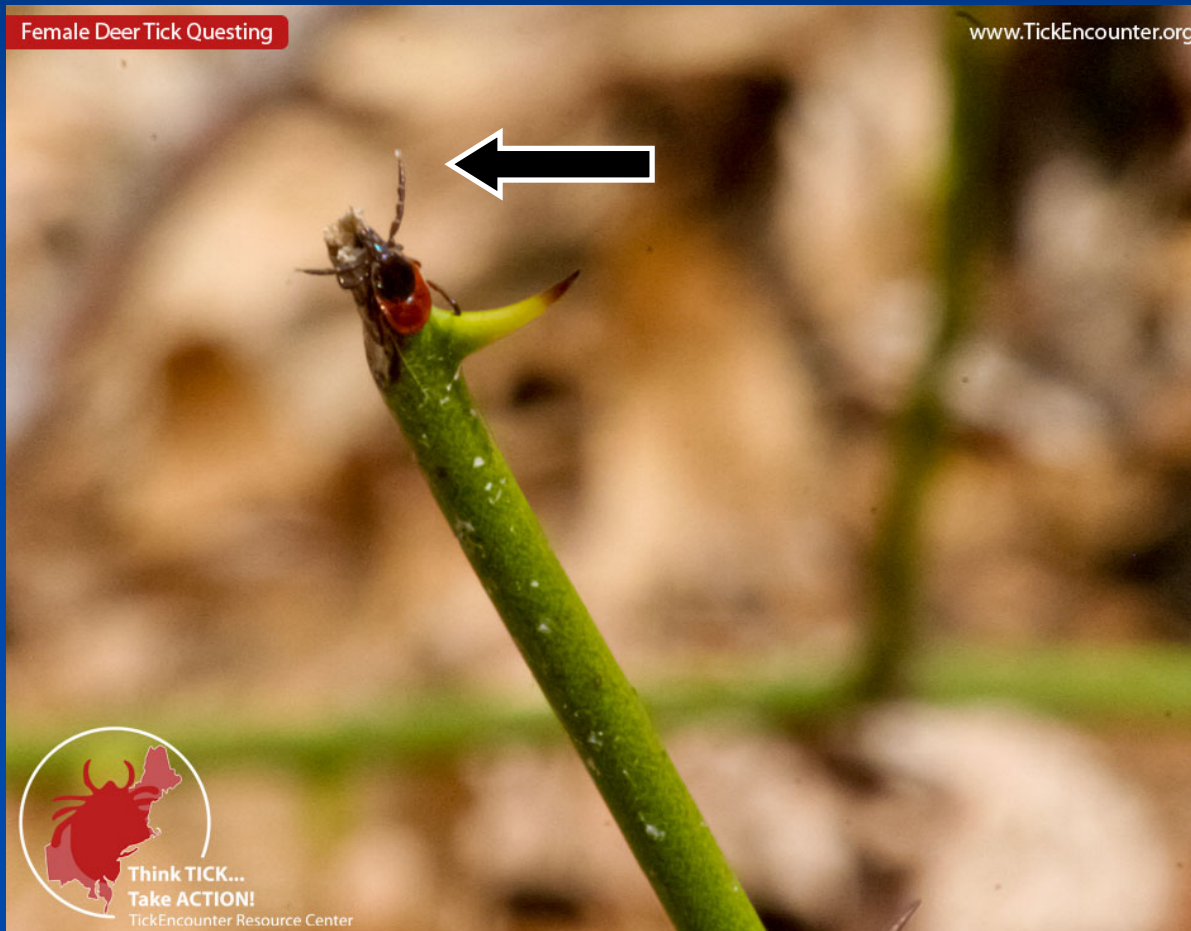
©Nutrientsreview.com

**Glycerol prevents ice crystal formation in cells**

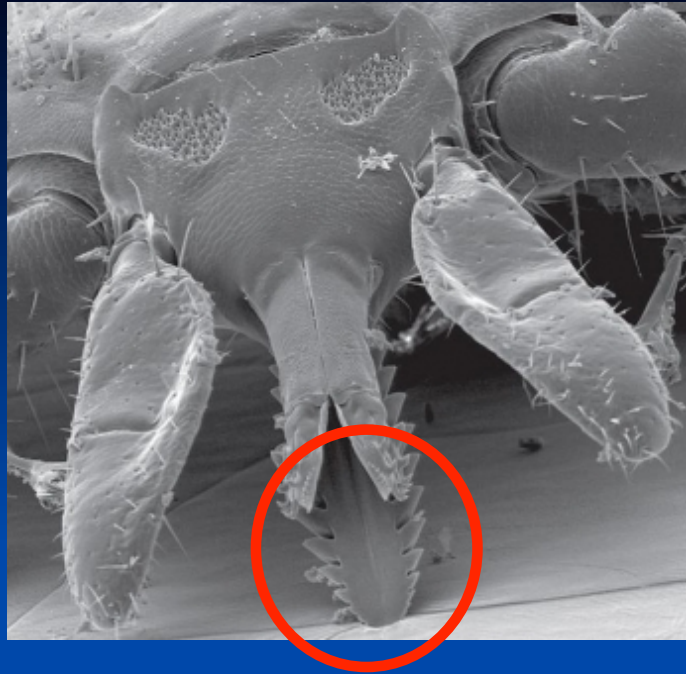
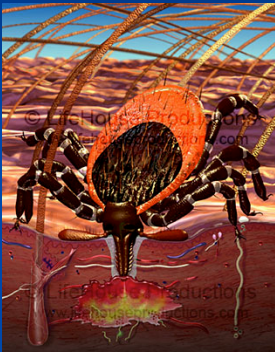
**Lyme bacteria use glycerol as a carbon (= energy) source**

