

Tracking Ticks and Tick-associated Diseases in Connecticut



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&

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The Connecticut Agricultural Experiment Station



Three Major Tick Species in Connecticut



Blacklegged Tick
(Deer Tick)
Ixodes scapularis

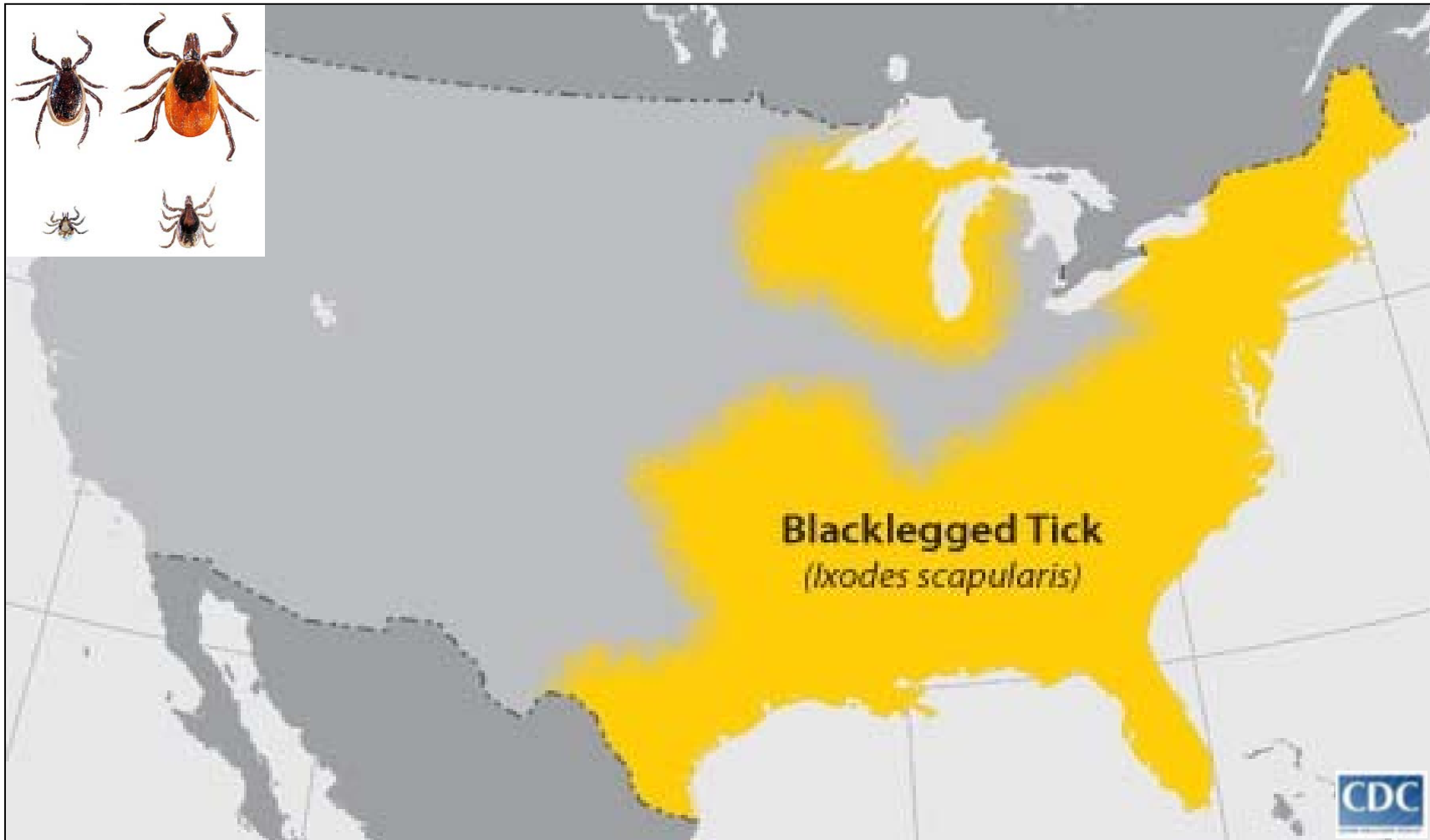


American Dog Tick
(Wood Tick)
Dermacentor variabilis



Lone Star Tick
Amblyomma americanum

Geographic Distribution of the Blacklegged Tick

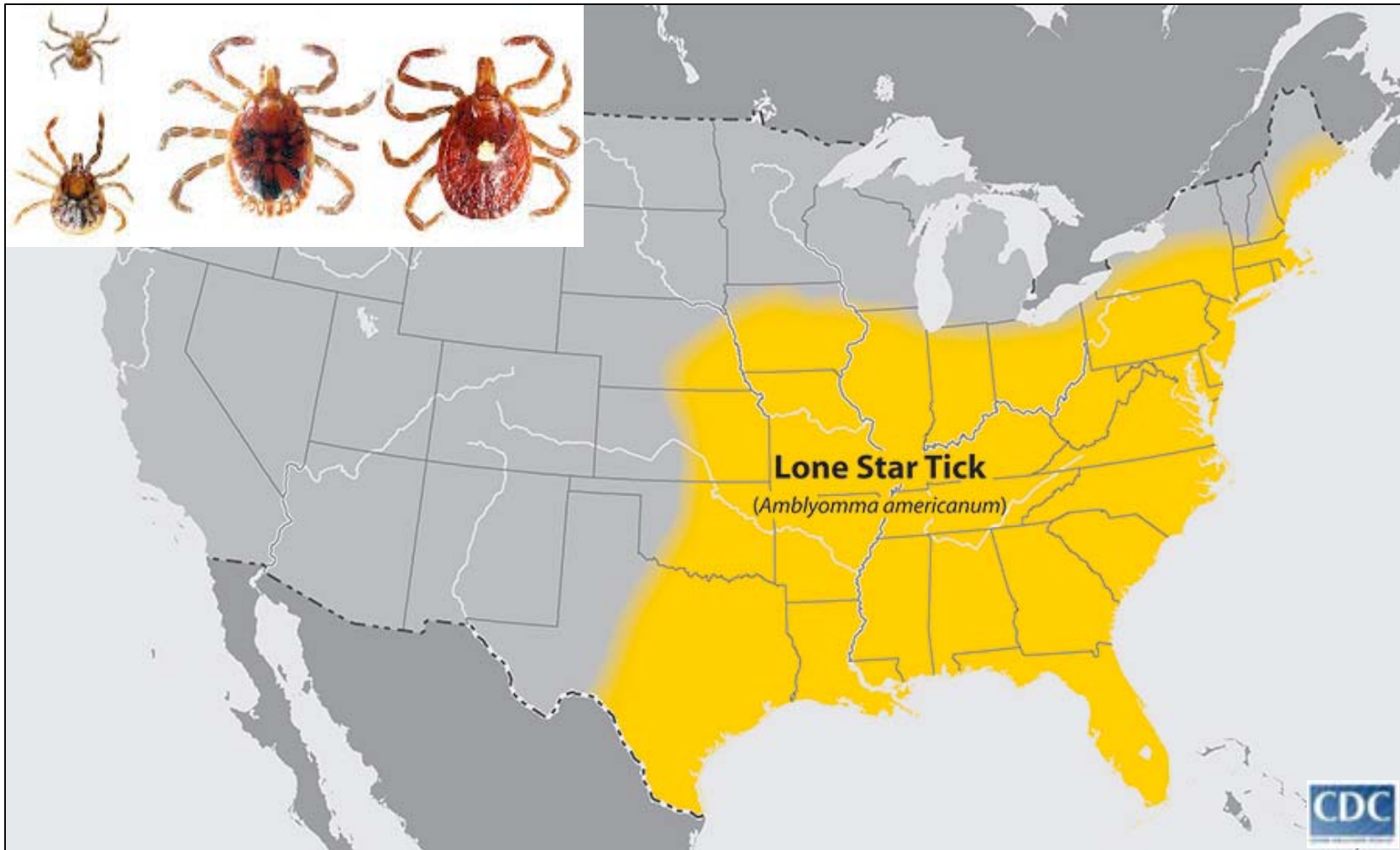


Geographic Distribution of the American Dog Tick

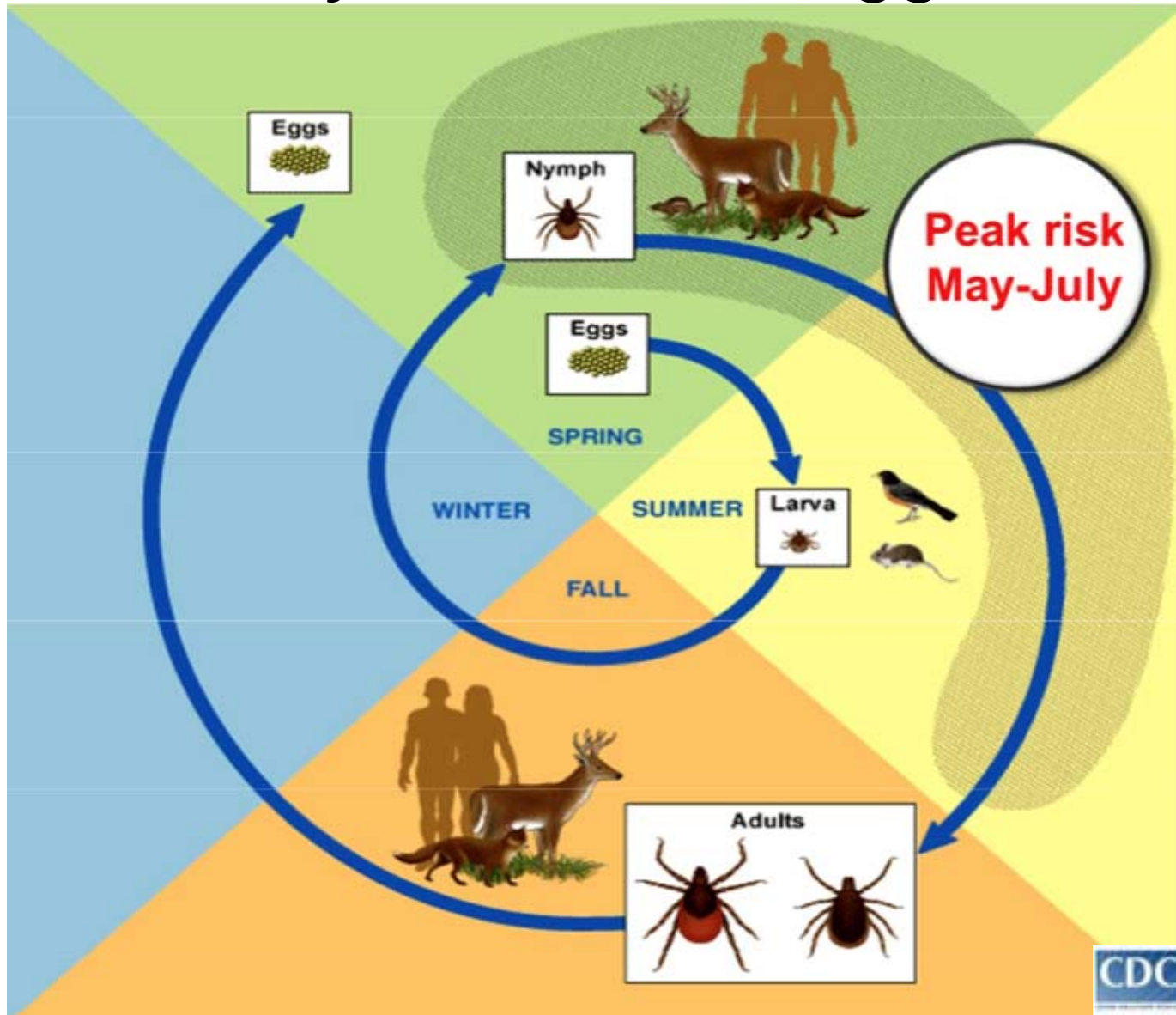




Geographic Distribution of the Lone Star Tick



The Life Cycle of Blacklegged Ticks



Lyme Disease

Infectious agent: *Borrelia burgdorferi*

Transmission: *Ixodes scapularis*
(Blacklegged Tick)

Incubation period: 3-30 days

Clinical presentations: Fever, headache, fatigue, and a characteristic skin rash called erythema migrans (bull's-eye rash)

