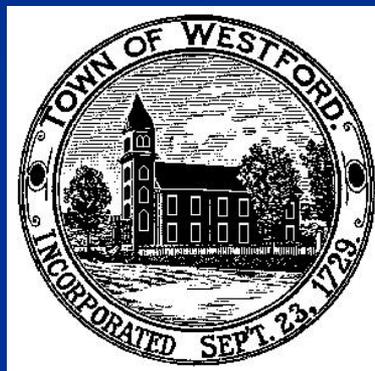




Deer Ticks ...*One bite can change your life...*



September 25, 2017

Larry Dapsis

Deer Tick Project Coordinator - Entomologist

www.capecodextension.org

508-375-6642





Reported Cases of Lyme Disease -- United States, 2014



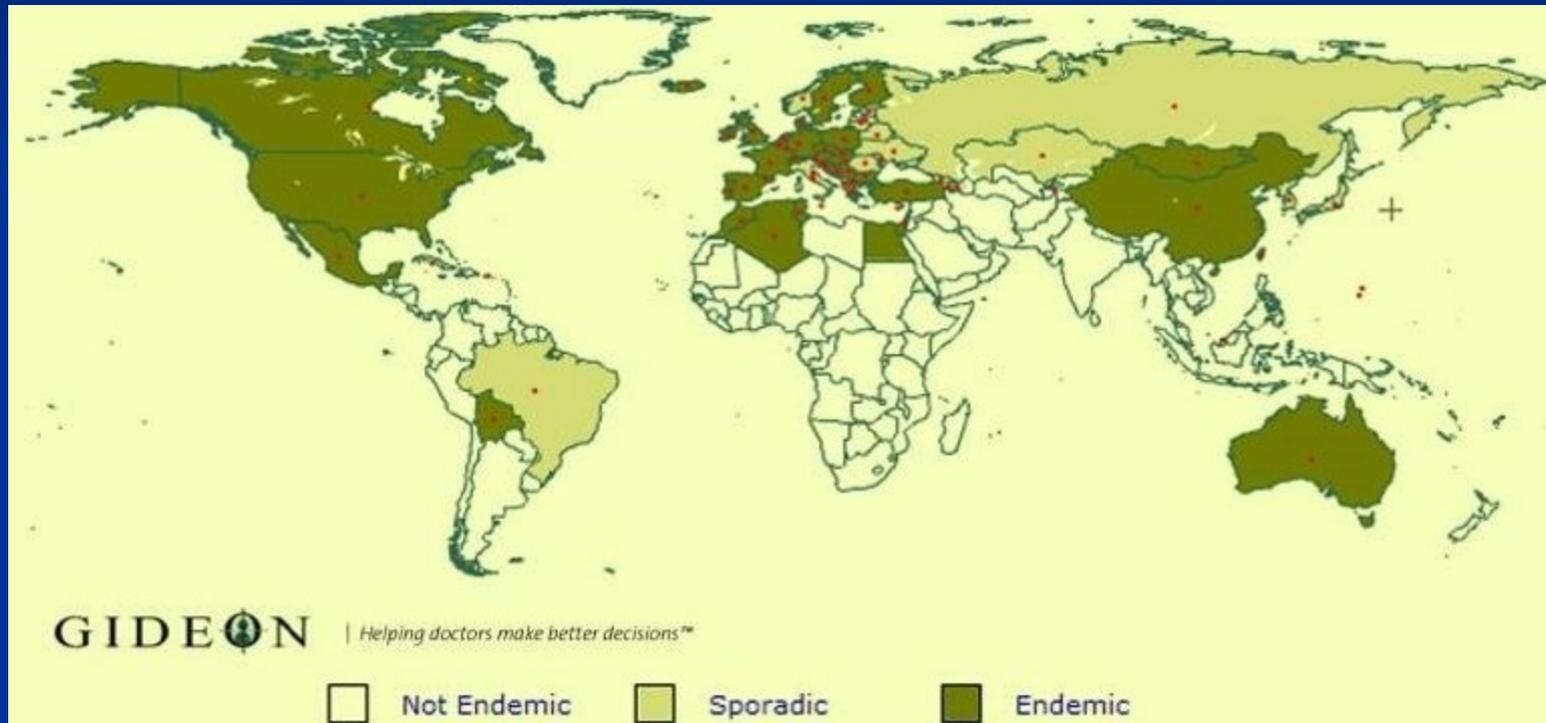
1 dot placed randomly within county of residence for each confirmed case