# Tick Ambush Behavior – Questing

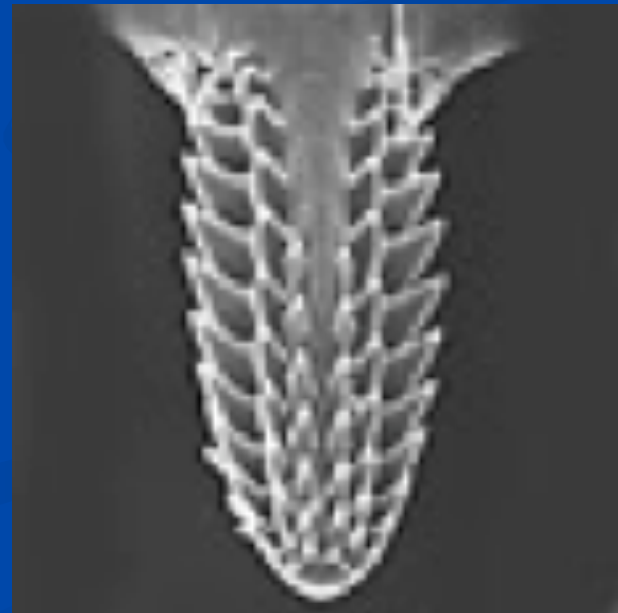
...Designed to latch onto any creature  
that brushes up against it







