

Ticks and Mosquitoes: Should they be included in School IPM programs?

Northeastern Center SIPM Working Group

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Discussion topics

- **Overview on ticks and mosquitoes as vectors & highlights on ticks (especially Blacklegged ticks in the Northeast)**
- **EPA Region 1 tick-related research**
- **School IPM considerations**

Background

- **Significant problems associated with ticks and mosquitoes in the Northeast**
 - New Vectors
 - New Diseases
 - Risks to children
- **Some Agencies are including vector education and outreach in their communications but little is targeted directly at schools**
 - CDC training
 - Region 1 Tick – related activities
 - Northeastern state/land grant research and outreach
- **Ticks and mosquitoes present different types of challenges**
- **Schools may offer unique opportunities**

Ticks Issues in the Northeast

Some Highlights on Biology, Management &
Research

School IPM Considerations

Some important ticks in the Northeastern States

Blacklegged Tick (*Ixodes scapularis*)



Lone Star Tick (*Amblyomma americanum*)



Dog Tick (*Dermacentor variabilis*)





Blacklegged Tick

Vectors Lyme disease, Anaplasmosis, Babesiosis

CDC Lyme Disease Fast Facts

In 2011, 96% of Lyme disease cases were reported from 13 states:

- Connecticut
 - Delaware
 - Maine
 - Massachusetts
 - New Hampshire
 - New York
 - New Jersey
 - Pennsylvania
 - Wisconsin
 - Maryland
 - Minnesota
 - Vermont
 - Virginia
- Lyme disease is the most commonly reported vector borne illness in the United States--in 2011, it was the 6th most common Nationally Notifiable disease. However this disease does **not** occur nationwide and is concentrated heavily in the northeast and upper Midwest

Reported Cases of Lyme Disease -- United States, 2001



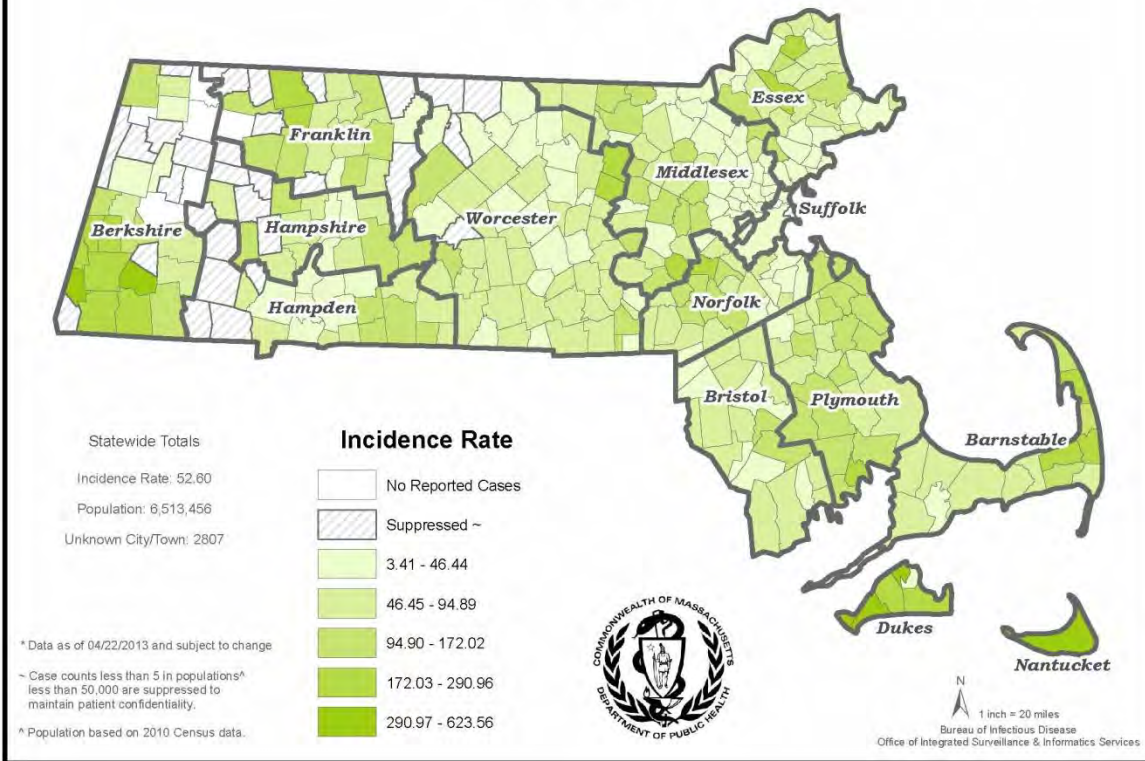
1 dot placed randomly within county of residence for each reported case