Diagnosis: Based on symptoms, physical findings (e.g., rash), 2-tiered serologic testing, and the possibility of exposure to infected ticks





Babesiosis

Infectious agent: *Babesia microti*

Transmission: *Ixodes scapularis*
(Blacklegged tick)

Incubation period: 1-9+ weeks

Clinical presentations: Flu-like symptoms, such as fever, chills, sweats, headache, body aches, loss of appetite, nausea, or fatigue

Diagnosis: Examining blood under a microscope and seeing *Babesia* parasites inside red blood cells, blood tests in a reference laboratory, and PCR



Anaplasmosis

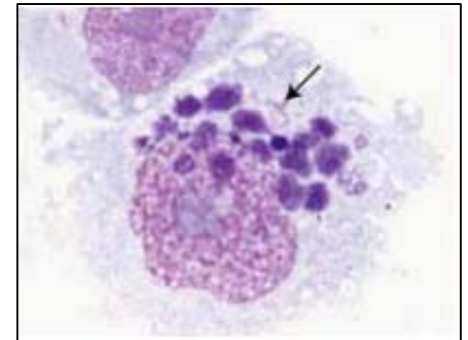
Infectious agent: *Anaplasma phagocytophilum*

Transmission: *Ixodes scapularis*
(Blacklegged tick)

Incubation period: 1-2 weeks

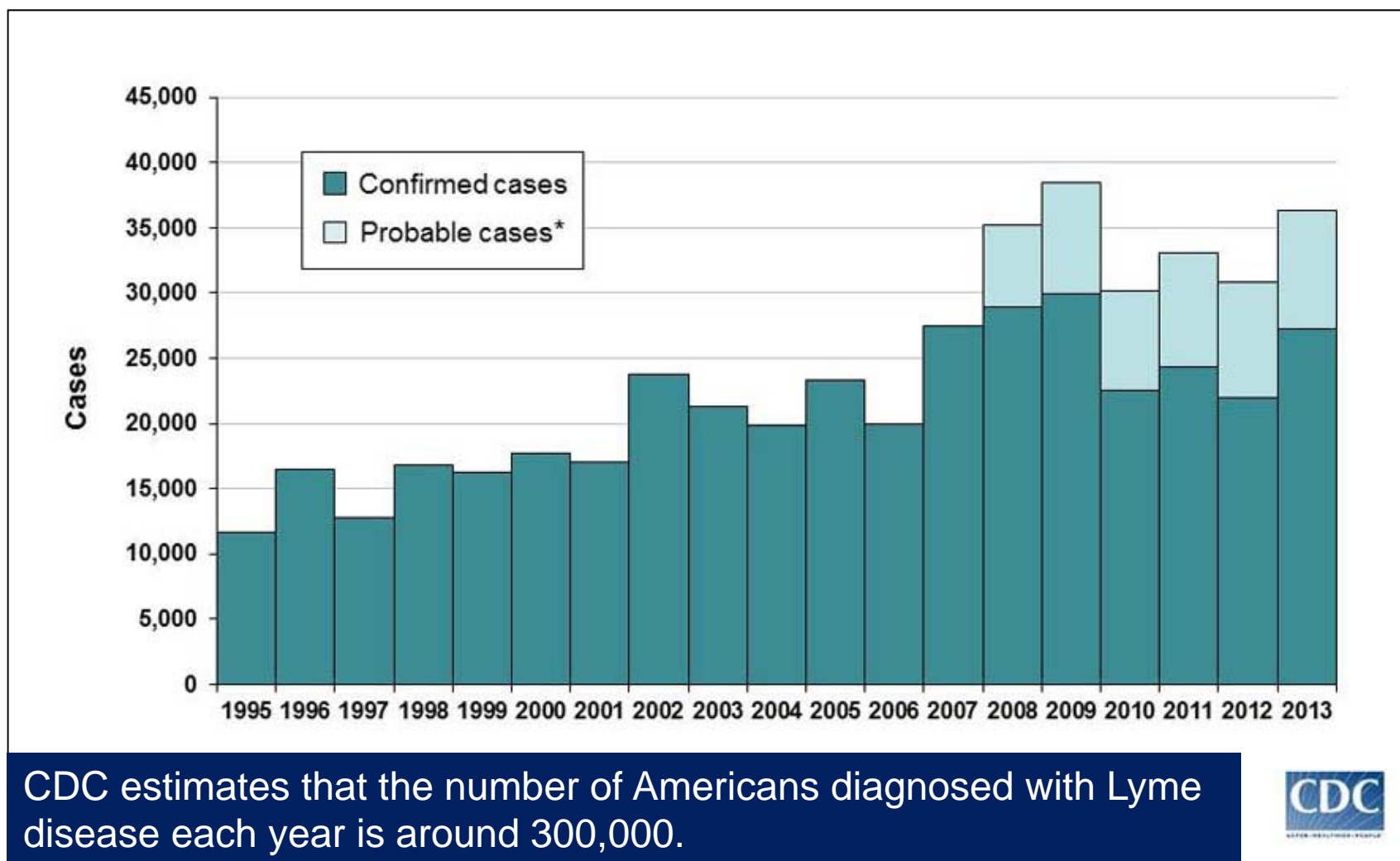
Clinical presentations: Fever, muscle pain, severe headache, discomfort, and joint pain