Reported Cases of Lyme Disease -- United States, 2001



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

CDC - 300,000 Cases per Year



Incidence Rate Lyme: 2013 - 2015

State Ranking

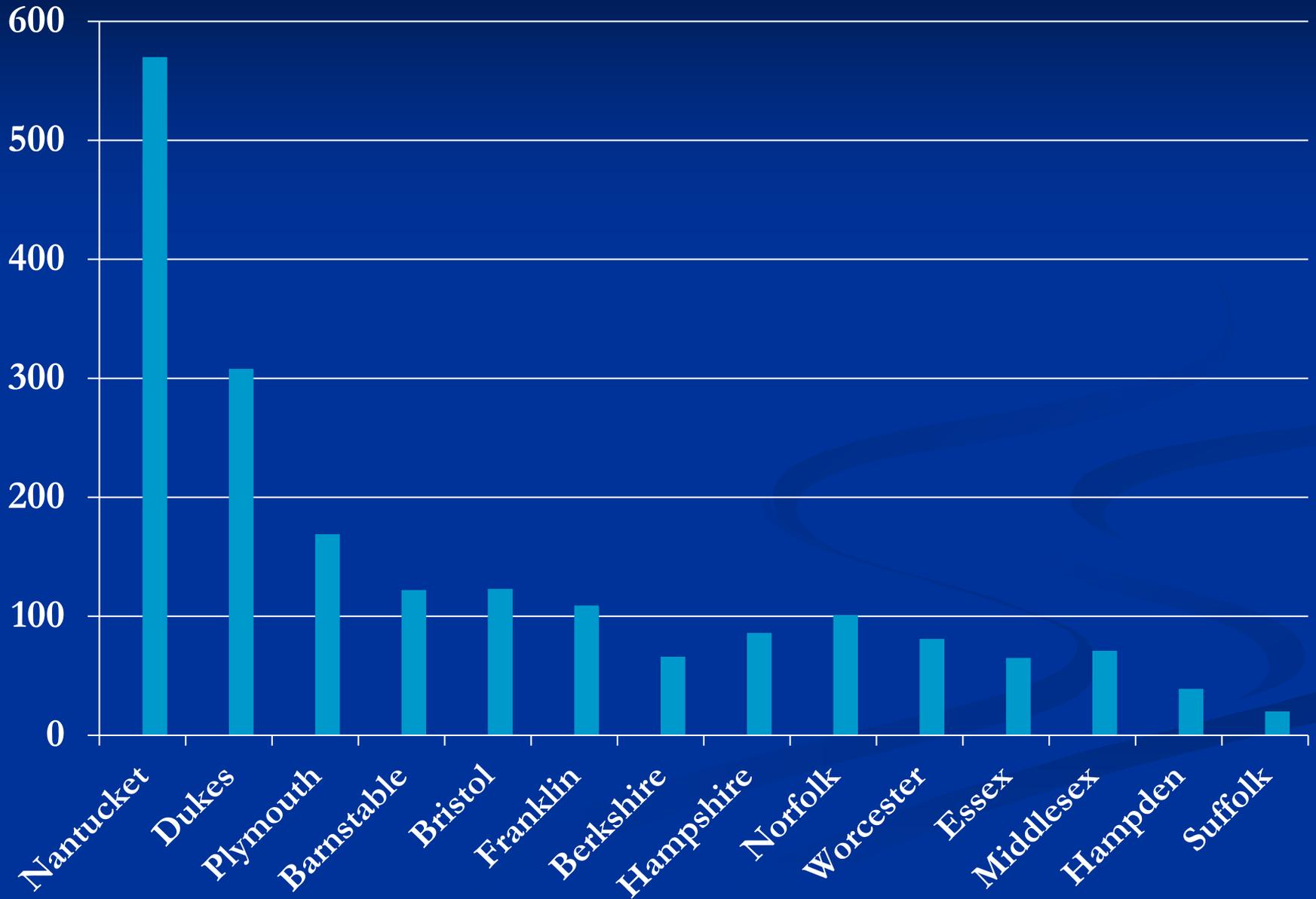


1 – Vermont	88 *
2 – Maine	83
3 – New Hampshire	60
4 – Connecticut	53
5 – Massachusetts	51
6 – Rhode Island	50
U.S.	8