Reported Cases of Lyme Disease -- United States, 2011



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

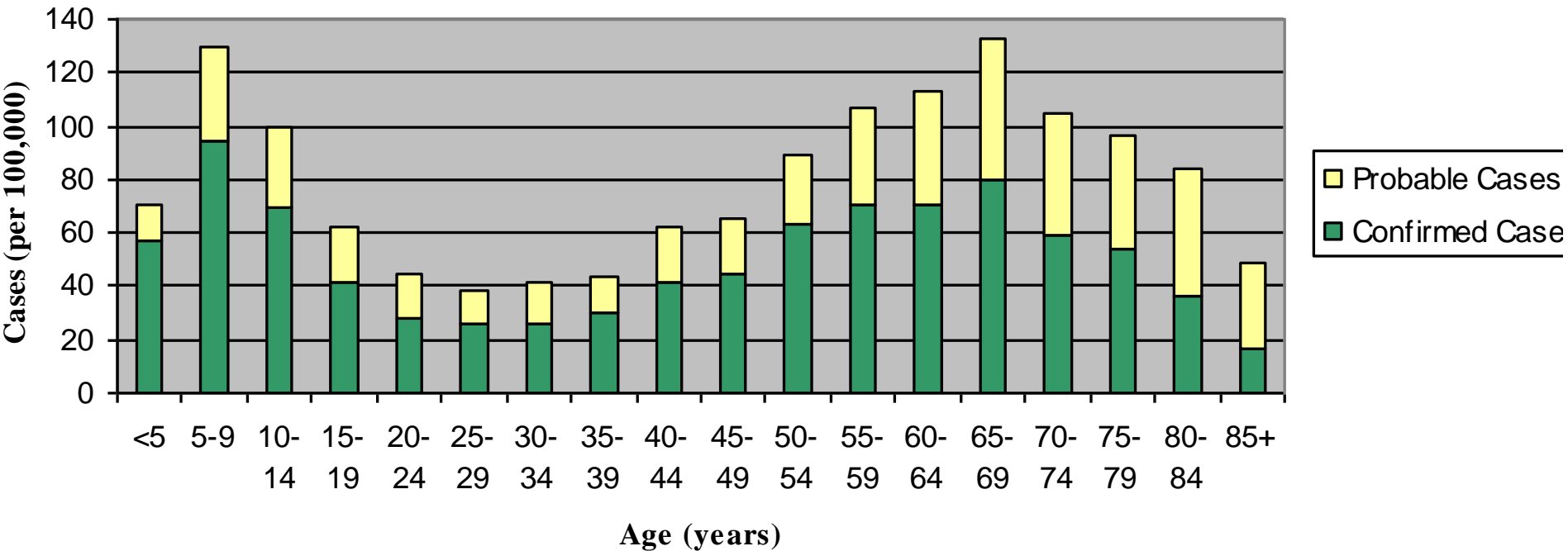
**Incidence Rates (per 100,000 population[^]) for Confirmed Lyme Disease in Massachusetts
2008-2012***