Diagnosis: Observation of *A. phagocytophilum* in cell culture, and PCR





Reported Cases of Lyme Disease, USA, 1995-2013



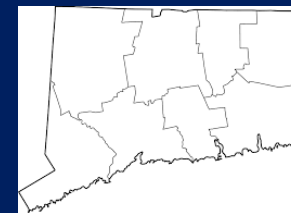


Reported Cases of Lyme Disease in the USA, 2013



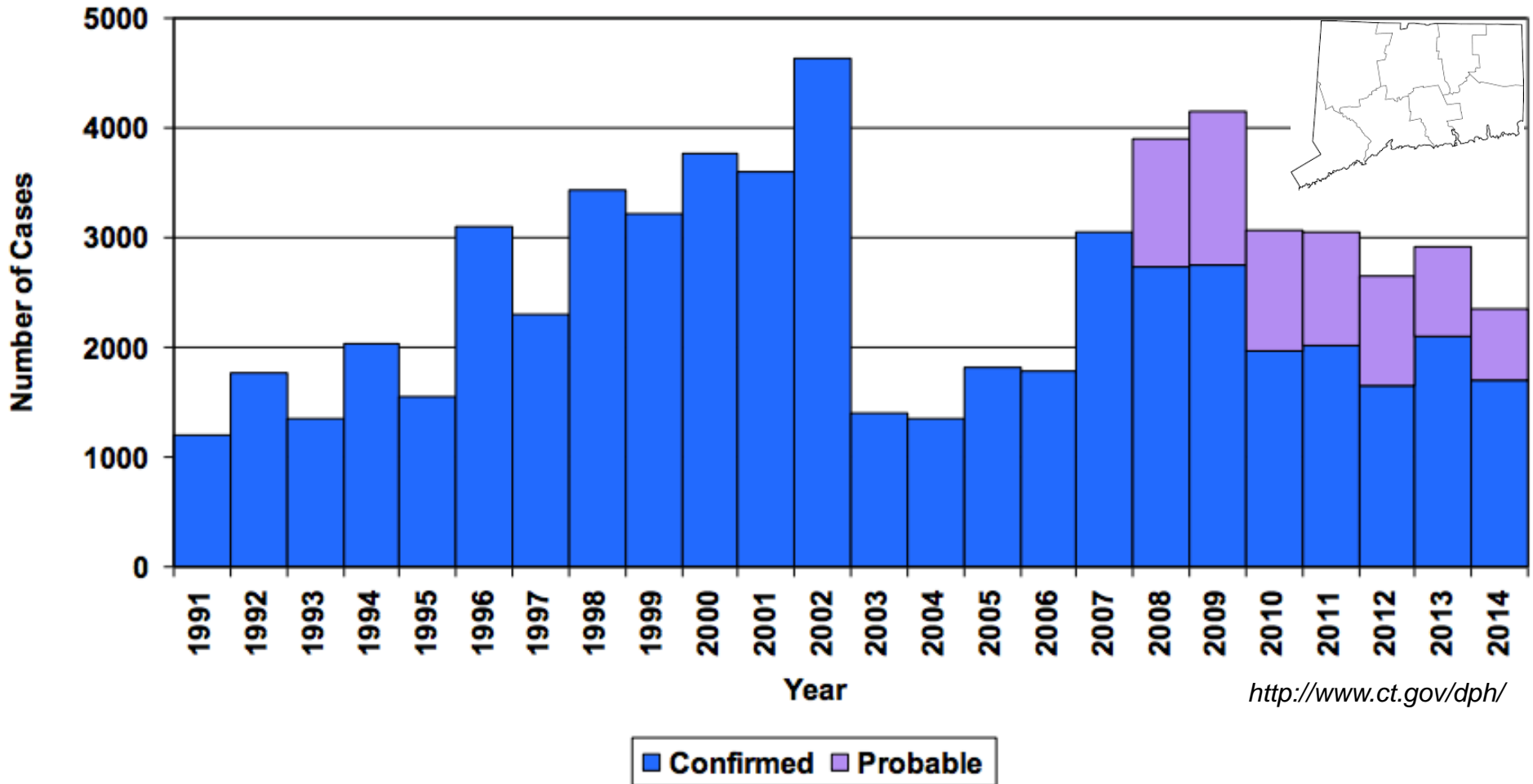
NH
ME
VT
MA
CT
NY
PA
NJ
RI
DE
PA
MD
MN
WI

- the 5th highest number of confirmed cases
- the 4th highest incidence rate of 58.7





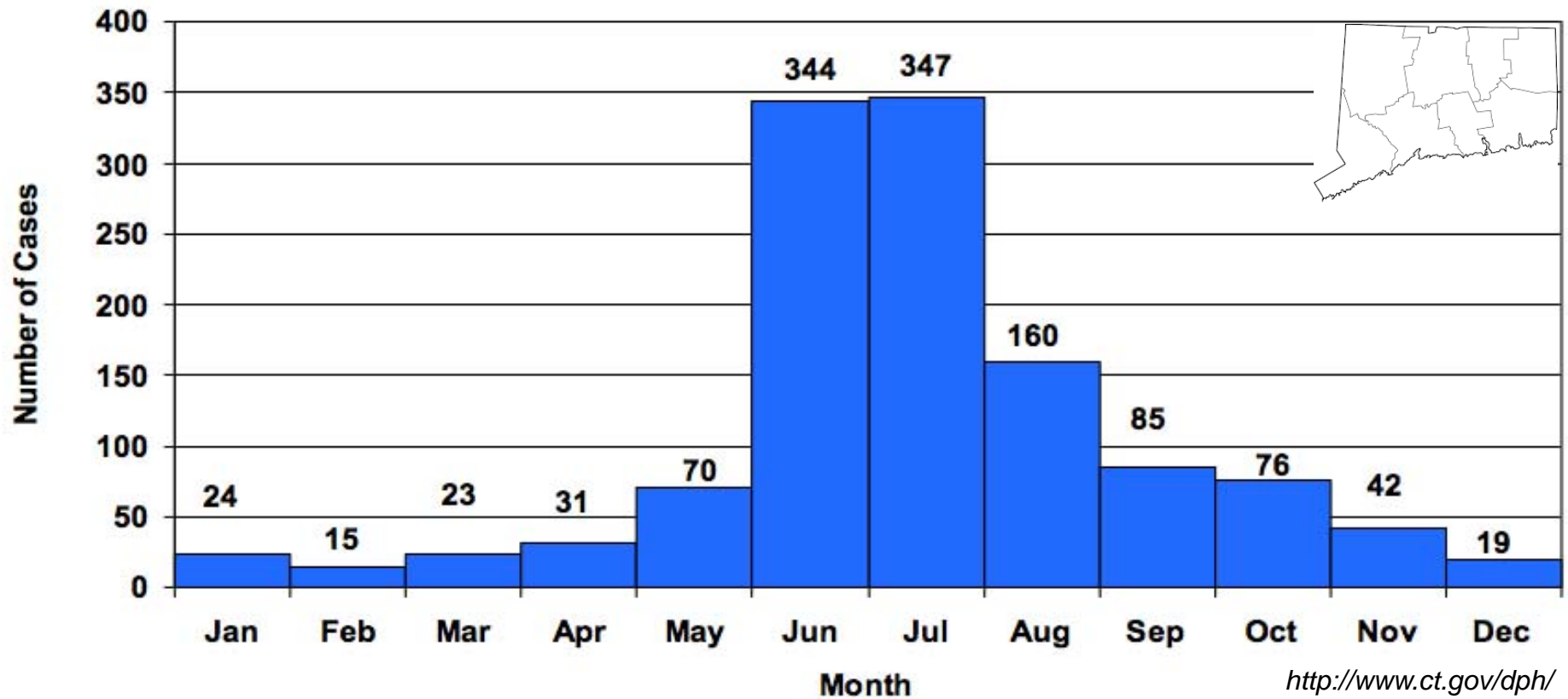
Lyme Disease Cases in Connecticut, 1991-2014