* Confirmed cases
Per 100,000

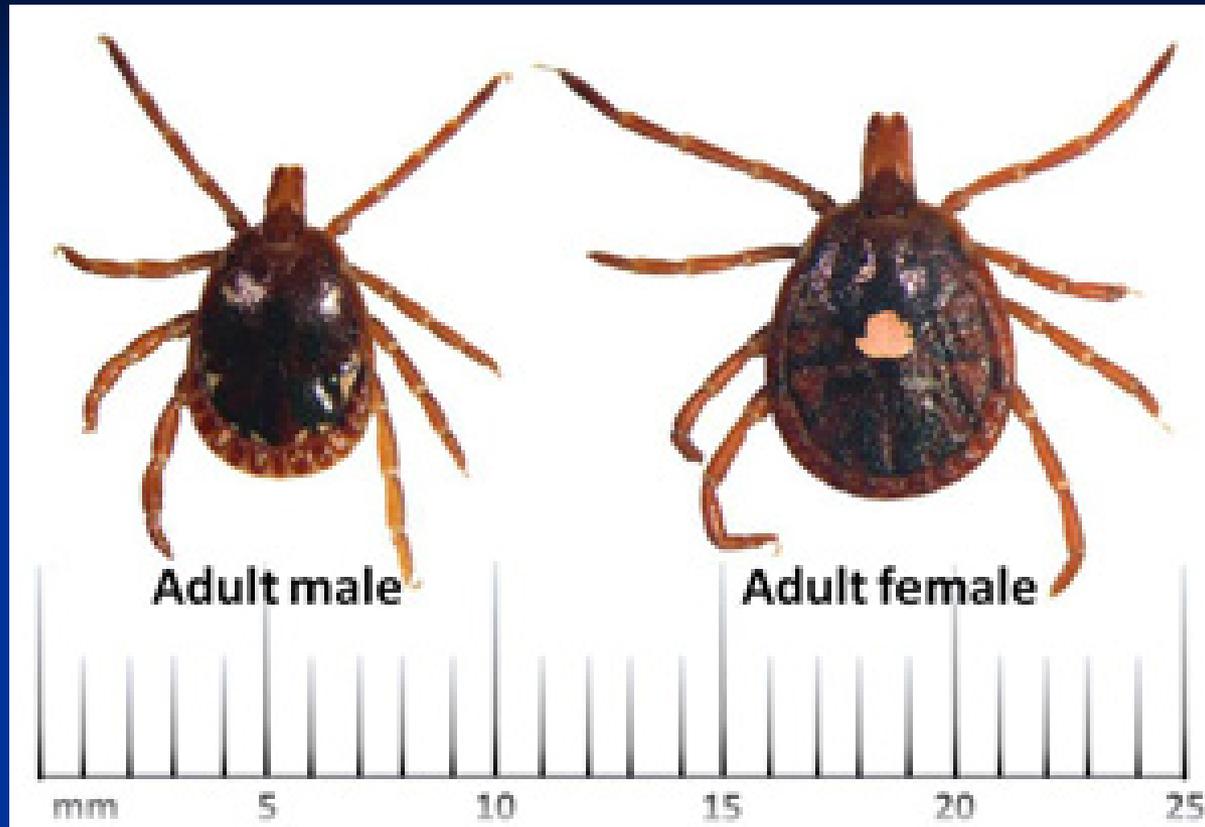


2014 - MA Lyme Incidence per 100,000

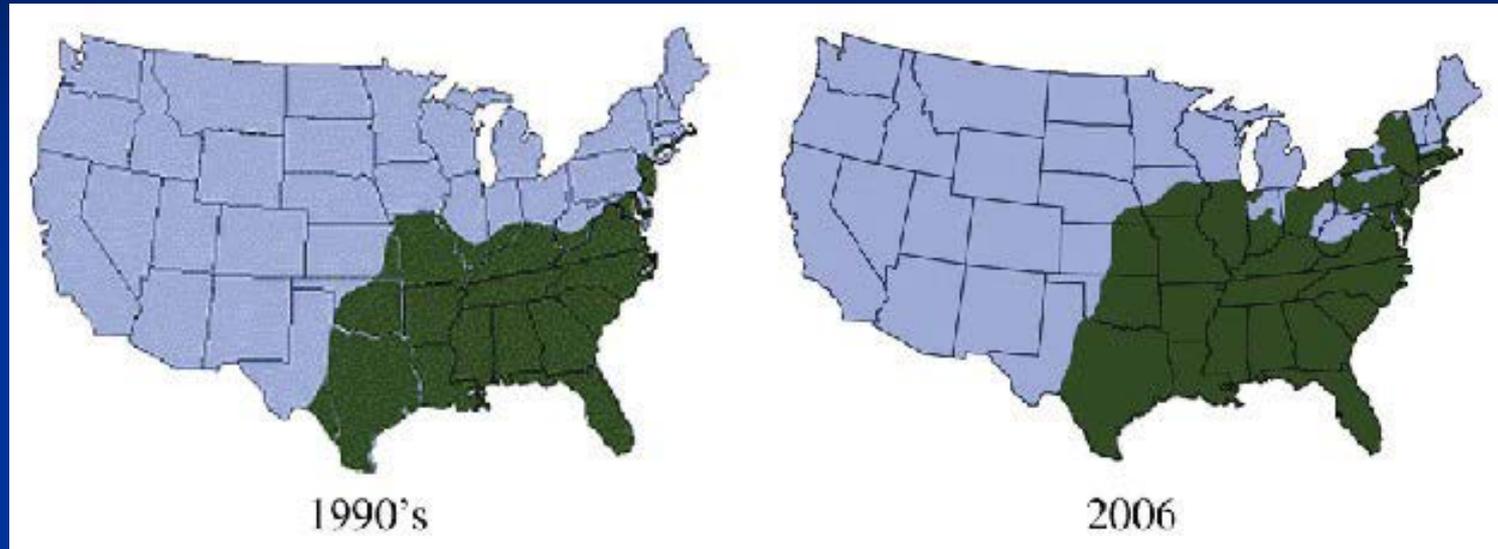




American Dog Tick
Dermacentor variabilis



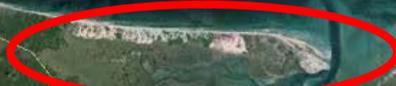
Lone Star Tick
Amblyomma americanum



Lone Star Tick Distribution



Sandy Neck, West Barnstable



© 2016 Google

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google earth

Lone Star Tick

- *Aggressive biter*

- Erlichiosis
- STARI
- Tularemia



Bite can trigger allergy to red meat consumption

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

Deer Tick, or Blacklegged Tick



Ambush Predator

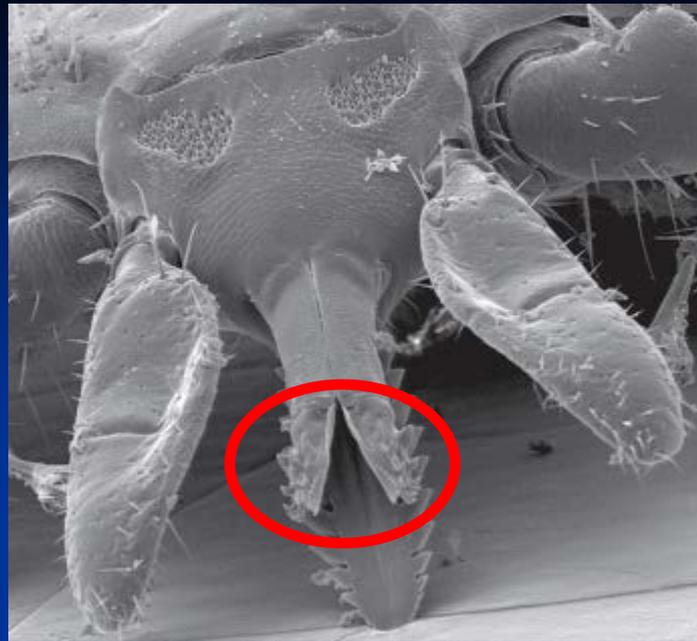
Questing Behavior

Female Deer Tick Questing

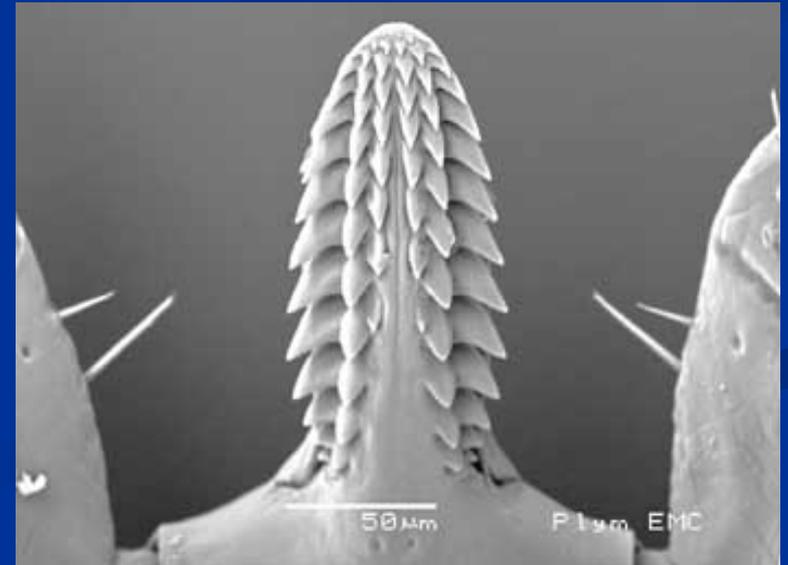
www.TickEncounter.org



Think TICK...
Take ACTION!
TickEncounter Resource Center



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





125 vertebrate species play in the tick-borne 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 more *difficult to detect*