Massachusetts Department of Public Health

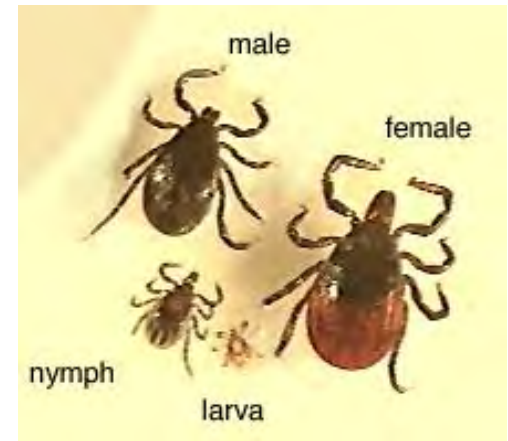
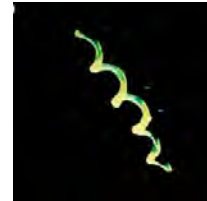
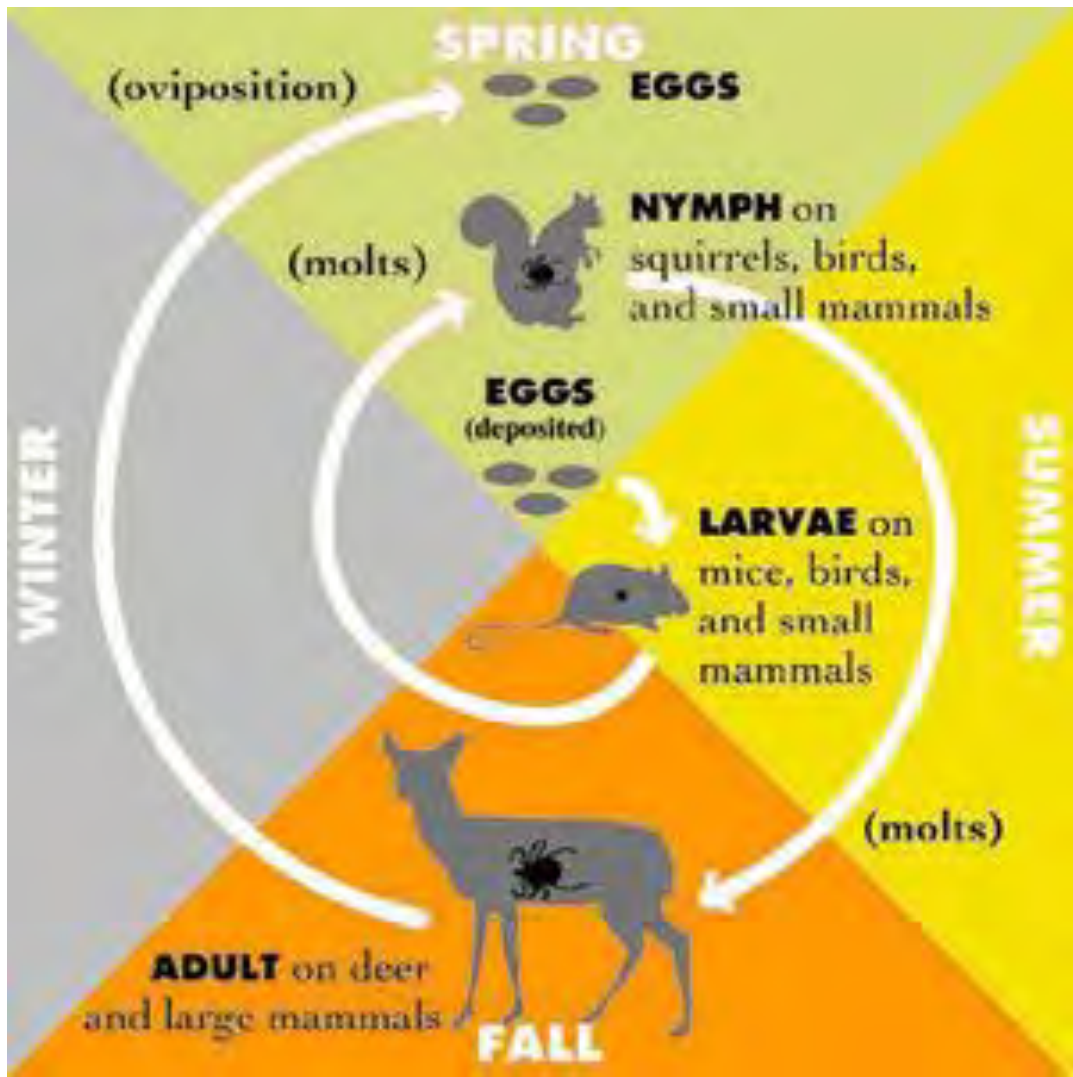
Lyme disease has become a state-wide problem