<http://www.ct.gov/dph/>

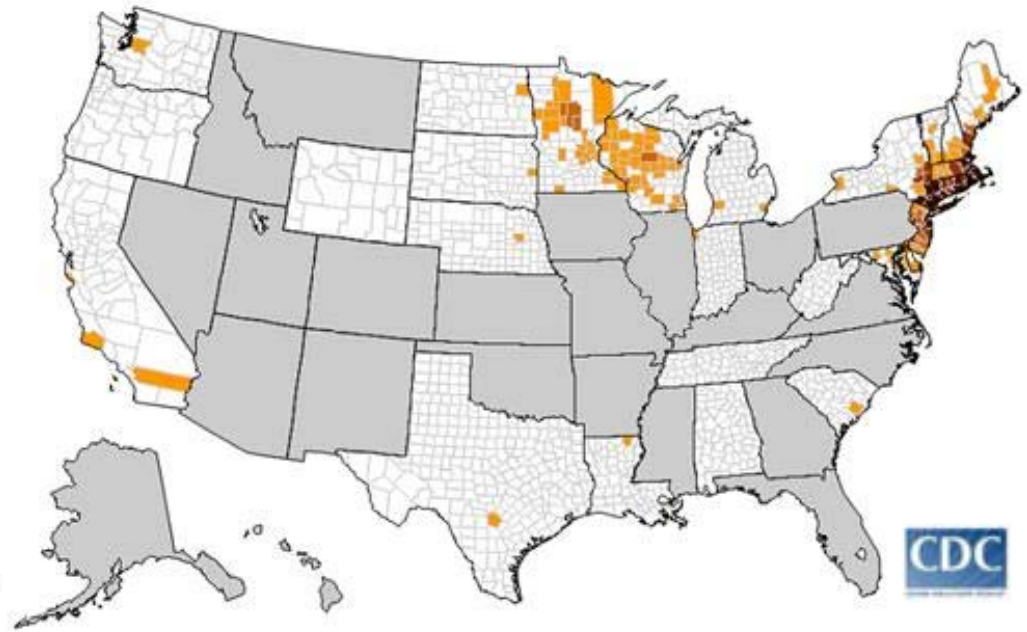
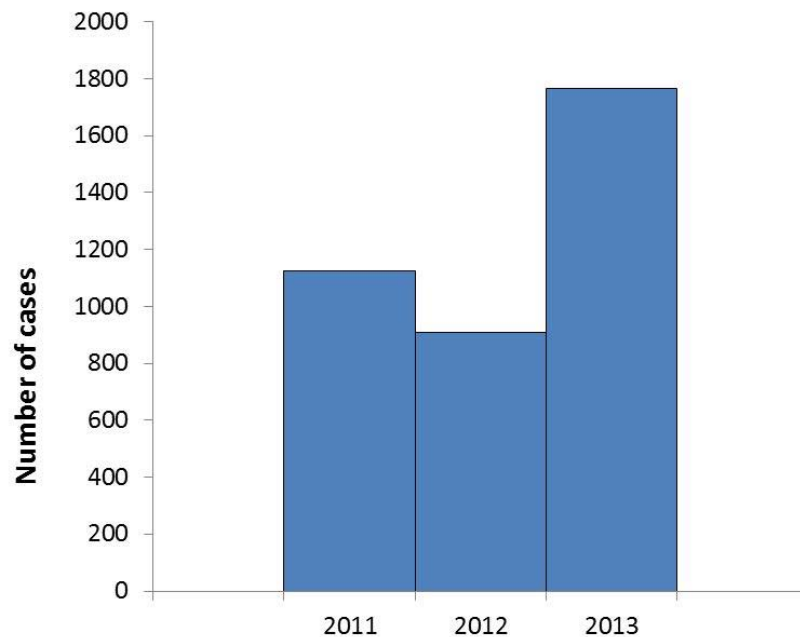


Lyme Disease Cases by Month in Connecticut, 2014

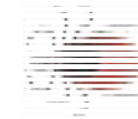
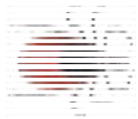




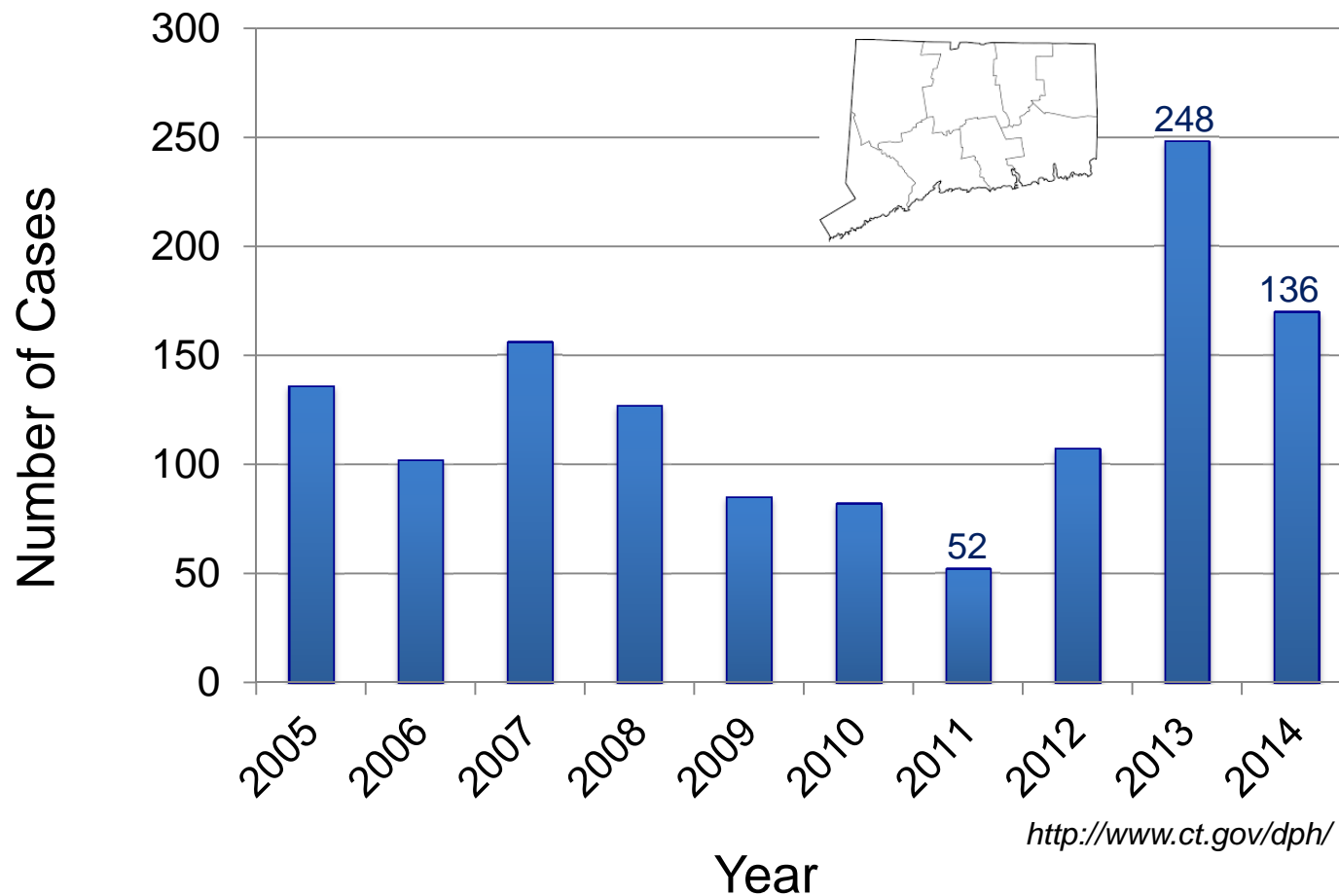
Reported Cases of Human Babesiosis in the U.S., 2011-2013



- 1,762 cases were reported in residents of 22 states
- Most (95%) of the cases were reported by 7 states: Connecticut, Massachusetts, Minnesota, New Jersey, New York, Rhode Island, and Wisconsin.