Tick SIZE WISE ? check your bagels

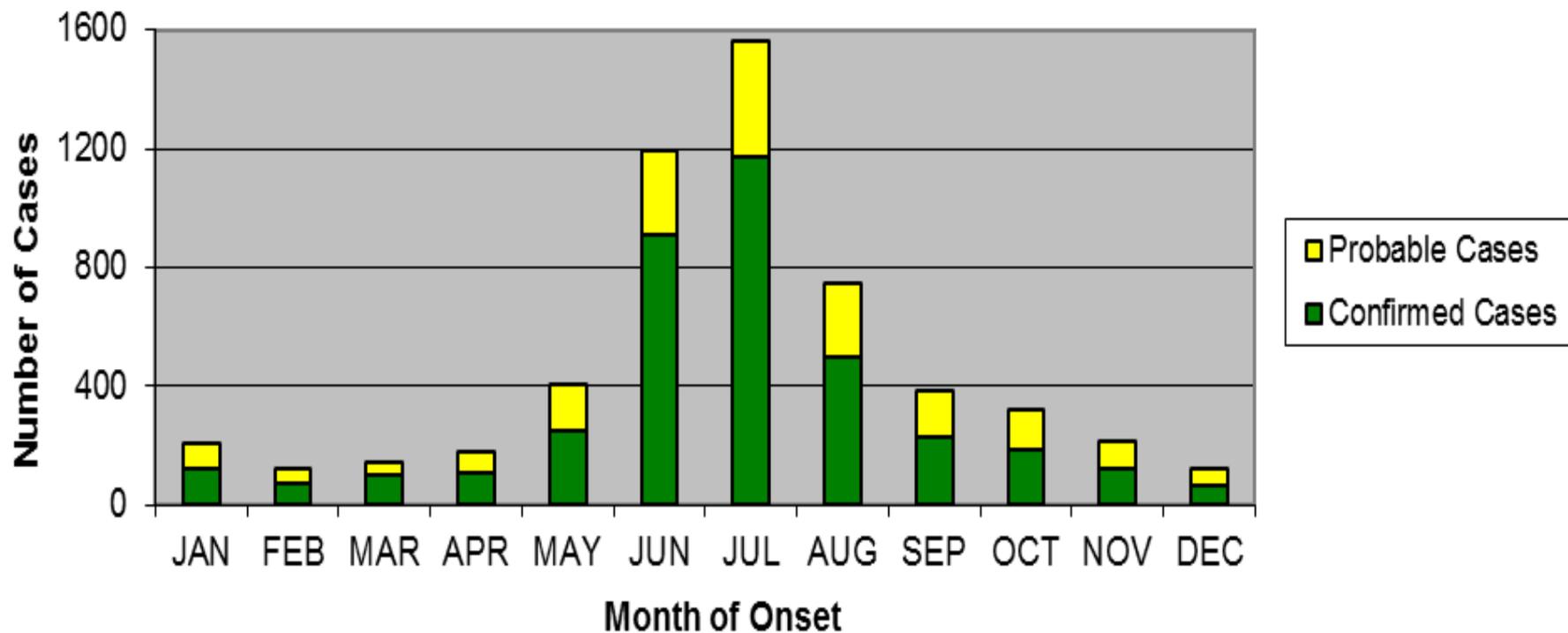
Adult



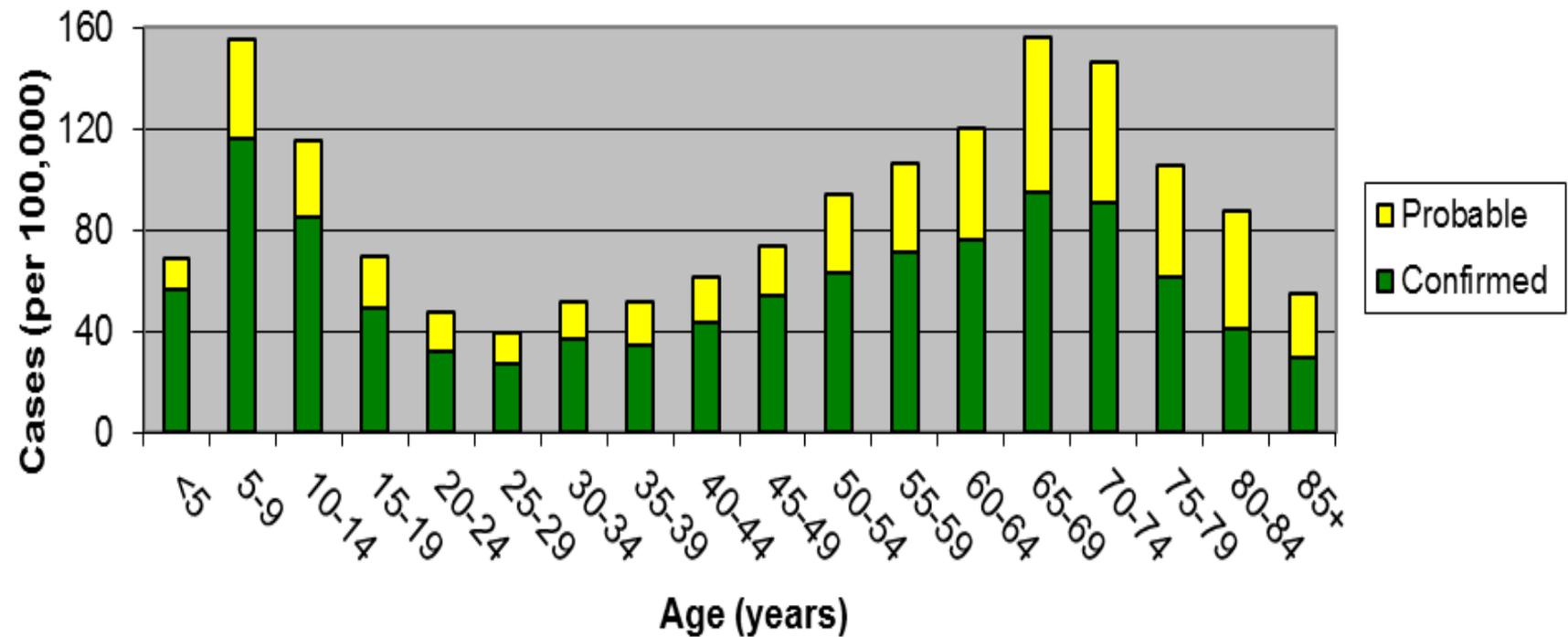
Nymph



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



Massachusetts Winters: *Kill Ticks?*

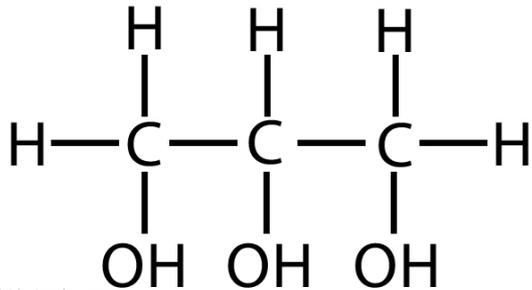


A Wisconsin
❄️❄️❄️❄️❄️❄️
Winter



Ticks make glycerol...

Glycerol (Glycerin)