Incidence Rates of Confirmed and Probable Lyme Disease Cases in Massachusetts, by Age Group, 2012



Massachusetts Department of Public Health

Children and people older than fifty most at risk





Black-legged tick nymph and adult



White-footed Mouse



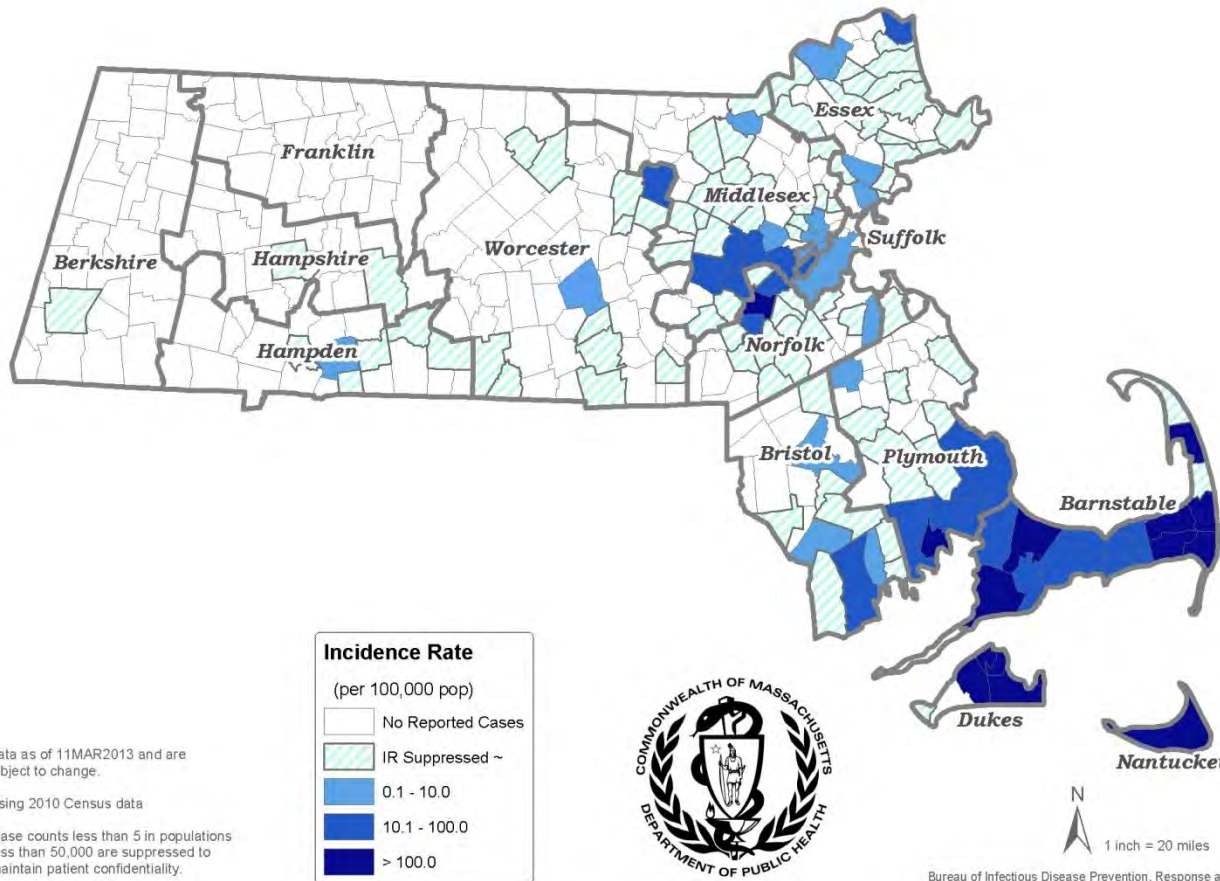
White-tailed Deer

Deer Tick Feeding



Babesiosis in Massachusetts

Incidence Rates (per 100,000 population[^]) for Confirmed Babesiosis in Massachusetts: 2008-2012*



* Data as of 11MAR2013 and are subject to change.