***Ticks are designed to stay a while...***



# About hosts...

**125 vertebrate species play in the tick-disease ecosystem...**

**Rodents are important infective hosts – Mice are extremely “competent”, as are chipmunks**

**Birds play a role**

**Hosts that are “incompetent”  
are important for supporting tick numbers**

# Risk of infection is year round, but the greatest risk...

is **NOT** the tick adults

Fall thru Spring, 50% infected

Bite more likely to be detected

...it's from the nymph stage

Late May into August, 25%  
infected

Bite is difficult to detect



# Tick SIZE WISE ? check your bagels

**Adult – Sesame Seed  
Sized**

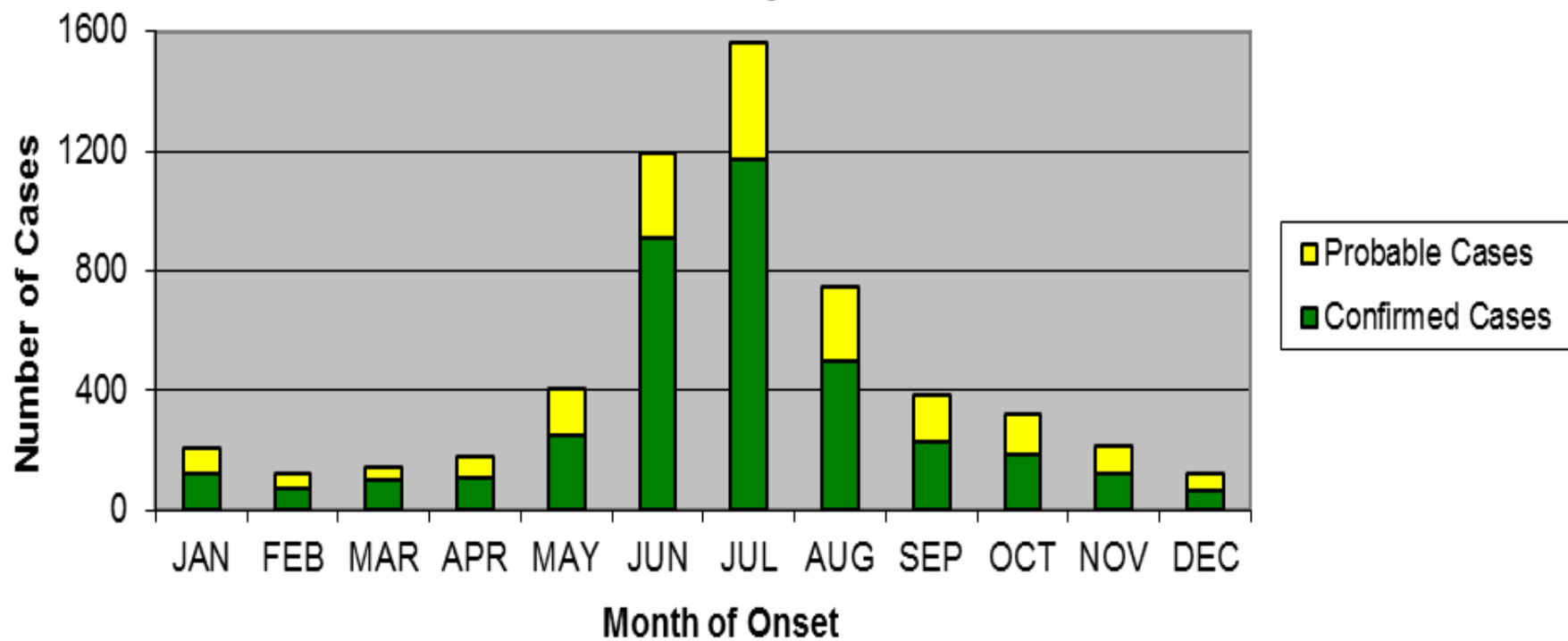


**Nymph - Poppy  
Seed Sized**

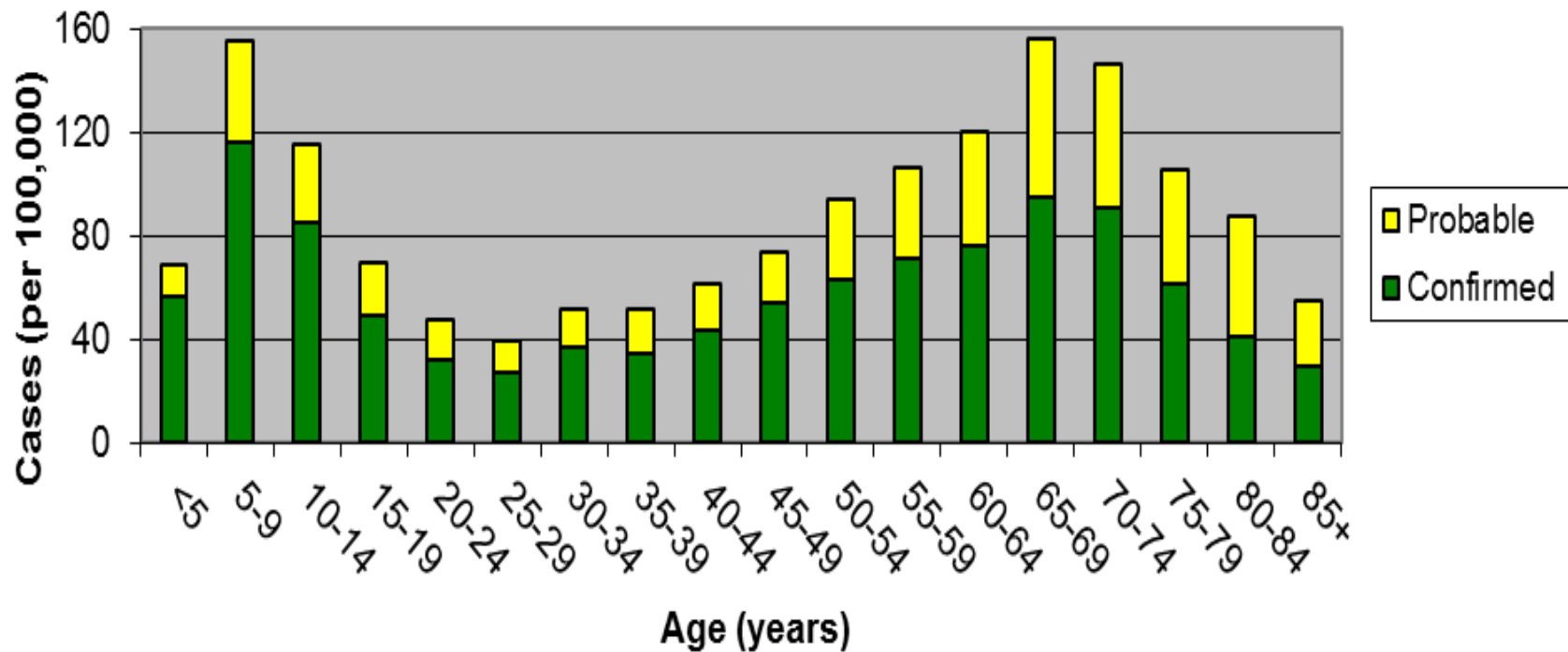




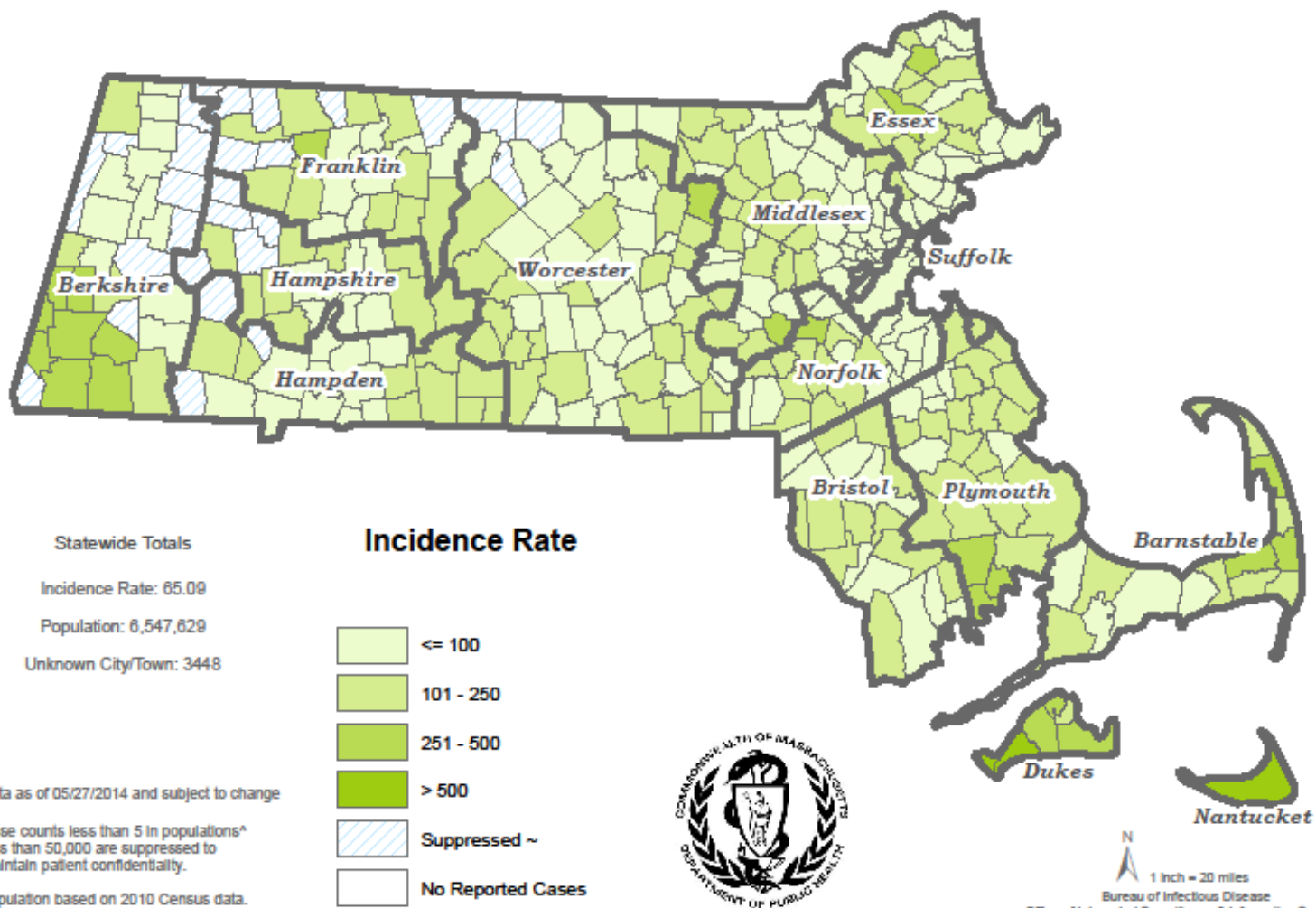
## Number of Confirmed and Probable Lyme Disease Cases Reported in Massachusetts by Month of Onset, 2014