...antifreeze

Glycerol prevents ice crystal formation in cells

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



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



○ Babesiosis

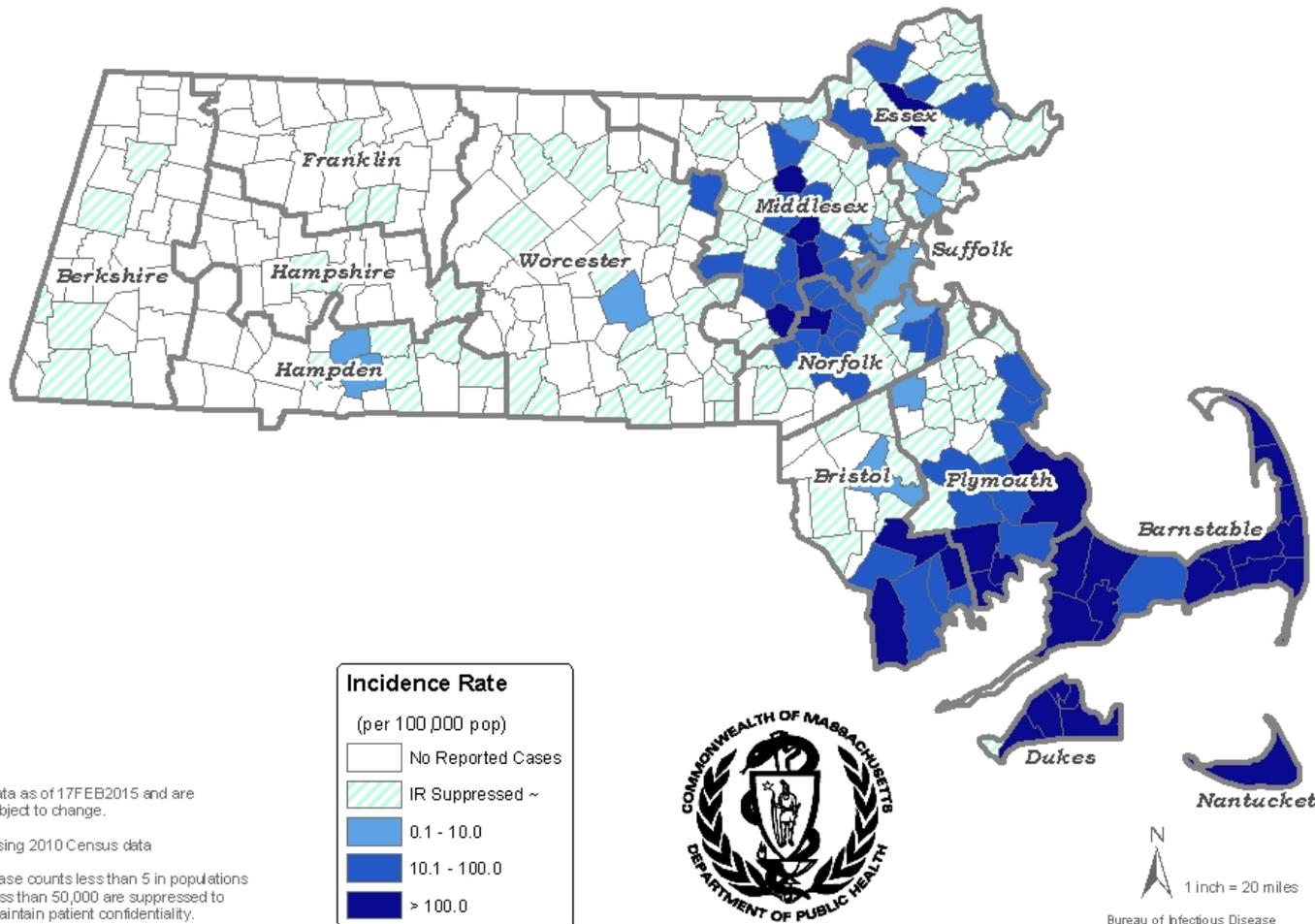
- Invades Red Blood Cells

- Symptoms include fever/chills, severe anemia

- Blood Transfusion



Incidence Rates (per 100,000 population[^]) for Confirmed and Probable Babesiosis in Massachusetts: 2010-2014^{*}

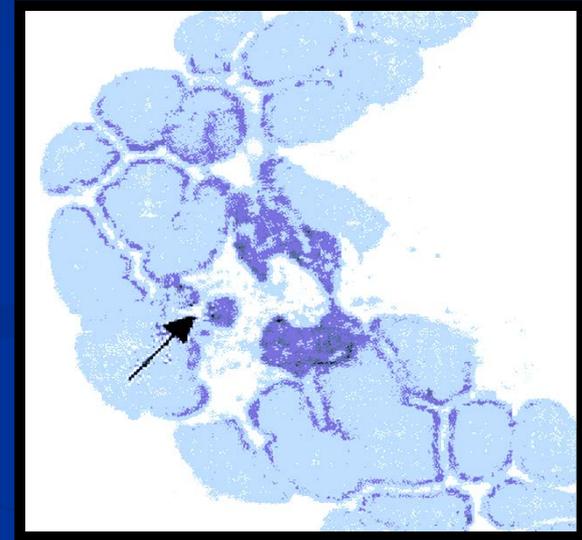


^{*} Data as of 17FEB2015 and are subject to change.

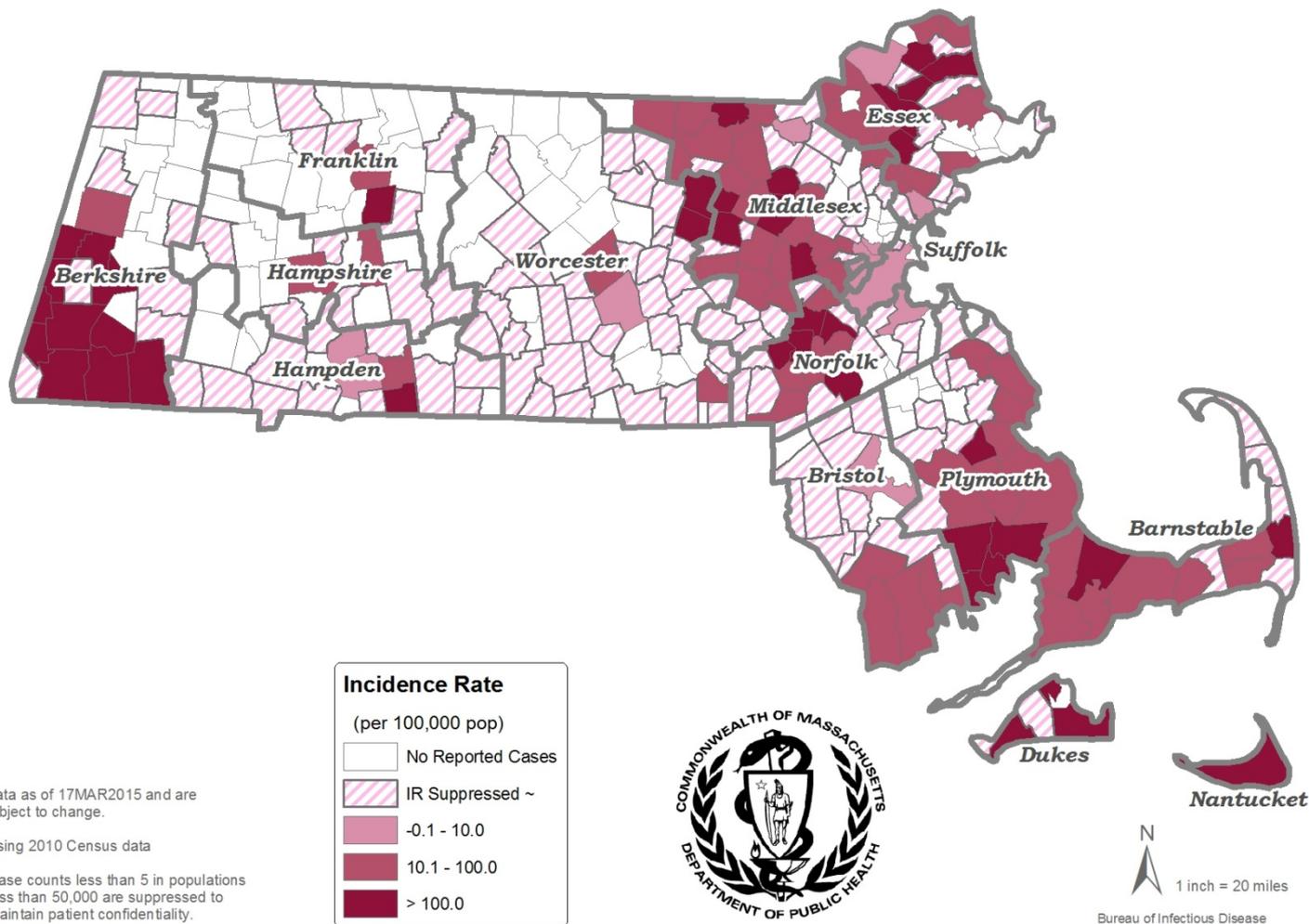
[^] Using 2010 Census data

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

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



Incidence Rates (per 100,000 population[^]) for Confirmed and Probable Anaplasmosis in Massachusetts: 2010-2014*