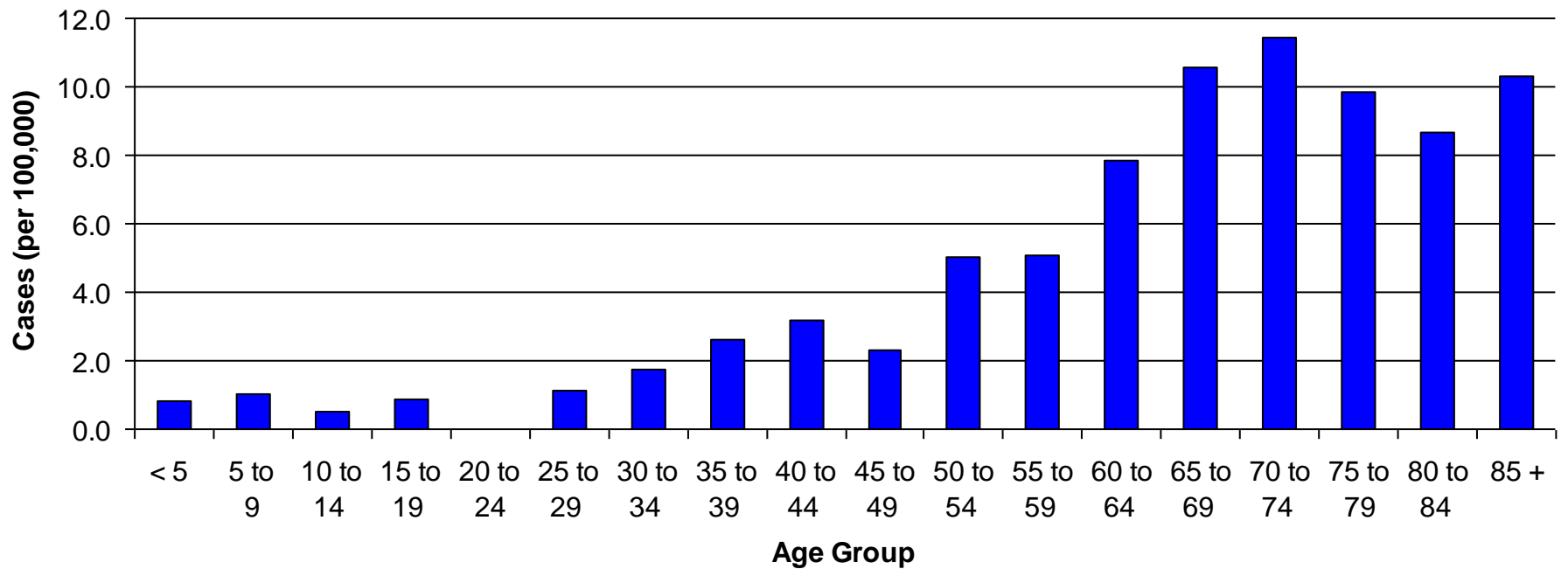
[^] Using 2010 Census data

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



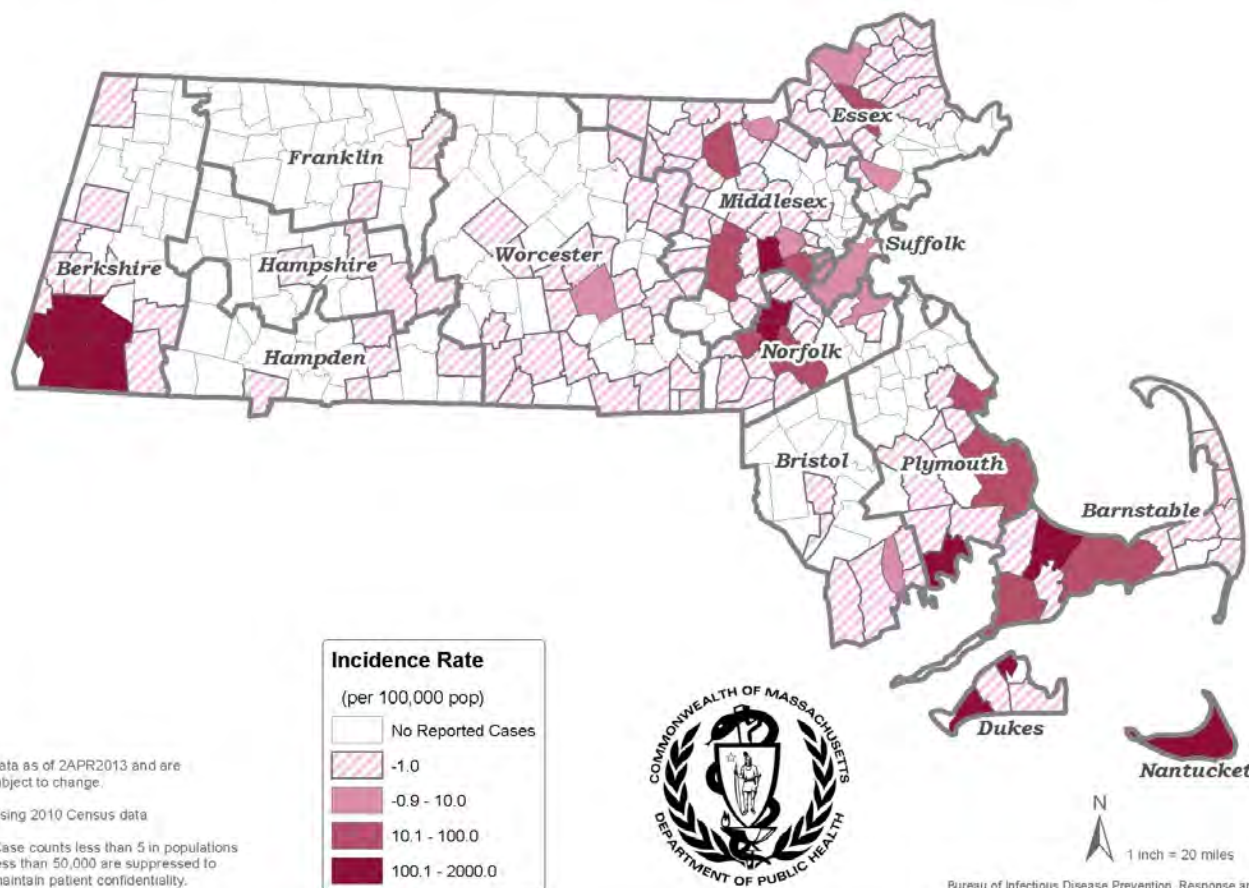
Bureau of Infectious Disease Prevention, Response and Services
Office of Integrated Surveillance & Informatics Services

Incidence Rate of Confirmed Babesiosis Cases Reported in Massachusetts, by Age Range, 2012



Anaplasmosis in Massachusetts

Incidence Rates (per 100,000 population[^]) for Confirmed Anaplasmosis in Massachusetts: 2008-2012^{*}