### Incidence Rates of Confirmed and Probable Lyme Disease Cases in Massachusetts by Age Group, 2014



## Incidence Rates (per 100,000 population<sup>^</sup>) for Confirmed and Probable Lyme Disease in Massachusetts 2009-2013\*



**“Upon further examination the complexity of this problem continues to grow....”**



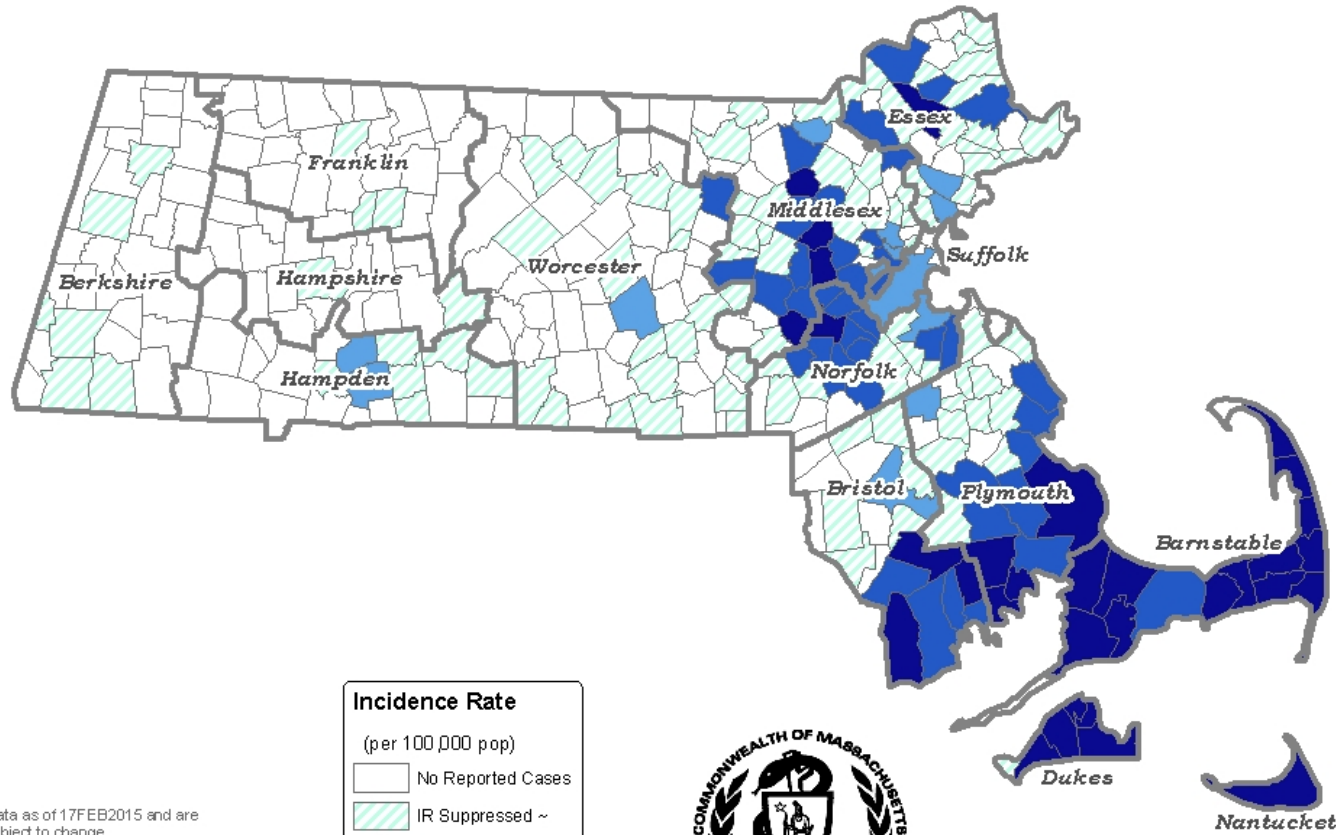


# Other Diseases Transmitted by Deer Ticks

- **Babesiosis**
  - Invades Red Blood Cells (malaria-like)
  - Symptoms include fever/chills, severe anemia
  - Blood Transfusion



**Incidence Rates (per 100,000 population<sup>^</sup>) for Confirmed and Probable Babesiosis in Massachusetts: 2010-2014\***

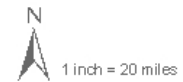


Incidence Rate	
(per 100,000 pop)	
	No Reported Cases
	IR Suppressed ~
	0.1 - 10.0
	10.1 - 100.0
	> 100.0

\* Data as of 17FEB2015 and are subject to change.

<sup>^</sup>Using 2010 Census data

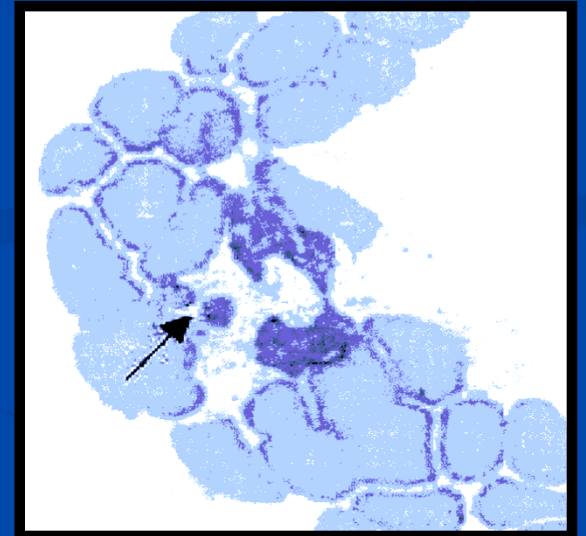
~ Case counts less than 5 in populations less than 50,000 are suppressed to maintain patient confidentiality.