Reported Cases of Human Babesiosis in Connecticut, 2005-2014

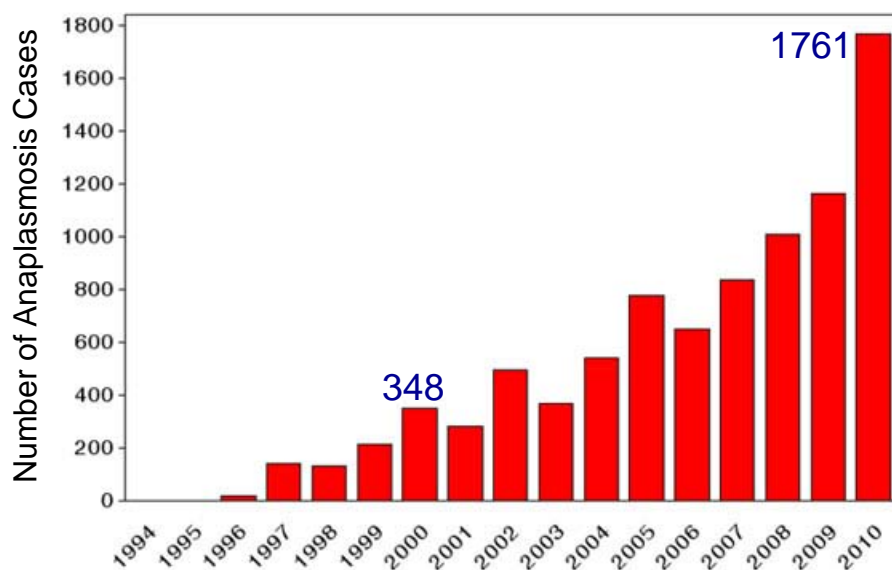




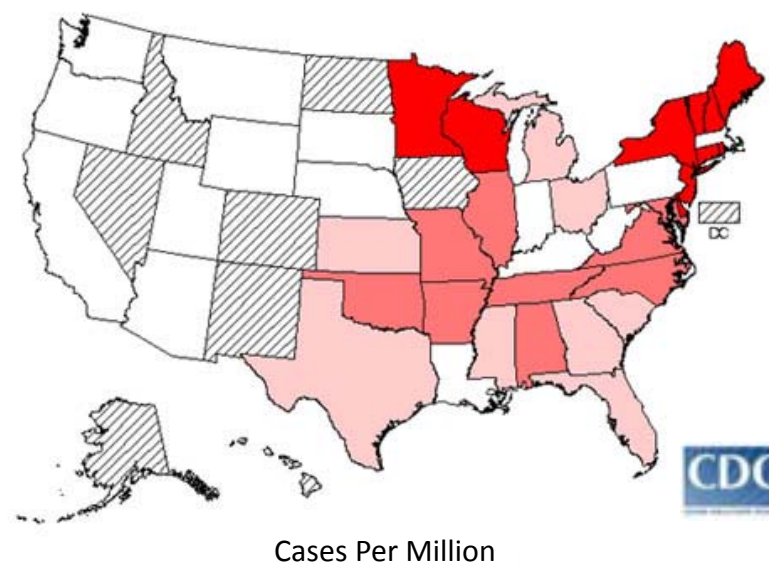
Confirmed Cases of Anaplasmosis Reported in the U.S., 1994-2010



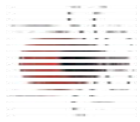
Number of Anaplasmosis Cases, 1994-2010



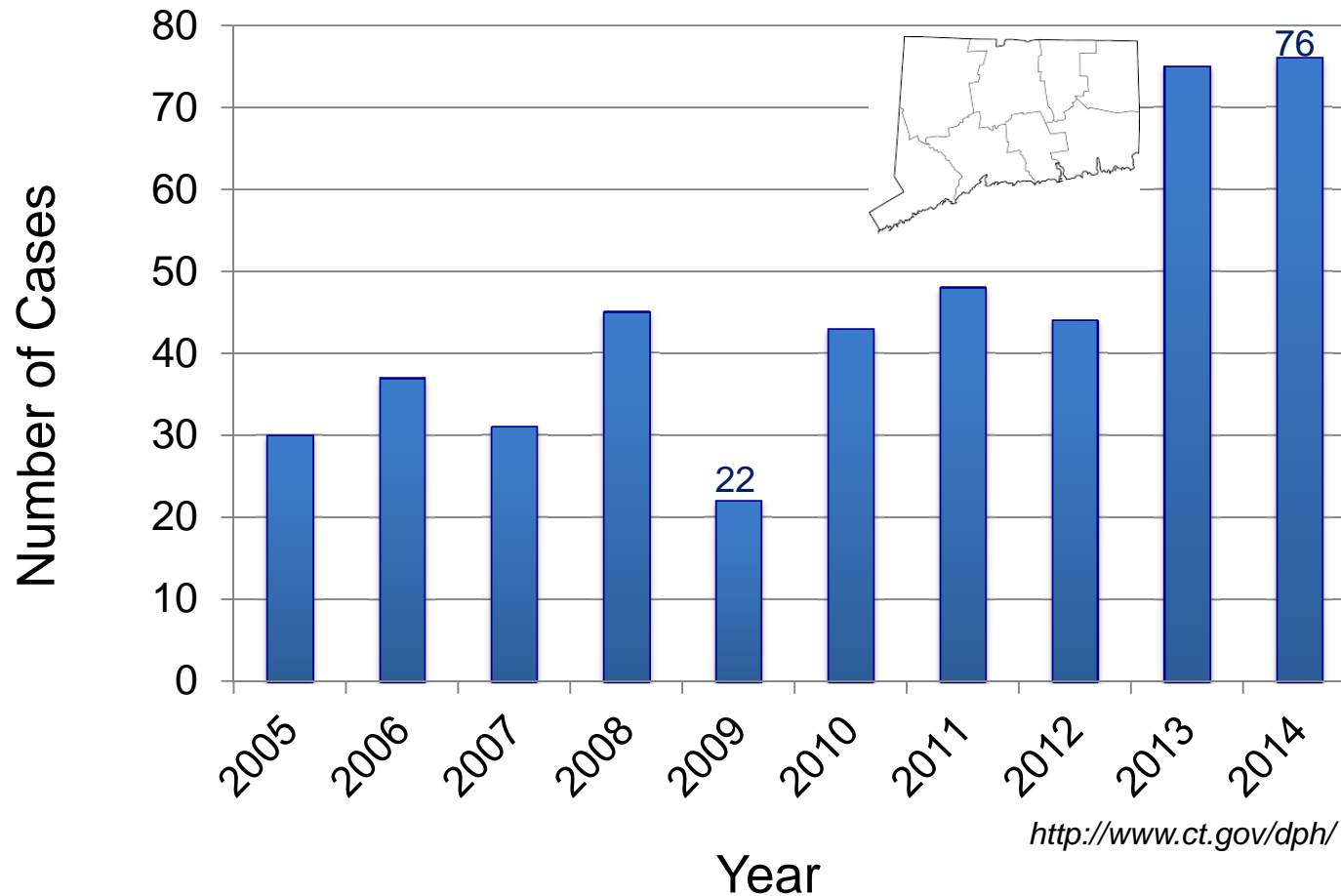
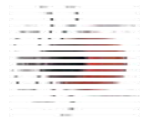
Anaplasmosis Incidence, 2010



Six states of New York, Connecticut, New Jersey, Rhode Island, Minnesota, and Wisconsin account for 90% of all reported cases of anaplasmosis.