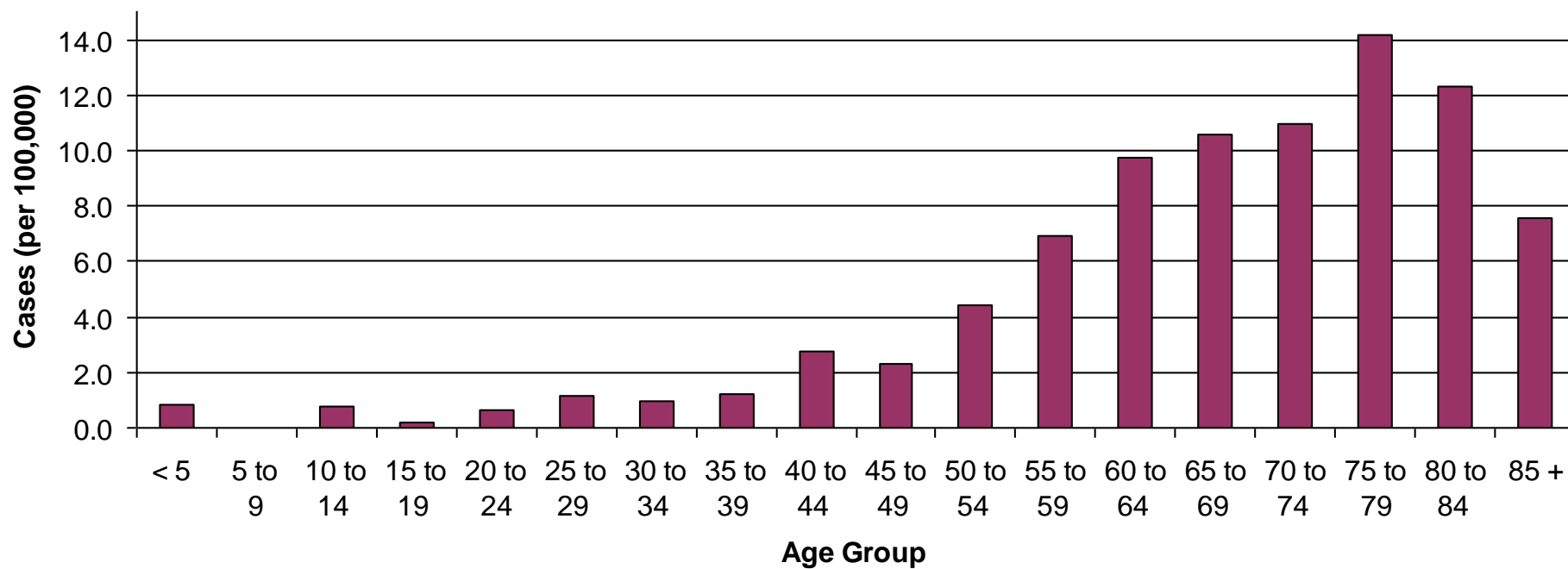


^{*} Data as of 2APR2013 and are subject to change.

[^] Using 2010 Census data

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

Incidence Rate of Confirmed HGA Cases Reported in Massachusetts, by Age Range, 2012





Lone Star Tick, *Amblyomma americanum*

Vectors STARI, ehrlichiosis, tularemia, Rocky Mountain Spotted Fever (?)

Managing risks posed by ticks

- No single solution, either pharmacological or non-pharmacological
- Variety of tactics including general landscape decisions, behavior changes (e.g., avoid tick habitat, walk in center of trails, etc.), take personal protections (e.g., repellents, tick checks and bathing, pesticide treated clothing), pesticide tools (e.g., perimeter landscape treatments, 4-poster, Damminex tubes)
- Goal is preventing tick bites
- Education and outreach

EPA Region 1 Tick-related Activities

- Pesticide Program Regulatory Activities
- Regional Research
 - RARE – 4-Poster Deer Feeding Station project
 - Do 4-posters reduce tick populations over time?
 - *Ixodes scapularis* pathogens
 - Borrelia, Babesia, Anaplasma
 - Rates in nymphs and adults
 - How are stations utilized by wildlife at various locations
 - Small Mammal Testing for pathogens
 - Trapped “hot spots” for small mammals
 - Identify reservoir hosts species for several pathogens

EPA Pesticide Program Roles Tick Control Efforts

- **Pesticide Product Registration**
- **Pesticide Applicator Certification and Training**
- **IPM support and implementation**

The effectiveness of permethrin-treated deer feeding stations for control of the Lyme disease vector *Ixodes scapularis* on Cape Cod and the Islands

EPA ORD Regional Applied Research Effort (RARE)