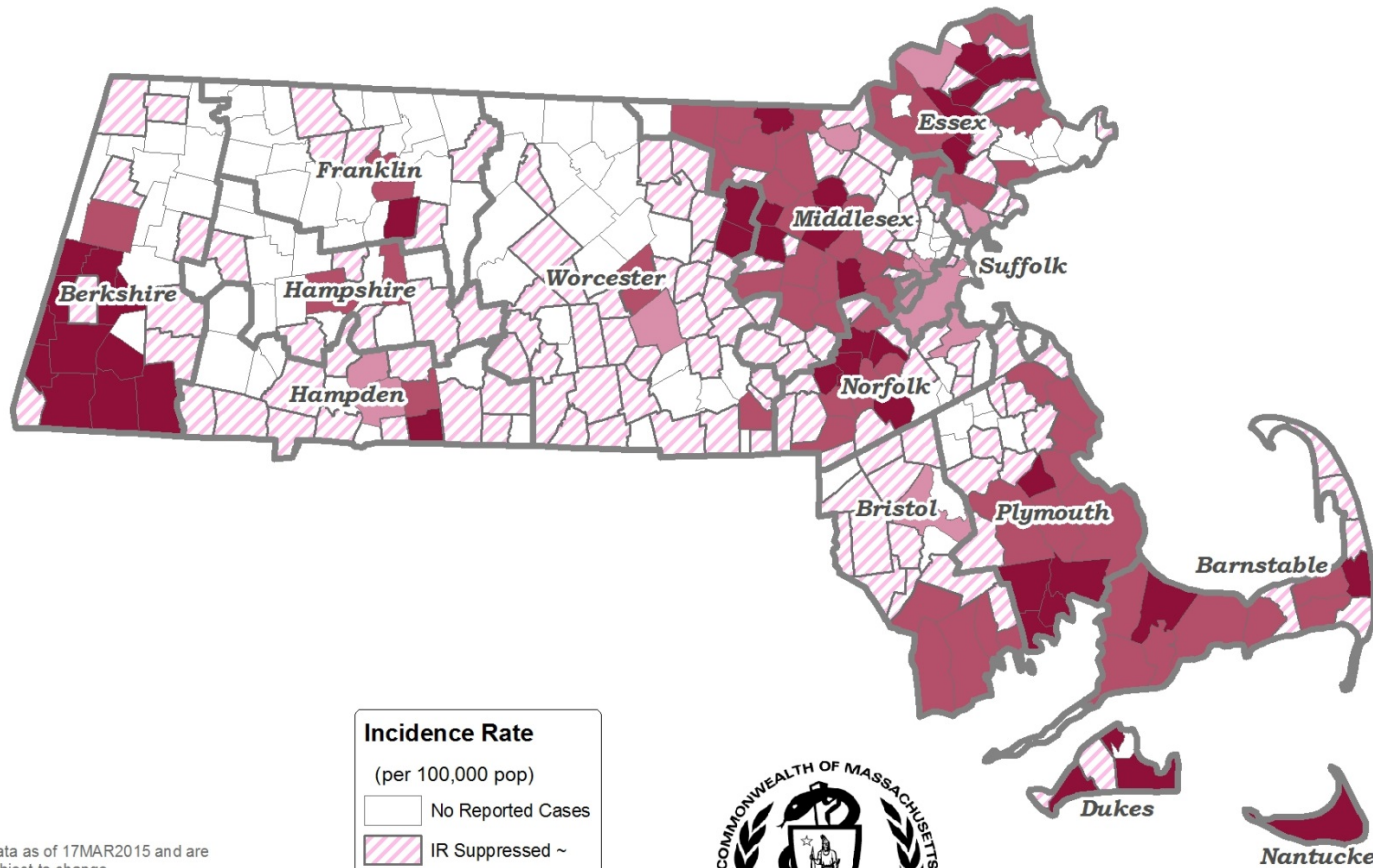
Bureau of Infectious Disease  
Office of Integrated Surveillance & Informatics Services

# Other Diseases Transmitted by Deer Ticks

- **Anaplasmosis (HGA)**
  - **Invades White Blood Cells**
  - **Symptoms include fever, nausea, headache, muscle pain, abdominal pain, confusion...**



**Incidence Rates (per 100,000 population<sup>^</sup>) for Confirmed and Probable Anaplasmosis  
in Massachusetts: 2010-2014\***



**Incidence Rate**  
(per 100,000 pop)

- No Reported Cases
- IR Suppressed ~
- 0.1 - 10.0
- 10.1 - 100.0
- > 100.0

\* Data as of 17MAR2015 and are subject to change.