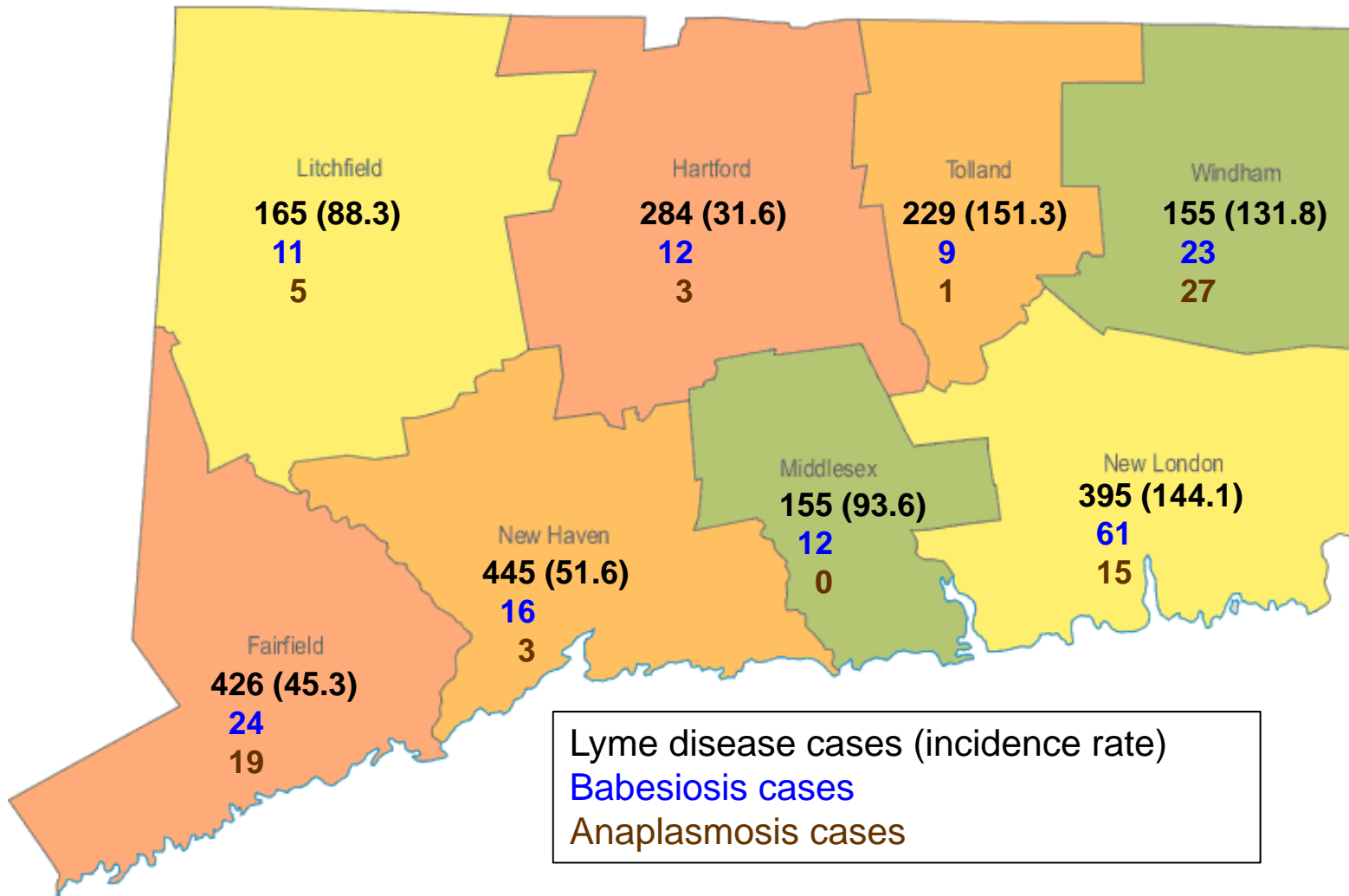


Confirmed Cases of Anaplasmosis Reported in Connecticut, 2005-2014





Tick-associated Disease Cases in Connecticut, 2014

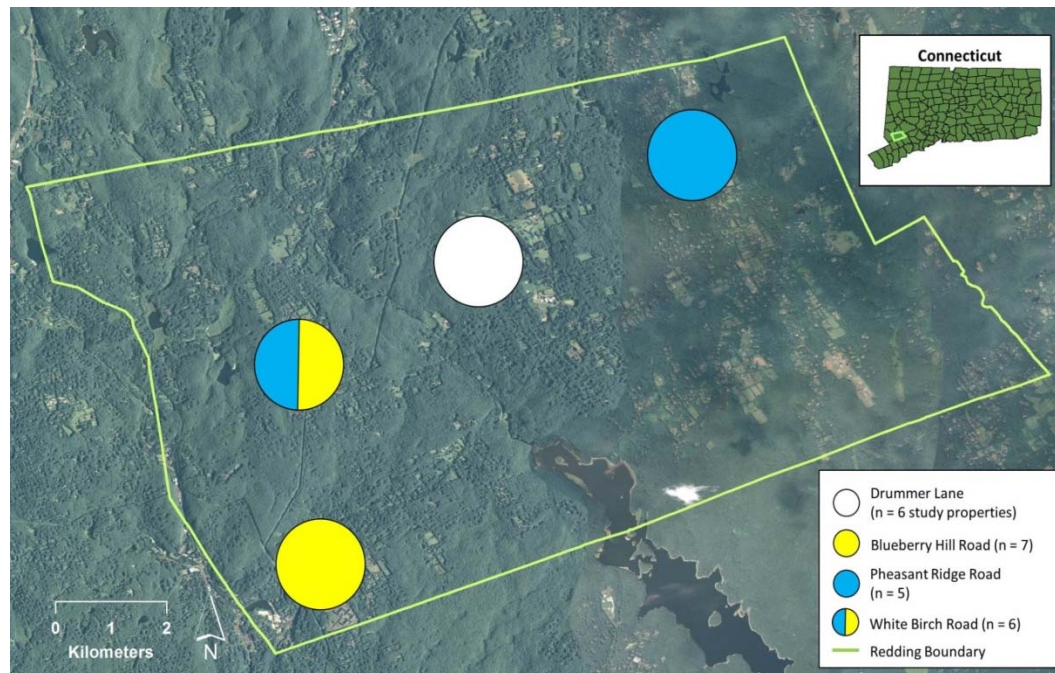




An Integrated and Individual Tick Management Program to Reduce Risk of Lyme Disease in a Residential Endemic Area

PIs: Kirby C. Stafford, Scott C. Williams, Goudarz Molaei

CDC Cooperative Agreement 1U01CK000182-01, -02, -03





Objectives



Objective 1. Develop a reduced risk approach to tick control, using an array of least-toxic control measures that is effective, safe, inexpensive, and simple to implement.

Objective 2. Measure efficacy of tick control methods in reducing tick population abundance, and infection rates in ticks and reservoirs, as a means of reducing the risk of tick-associated disease to humans.

Objective 3. Determine most effective timing and method of implementation of tick control methods, as well as associated costs to the homeowner.

Objective 4. Create a Lyme disease decision support system that provides guidance to homeowners on the risk of acquisition of tick-associated diseases, and makes recommendations on preventive measures.



Evaluation of a Rodent-Targeted Lyme Disease Vaccine



PIs: Kirby C. Stafford, Scott C. Williams, Goudarz Molaei

Goal: To investigate the effectiveness of a rodent-targeted vaccine (RTV) in controlling Lyme Borreliosis in three residential neighborhoods in Redding CT.

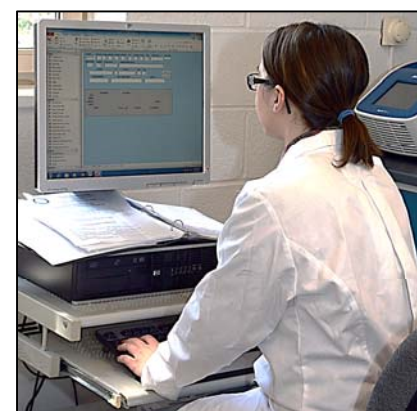


Treatments:

1. The RTV treatment only (delivered in rodent bait boxes)
2. RTV treatment in combination with applications of the biological tick control compound based on the fungus *Metarhizium anisopliae* (Met52)

Tick Testing Program

- The CAES Tick Testing Program was established in 1990, following years of pioneering Lyme disease research, and has served residents of Connecticut since.





Outline of the Tick Testing Process



- Accepting submissions:

Identification of the specimen: species, life cycle stage, and engorgement status

- Screening (we test engorged nymph and adult female blacklegged and Lone star ticks).



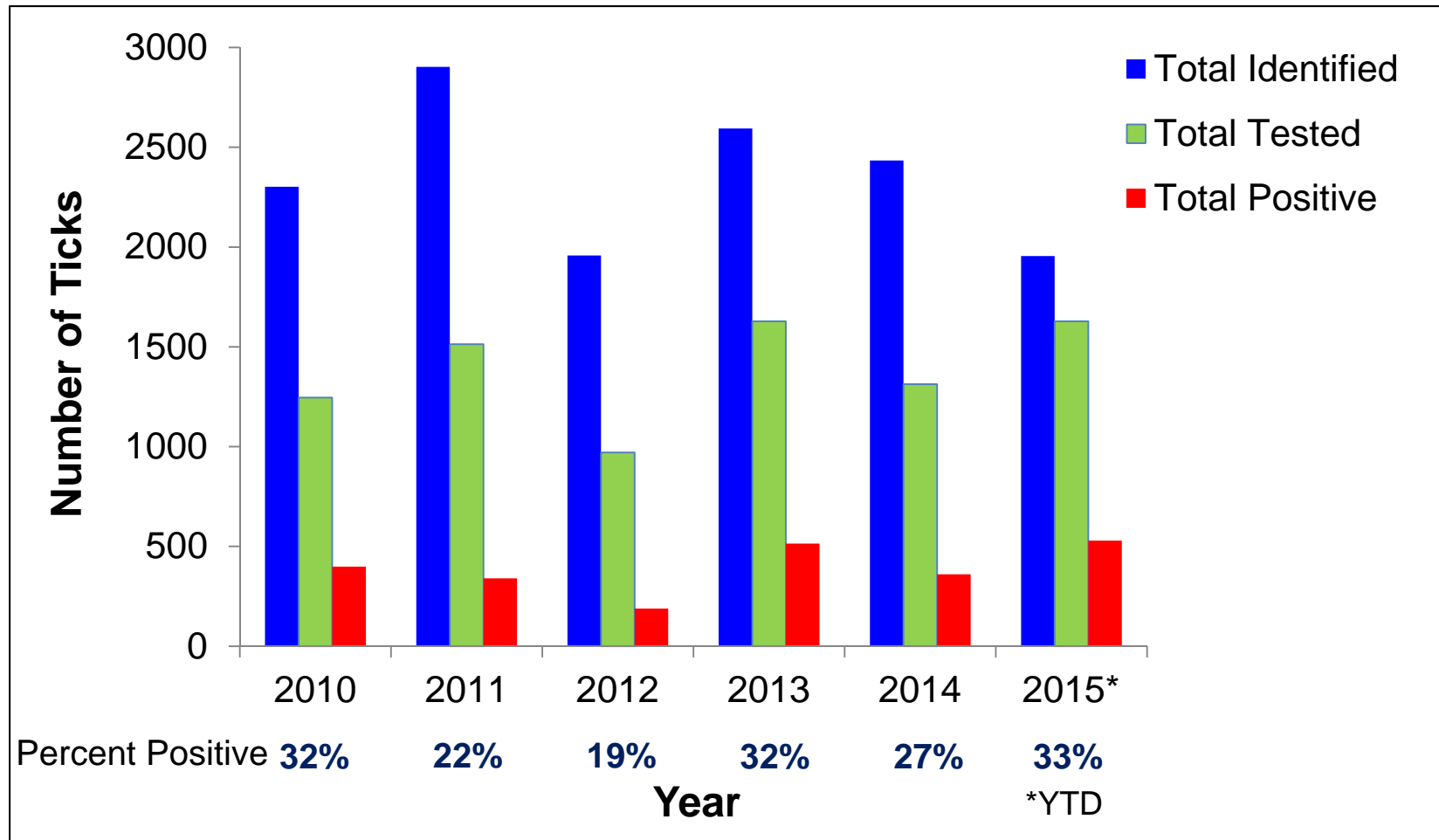
- The testing procedure involves:

- DNA extraction
- Screening DNA by PCR using three diagnostic genes

- Reporting results:

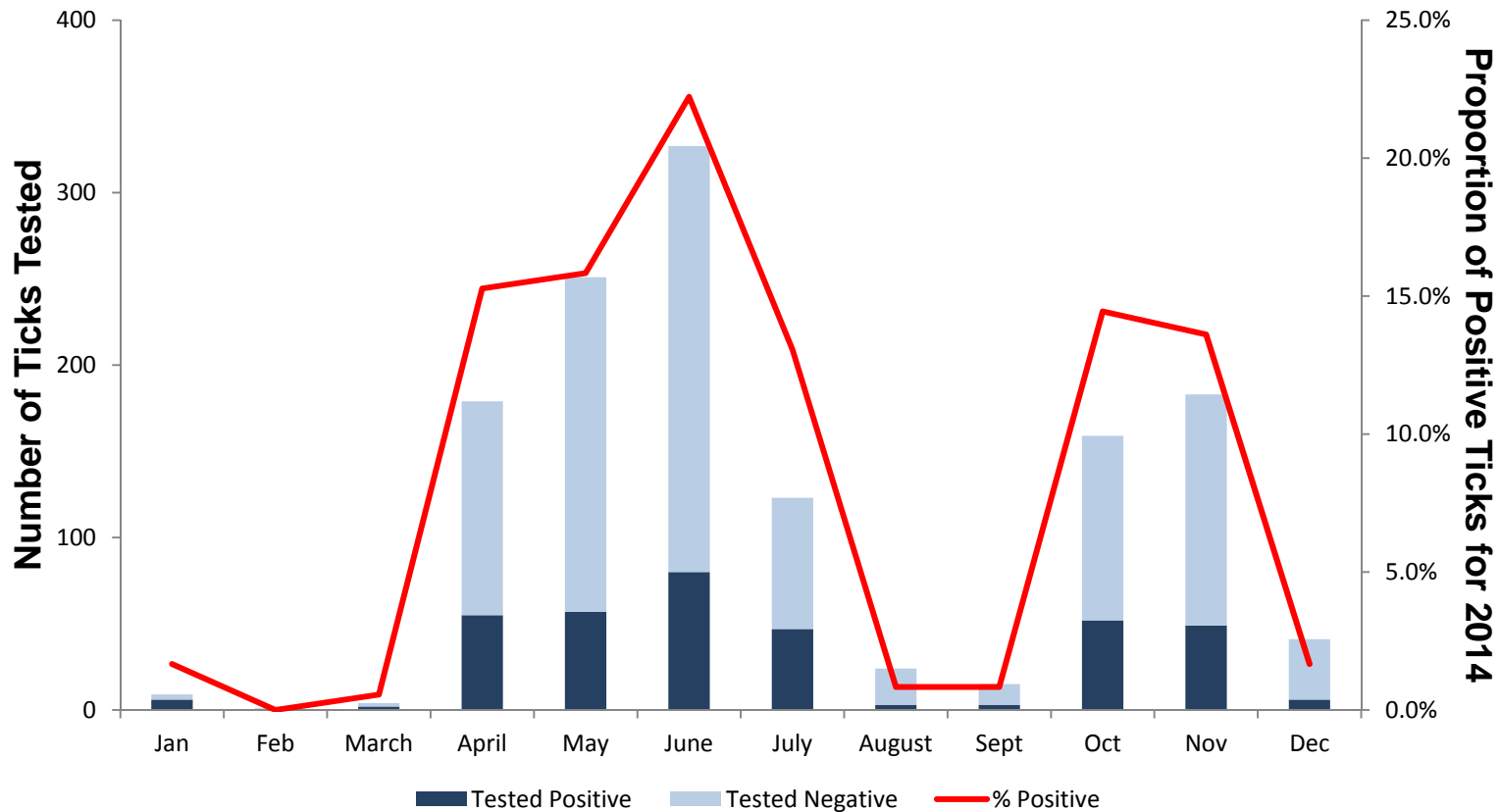


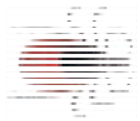
*Ticks Testing Results for Infection with *Borrelia burgdorferi* in CT*



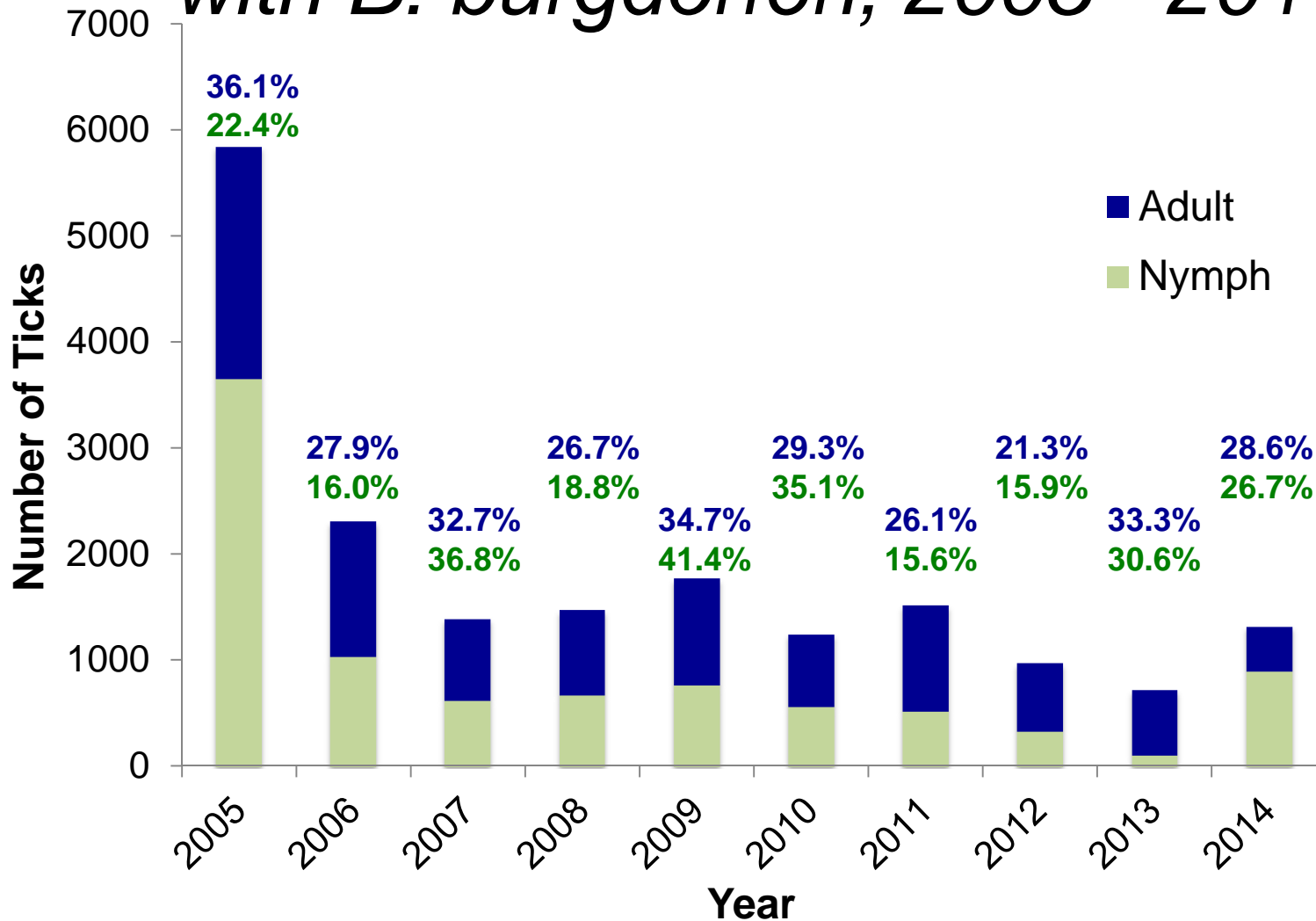
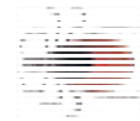