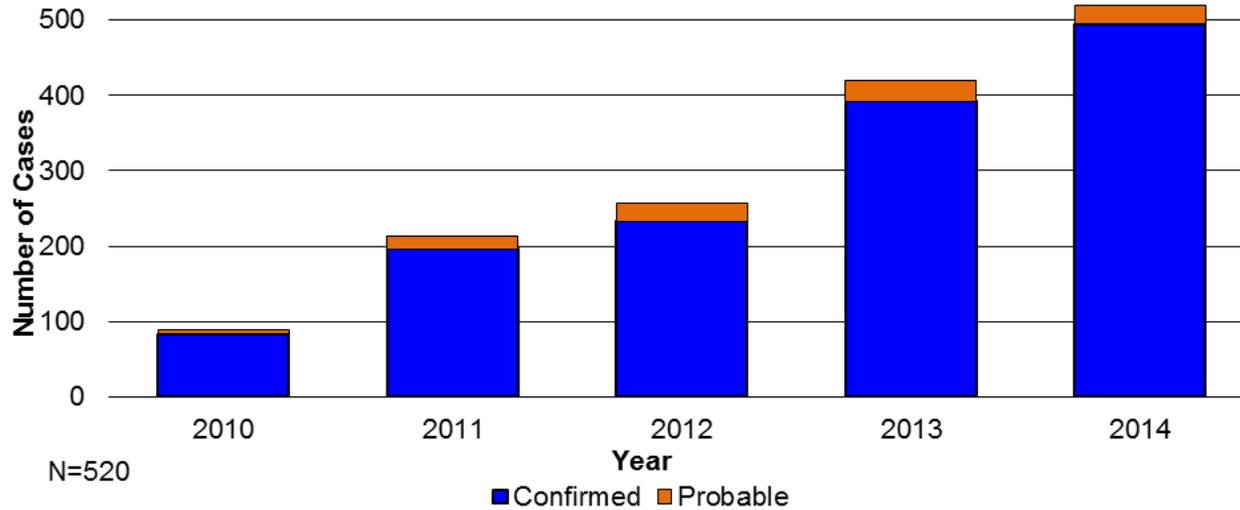


* Data as of 17MAR2015 and are subject to change.

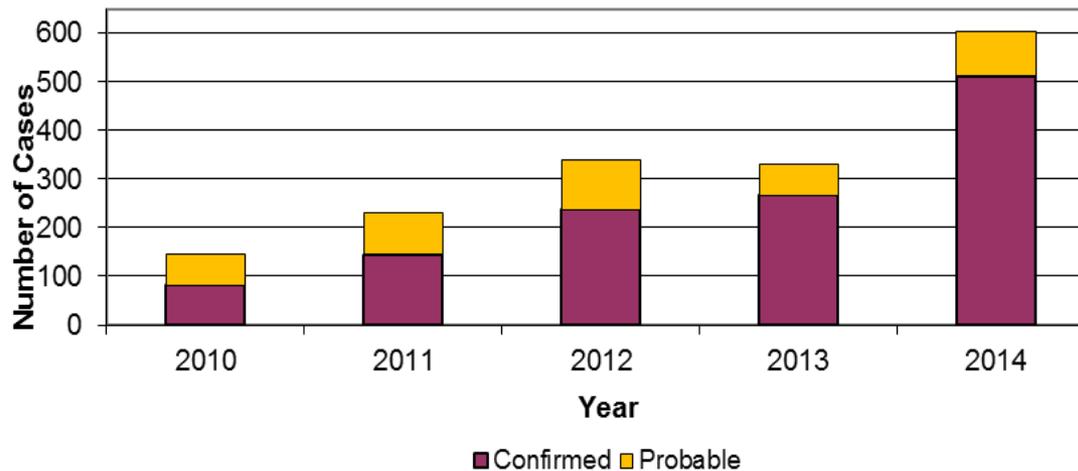
[^] Using 2010 Census data

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

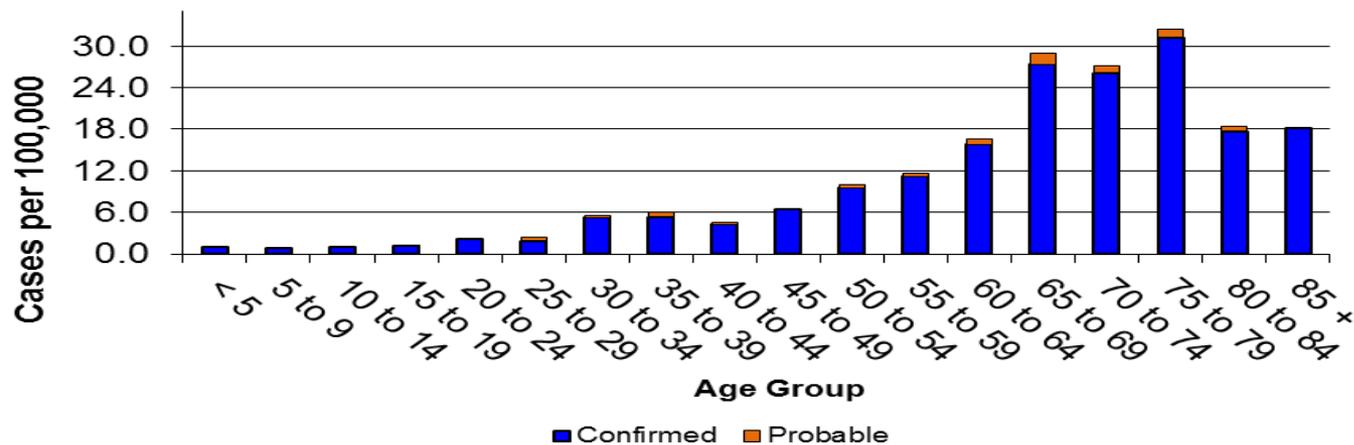
Number of Confirmed and Probable Babesiosis Cases Reported in Massachusetts by Year