<sup>^</sup> Using 2010 Census data

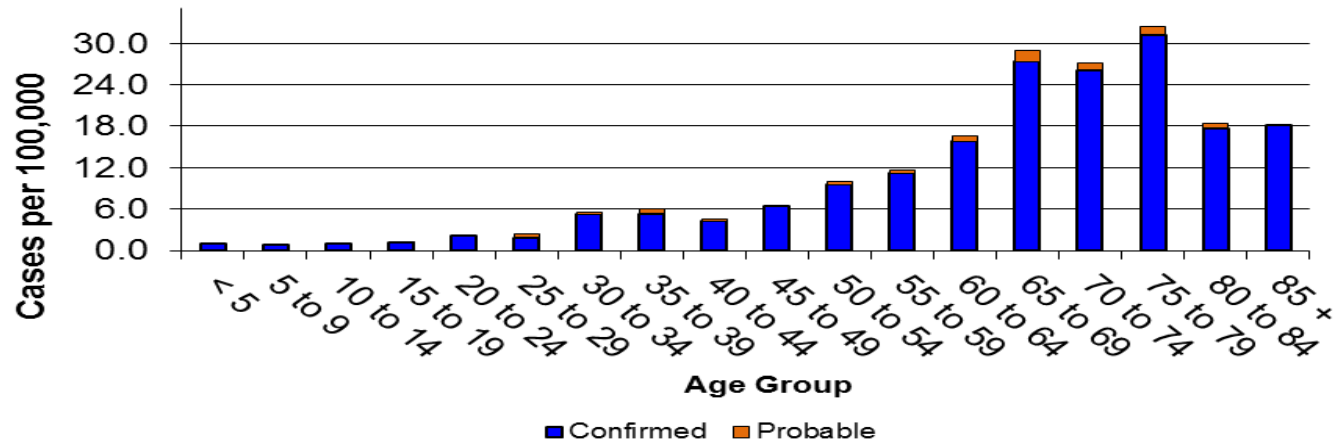
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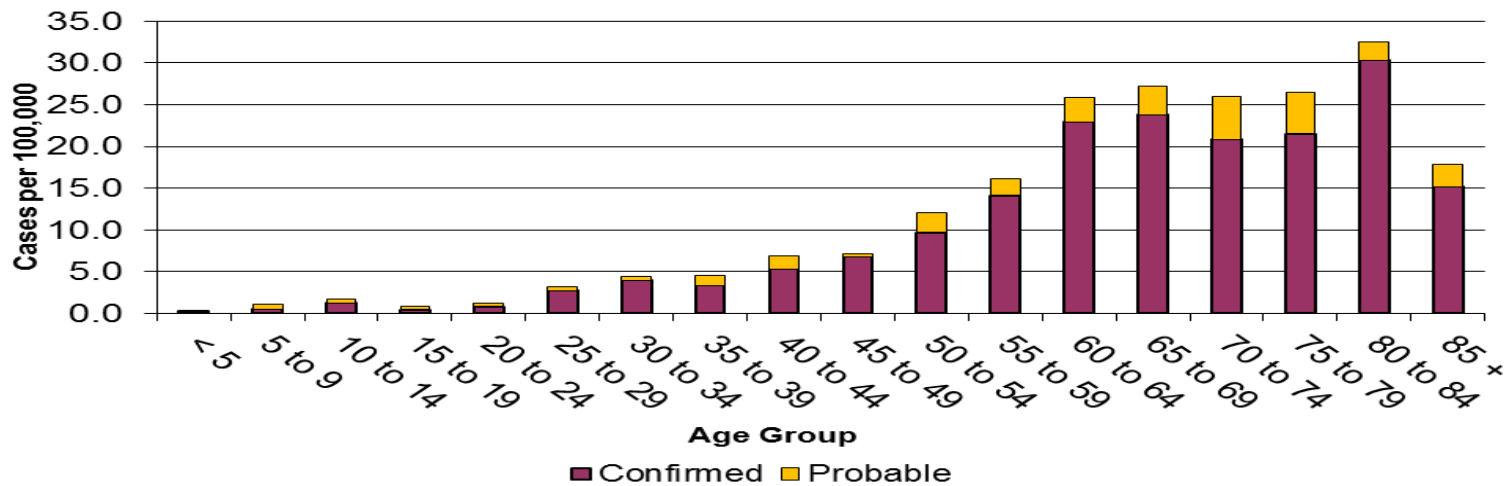
Bureau of Infectious Disease  
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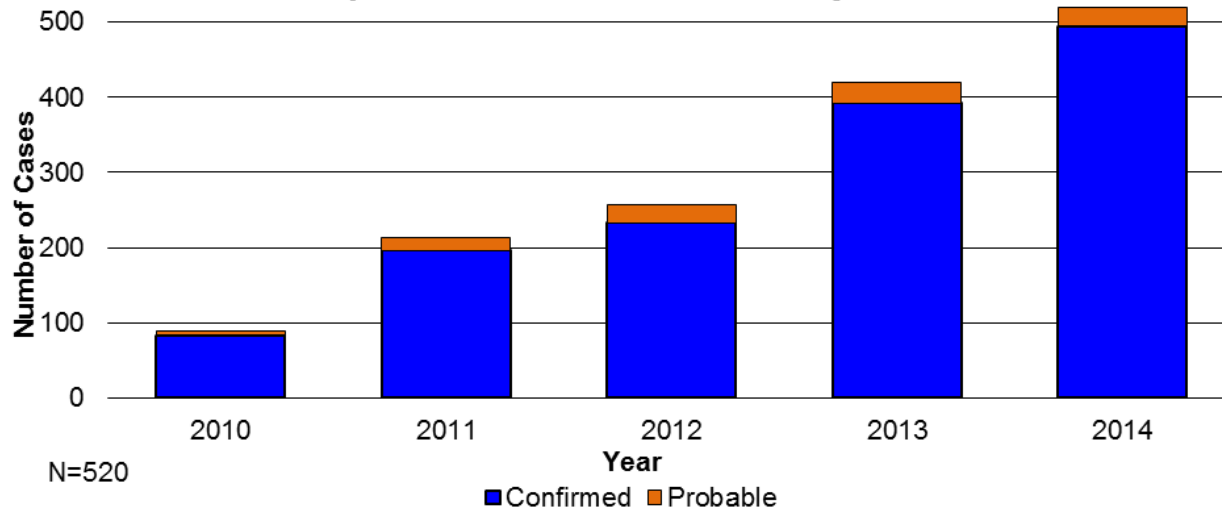
**Incidence Rate of Confirmed and Probable Babesiosis Cases Reported in Massachusetts, by Age Range, 2014**