Prevalence of *Borrelia burgdorferi* Infection in Ticks Found on Humans, 2014



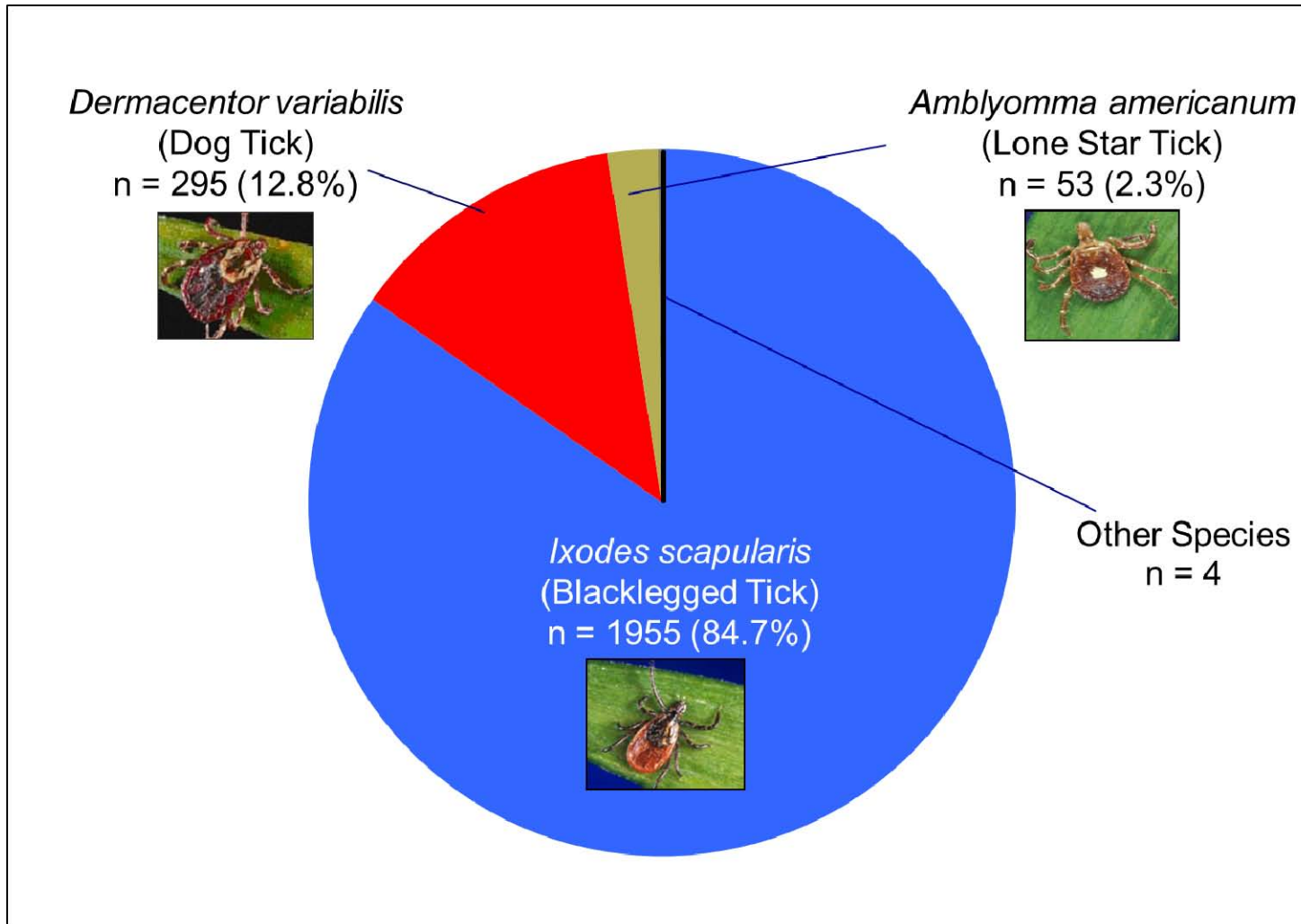


Nymphal and Adult Tick Infection with *B. burgdorferi*, 2005 - 2014



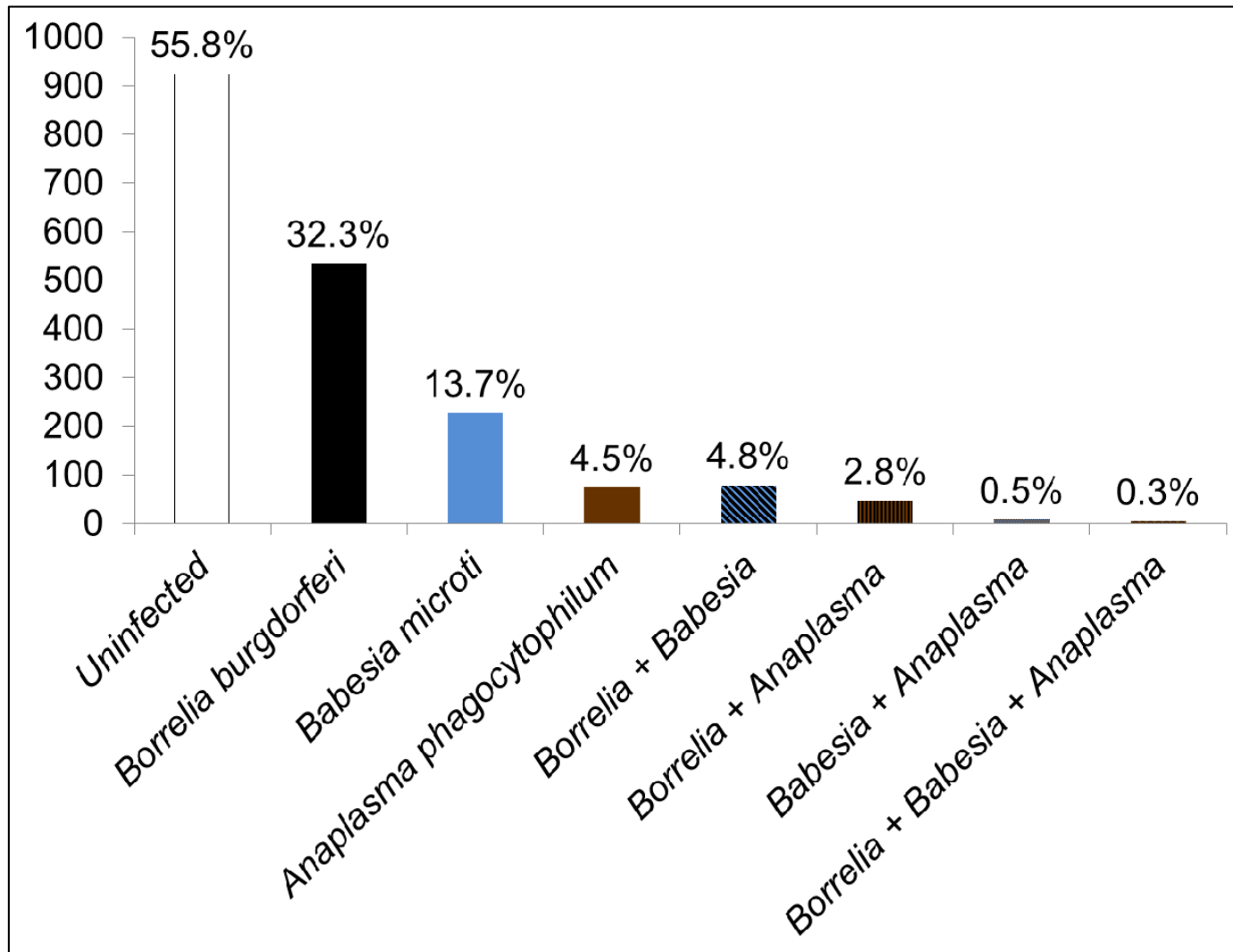


Species and Number of Ticks Received for Testing in 2015





Tick Testing Results, 2015





Who May Submit Ticks for Testing?



- Ticks are accepted only from residents of Connecticut.
- Substitute House Bill No. 5872, of April 10, 1992, states that the Connecticut Agricultural Experiment Station “***shall not conduct any testing of ticks for Lyme disease except at the request of a state or municipal health official or for scientific research purposes.***”



Fill out Form

Please include a completed copy of the submission form, which can be obtained online.



CAES

The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

Tick Submission Form

Date: _____

Instructions: Complete this form and include it with your tick specimen (It is important to print information legibly).

Information on person/health department submitting tick (to whom report will be sent):
(Please identify name and e-mail address of the person/health department official to whom the report will be sent.)

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

E-mail Address (required): _____ Telephone number(s): _____

Please note that the Tick Testing Program is intended for the identification and/or testing of ticks which have fed on humans. Ticks removed from pets will be identified, but not tested.

Was this tick removed from a pet? Y ___ N ___

Pet species/name/age: _____

Information on person bitten by tick:

Name (if different from above): _____

Address (if different from above): _____

Telephone number(s): _____

Age: _____ Gender: M ___ F ___

Date tick was removed: _____ Part of body where tick was found: _____

Town in which tick was acquired: _____

Please submit samples to:

The Connecticut Agricultural Experiment Station, Tick-Testing Laboratory, Slate Building Room 112, 123 Huntington Street, P.O. Box 1106, New Haven, CT 06504

Phone: (203) 974-8500 Fax: (203) 974-8502

Toll Free: 1-(877) 855-2237

WWW.CT.GOV/CAES

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