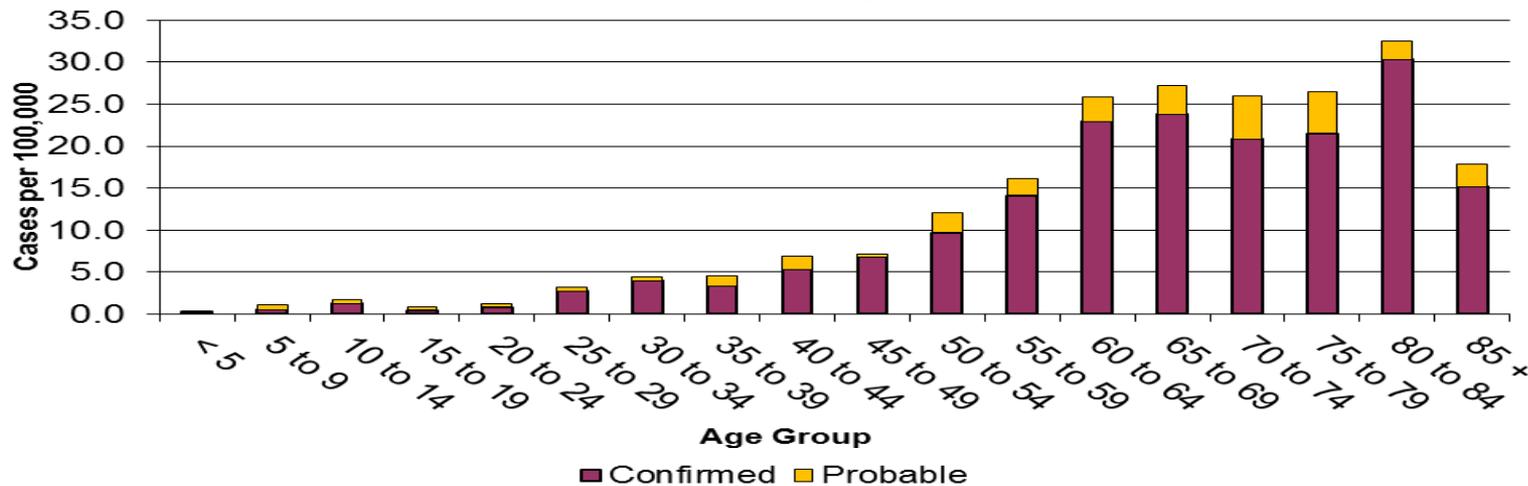
Number of Confirmed and Probable Anaplasmosis Cases Reported in Massachusetts by Year



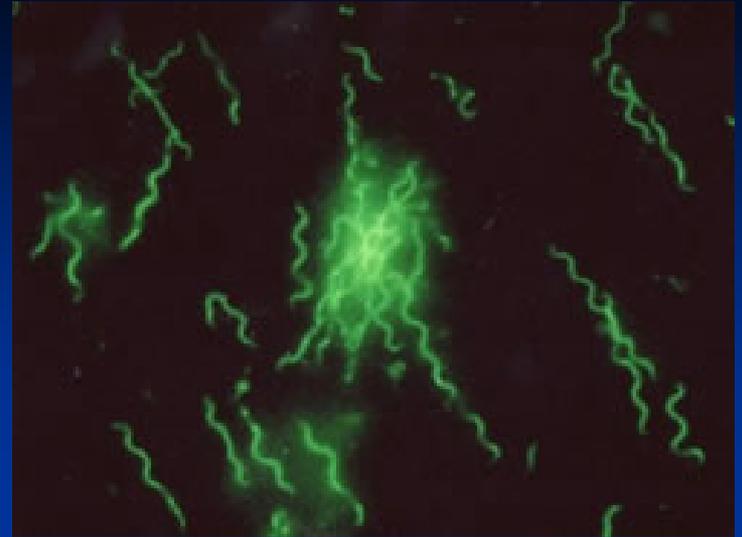
Incidence Rate of Confirmed and Probable Babesiosis Cases Reported in Massachusetts, by Age Range, 2014



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



Borrelia miyamotoi
Relapsing Fever

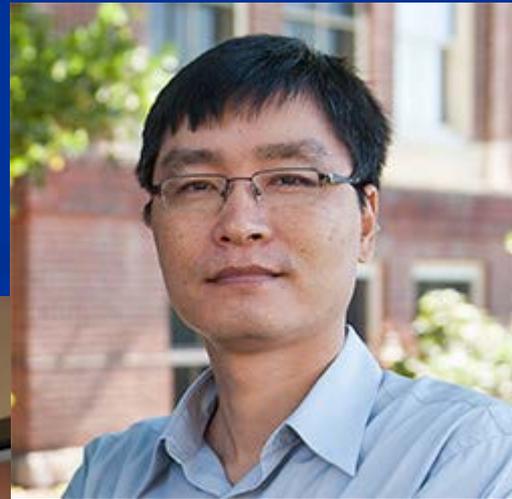


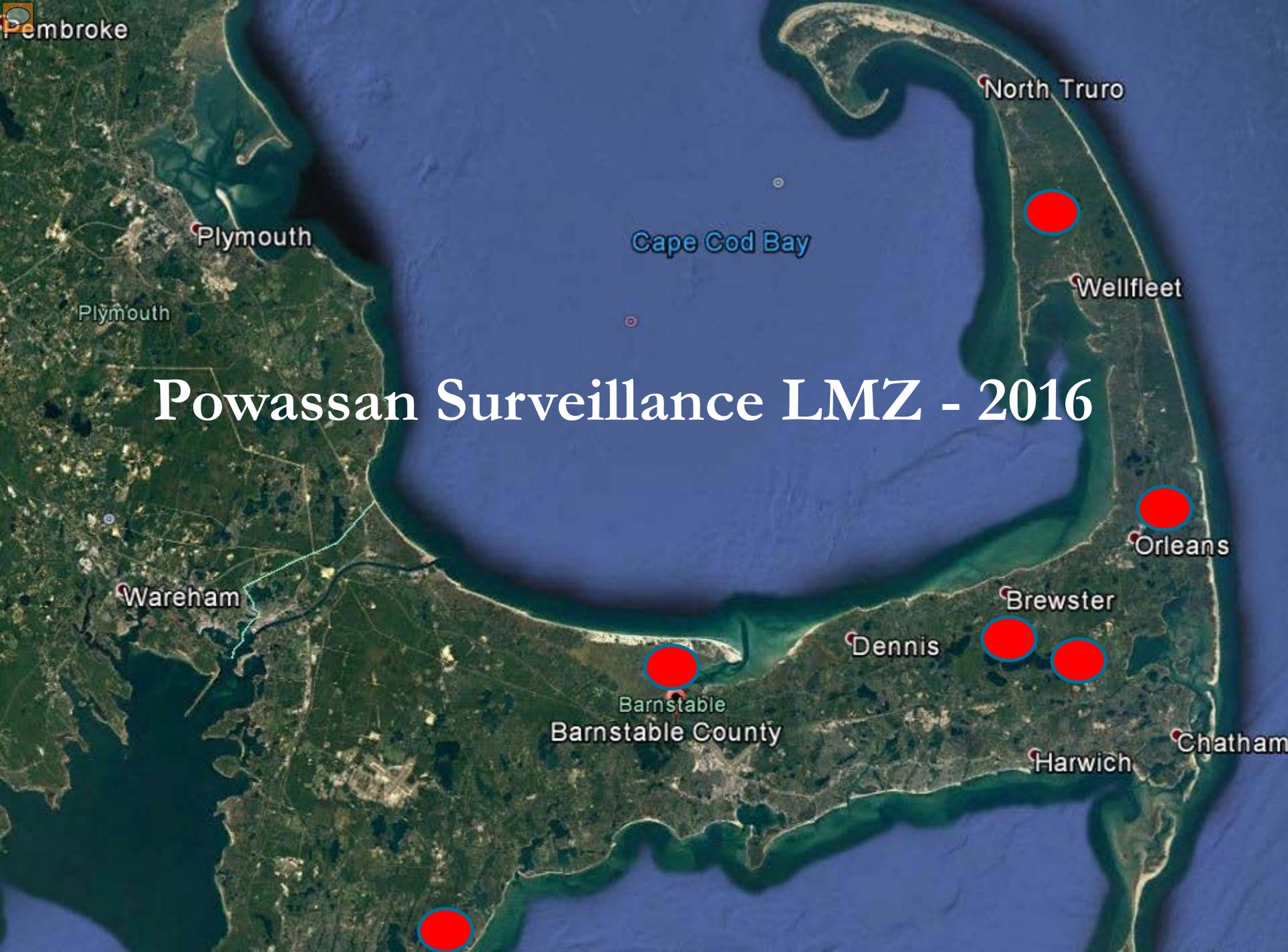
- First linkage to human disease in 2012 – Russia
- Found in 3% of ticks tested from Cape - 2016