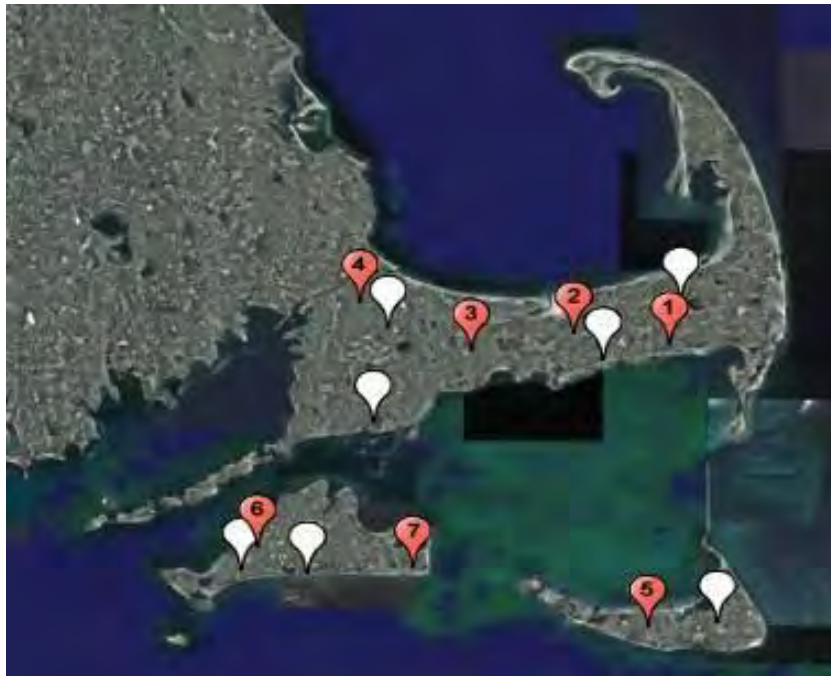
Regional Contacts: Robert Koethe, Bart Hoskins, Robert Hillger

ORD Contact: Jason Grear



What is a “Four Poster”?

- A “Four Poster” is a plastic device consisting of a large feed corn bin with a narrow feed trough at either end. Each trough has a PVC post on either side covered with a paint roller, which is soaked in permethrin. Deer feeding at the troughs will have their neck and ear area coated in permethrin. The four poster may reduce tick populations locally by targeting adult ticks that would otherwise lay eggs using the blood meal from a deer.
- Four-poster feeding stations have been shown to reduce tick abundance, but deployment is challenging.





69°F

HC600 COVERT

RECONYX

2011-10-04 10:04:33 PM M 3/3 59°F



HC600 COVERT

RECONYX

2011-10-05 2:06:52 AM M 1/3 57°F



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Tick Pathogens

- Lyme is prevalent in the study area, but *Babesia* and *Anaplasma* are also present.
- Ticks collected for four poster study evaluation were analyzed at the UMASS Laboratory of Medical Zoology by Dr. Steven Rich for presence of all three pathogens.
- Some sites appeared to have greater incidence of co-infection with Lyme and other pathogen(s).

Co-infection Host Study

- Research supported by EPA Region 1, ORD and UMASS Amherst
- Pilot conducted in 2012
 - EPA working with Dr. Stephen Rich of UMASS Amherst to identify competent small mammal tick hosts for the various pathogens.
 - In 2012 EPA sampled small mammals (voles, shrews, mice, rats) and collected replete ticks and blood samples for presence of Lyme, *Anaplasma*, and *Babesia*.
- This work continuing in summer/fall of 2013







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CLOROX
Disinfecting Wipes
Kills 99.9% of Germs

RAVE 1001 21009





School IPM: Reasons to include Tick IPM in overall School IPM programs

- Ticks widespread and common and can spread serious diseases to students, faculty and staff

School grounds and properties may contain significant tick populations

- School might not have a plan and approach that easily accommodates vector control
- School nurses can serve as a useful resource
- Children can help increase awareness and educate parents
- People sometimes take unnecessary or inappropriate actions
- Simple actions can reduce risks

Possible Tick Topics for Schools

- **Managing School Properties**
 - Vegetation
 - Pesticides
 - Playground and sports equipment placement and storage
 - Limit access and attractiveness to alternative hosts (mice, dogs, deer, etc.)
- **Monitoring for Ticks**
- **Guidance for Prevention; Precautions for Outdoor Activities**
 - Clothing – (e.g., light colored, pants tucked in socks, long sleeves, pesticide treated)
 - Behavior (e.g., walk in center of trails, tick checks, bathing)
 - Special policies (e.g., dedicated clothing, recommendations before outings,)
- **How to Remove Ticks**
- **How to Identify ticks**

Examples of potential products to support Schools

- **Guidance on Landscaping**
- **Outreach Materials for students to take home**
- **Outreach material for school nurses**
- **Educational Materials for Curricula**



HC600 COVERT



Both deer kicking the station.