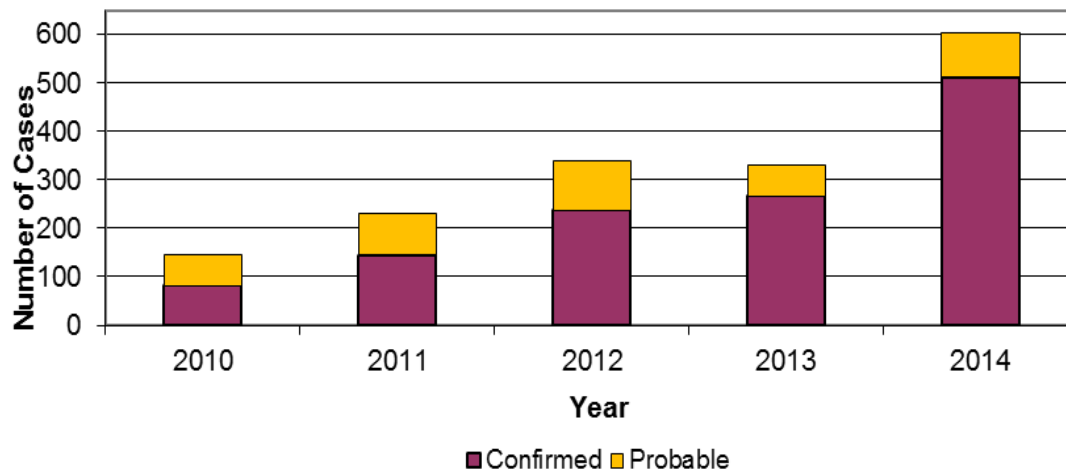
**Incidence Rate of Confirmed and Probable HGA Cases Reported in Massachusetts, by Age Range, 2014**



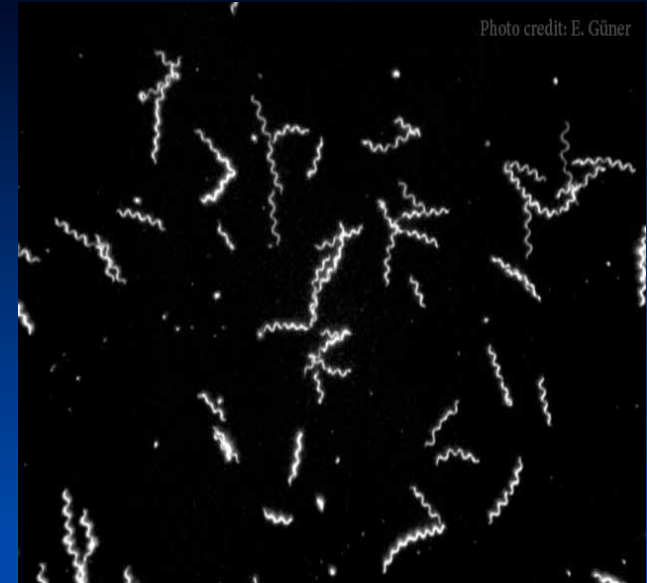
### Number of Confirmed and Probable Babesiosis Cases Reported in Massachusetts by Year



### Number of Confirmed and Probable Anaplasmosis Cases Reported in Massachusetts by Year



# *Borrelia miyamotoi*



- First linkage to human disease in 2012 – Russia
- U.S. cases followed...Relapsing Fever
- Found in 2.3% of ticks tested from Cape - 2011



- NH 1
- MA 1
- RI
- CT
- NJ 1
- DE
- MD
- DC
- WV

# Powassan Virus – 2004 to 2013 CDC



# Powassan Massachusetts, 2013- September, 2015

- 7 cases (5 confirmed, 2 probable)
- Residents of:  
Barnstable, Essex, Middlesex and Norfolk  
counties
- Exposure occurred in Massachusetts
- Month of onset
  - May, June, September and October
- Encephalitis requiring hospitalization
  - No fatalities

# Phase 1 Game Plan- Protect Yourself



- Deet, Picaridan, IR3535, Oil of Lemon Eucalyptus to treat exposed skin



- “All Natural”?



# Protect Yourself

- Long pants - tucked into socks
- Light colors...easier to see ticks
- Tumble-dry clothes for 20 minutes



- Shoes





# Tick Repellent Clothing – Permethrin



Fabric only...  
Active thru 6

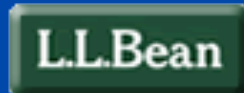
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Note, Permethrin is an insecticide that repels and kills ticks. Read the Label...



# Pre-treated Tick Repellent Clothing



- Proprietary process to bond permethrin to fabric...
- 70 Washings EPA Claim
- Many brands...one supplier

Or, send clothing to Insect Shield for treatment

# Permethrin Facts

- 2,250 times more toxic to ticks than humans
- EPA: Reasonable certainty that permethrin-treated clothing poses no harm to infants, children or pregnant women
- Low skin absorption...metabolized quickly
- Also used for scabies
- Exposure data also studied by Research Council



# Phase 1 Game Plan- Protect Yourself

- Proper Tweezers
- Proper Removal
- Record Date...Save Tick
- Infection Test Available
  - Laboratory of Medical Zoology...UMass-Amherst
  - [www.TickReport.com](http://www.TickReport.com)



Tests Ordered			
Pathogen	Date Ordered		Result
Borrelia mayonii	4/6/2016		NEGATIVE
Borrelia burgdorferi	3/30/2016		POSITIVE
Anaplasma	3/30/2016		NEGATIVE
Babesia	3/30/2016		POSITIVE
Borrelia miyamotoi	3/30/2016		NEGATIVE

**Patient Information:**  
**Host Source:** human  
**Gender:** male  
**Age:** 3  
**City:** Norwell  
**State:** MA  
**Zip:** 02061  
**Attached:** Yes  
**Site of Attachment:**  
 Head  
**Rash Present:** No