Powassan Massachusetts 2013-2015



- 13 cases
- Exposure occurred in Massachusetts
- Encephalitis requiring hospitalization
 - 3 fatalities
- Residents of
Barnstable, Essex, Middlesex and Norfolk
counties





Powassan Surveillance LMZ - 2016

North Truro

Cape Cod Bay

Wellfleet

Orleans

Brewster

Dennis

Barnstable
Barnstable County

Harwich

Chatham

Plymouth

Plymouth

Wareham

Pembroke



	% Infection	Number of Ticks Tested
Truro	10.4	115
Orleans	2.5	118
Brewster 1	7.0	129
Brewster 2	0	114
Barnstable	0	38
Falmouth	4.0	101

Phase 1 Game Plan- Protect Yourself



Phase 1 Game Plan- Protect Yourself

- Proper Tweezers
- Proper Removal
- Record Date...Save the Tick



- Infection Test Available
 - Laboratory of Medical Zoology...UMass-Amherst
 - 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

Feeding State: engorged



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



Protect Yourself

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



- Shoes



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



- “All Natural”?



Tick Repellent Clothing – Permethrin



Fabric only...Active thru 6 washings



Pre-treated Tick Repellent Clothing



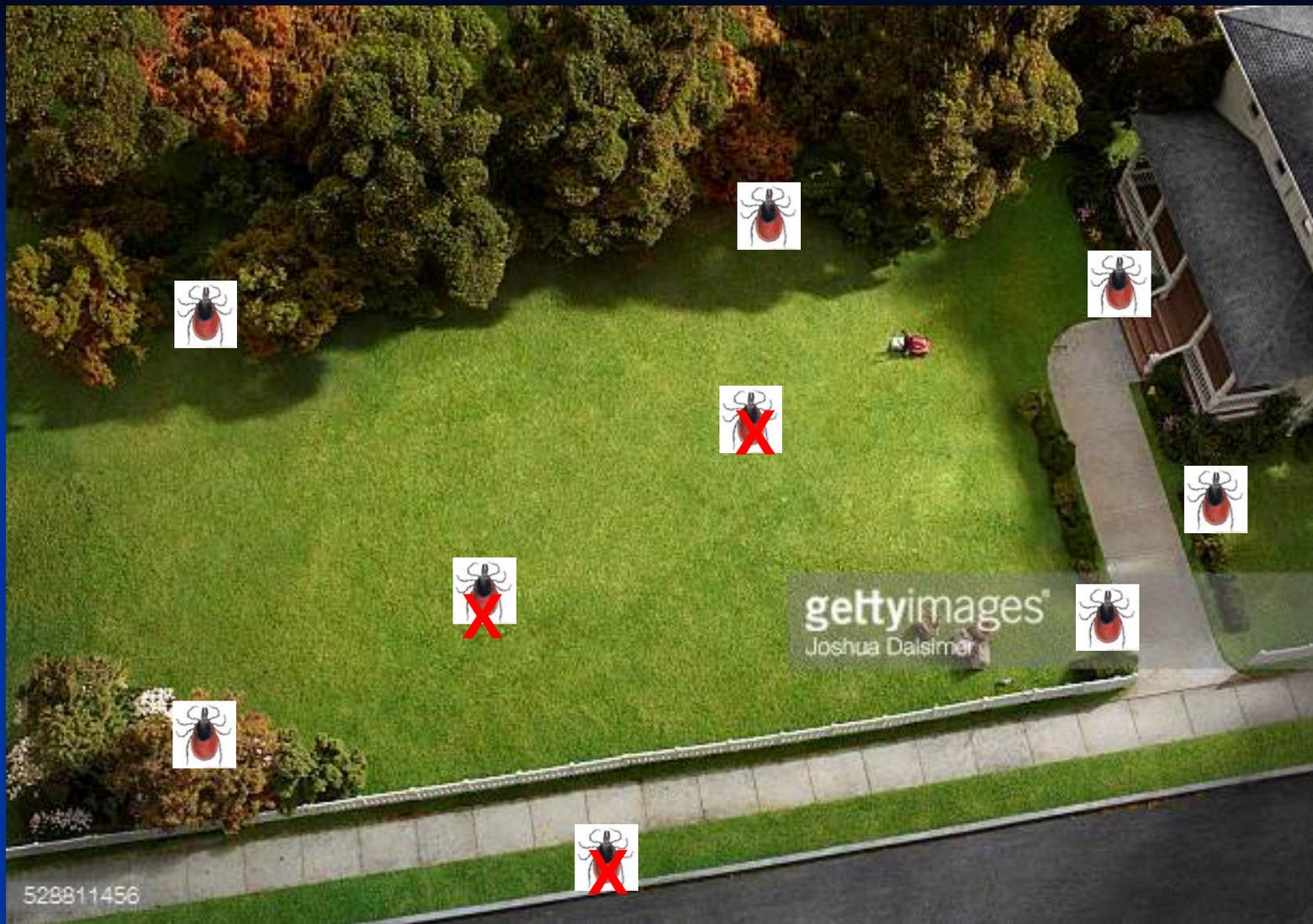
- 70 Washings
EPA Claim

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, pregnant women or nursing mothers
- Low skin absorption...metabolized quickly
- Exposure data also studied by National Academy of Sciences
- Also used for scabies and head lice control





Phase 2 Game Plan - Protect Your Yard

Phase 3 Game Plan - Protect Your Pets

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



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

Simplified Game Plan Summary

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