**Tick Information**  
**Species:** *Ixodes*  
*scapularis*  
**Sex:** female  
**Stage:** adult





Tests Ordered			
Pathogen	Date Ordered		Result
Borrelia burgdorferi	11/19/2016		POSITIVE
Anaplasma	11/19/2016		POSITIVE
Babesia	11/19/2016		POSITIVE
Borrelia miyamotoi	11/19/2016		POSITIVE

## Patient Information:

Host Source: human

Gender: female

Age: 63

City: Eastham

State: MA

Zip: 02642

Attached: Yes

Site of Attachment:

Upper Leg

Rash Present: No

## Tick Information

Species: *Ixodes scapularis* (Deer tick)

Sex: female

Stage: adult

Feeding State: partially fed



# Phase 2 Game Plan - Protect Your Yard

- Wildlife and habitat management ?????
- Perimeter sprays effective  
...NOT the entire yard  
Consider all “edges”



# Damminix Tubes – Eco-Health, Inc.



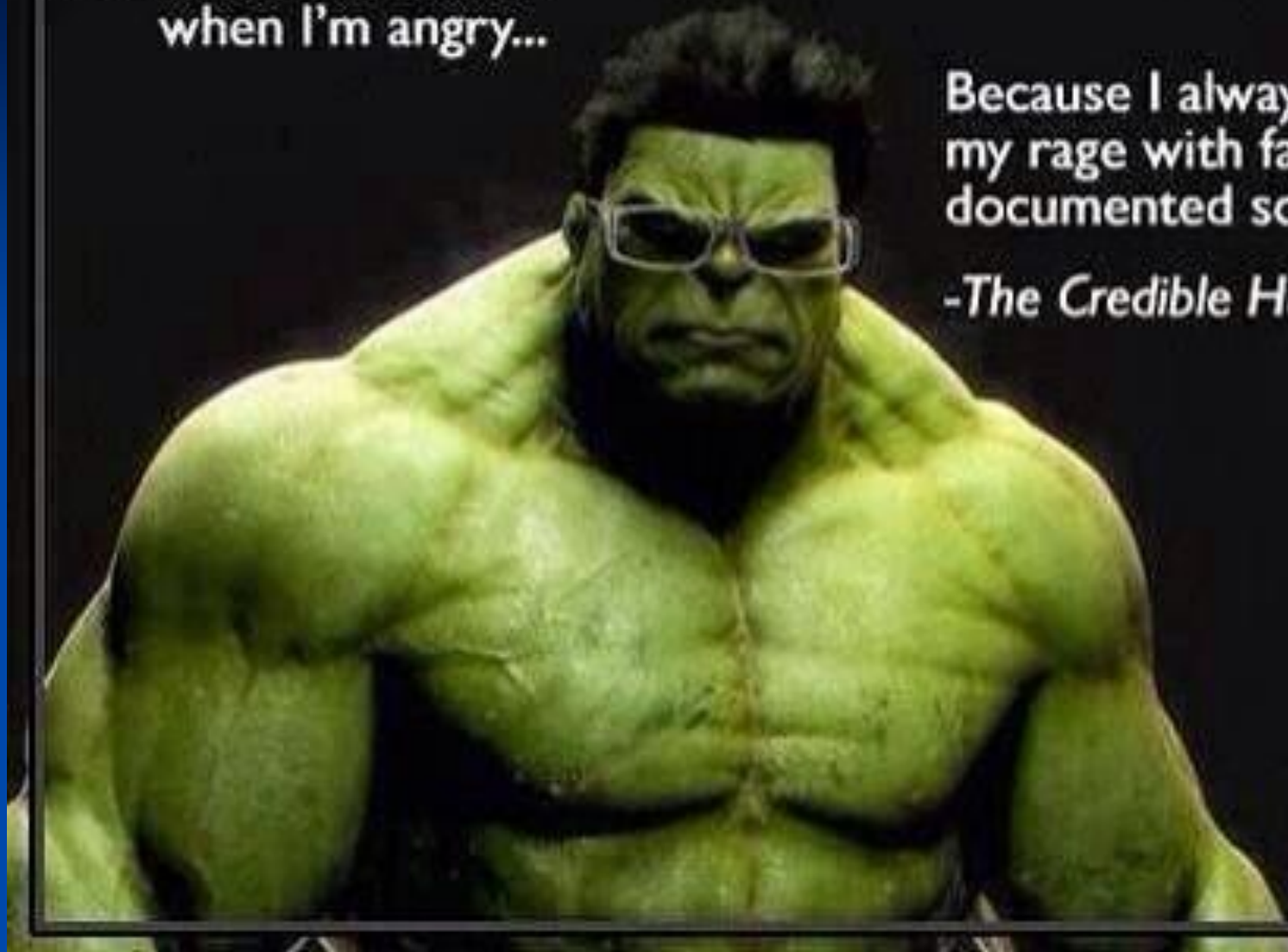
# Damminix Tubes

- **Several initial university studies looked promising**
  - Fewer ticks on mice
- **Follow-up studies, NY & CT**
  - Replicated, multi-year
  - No significant effect on nymph tick populations
    - ...not all tick-carrying animals take cotton
- **Company website – testimonial driven, no baseline data in company trial**

You wouldn't like me  
when I'm angry...

Because I always back up  
my rage with facts and  
documented sources.

*-The Credible Hulk*





# Phase 3 Game Plan - Protect Your Pets

- Tick check
- Topical products: K9 Advantix II, Frontline
- Seresto collar





I make this vest  
look GOOD!!!

**insect shield<sup>®</sup>**  
repellent technology



# **Don't Let...*one bite can change your life...***

## **Simplified Game Plan Summary**

- **Tick Checks and Use of Permethrin-Treated Clothing**
- **Perimeter Yard Spray**
- **Pet Protection**



# Questions?

