

Vectorborne Diseases in Maine

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Maine Center for Disease
Control and Prevention
An Office of the
Department of Health and Human Services

Paul R. LePage, Governor

Mary C. Mayhew, Commissioner

Presentation Agenda

- Tick biology
- Tick ecology
- Lyme disease
- Prevention
- Other tick-borne diseases in Maine
- Mosquito-borne illnesses

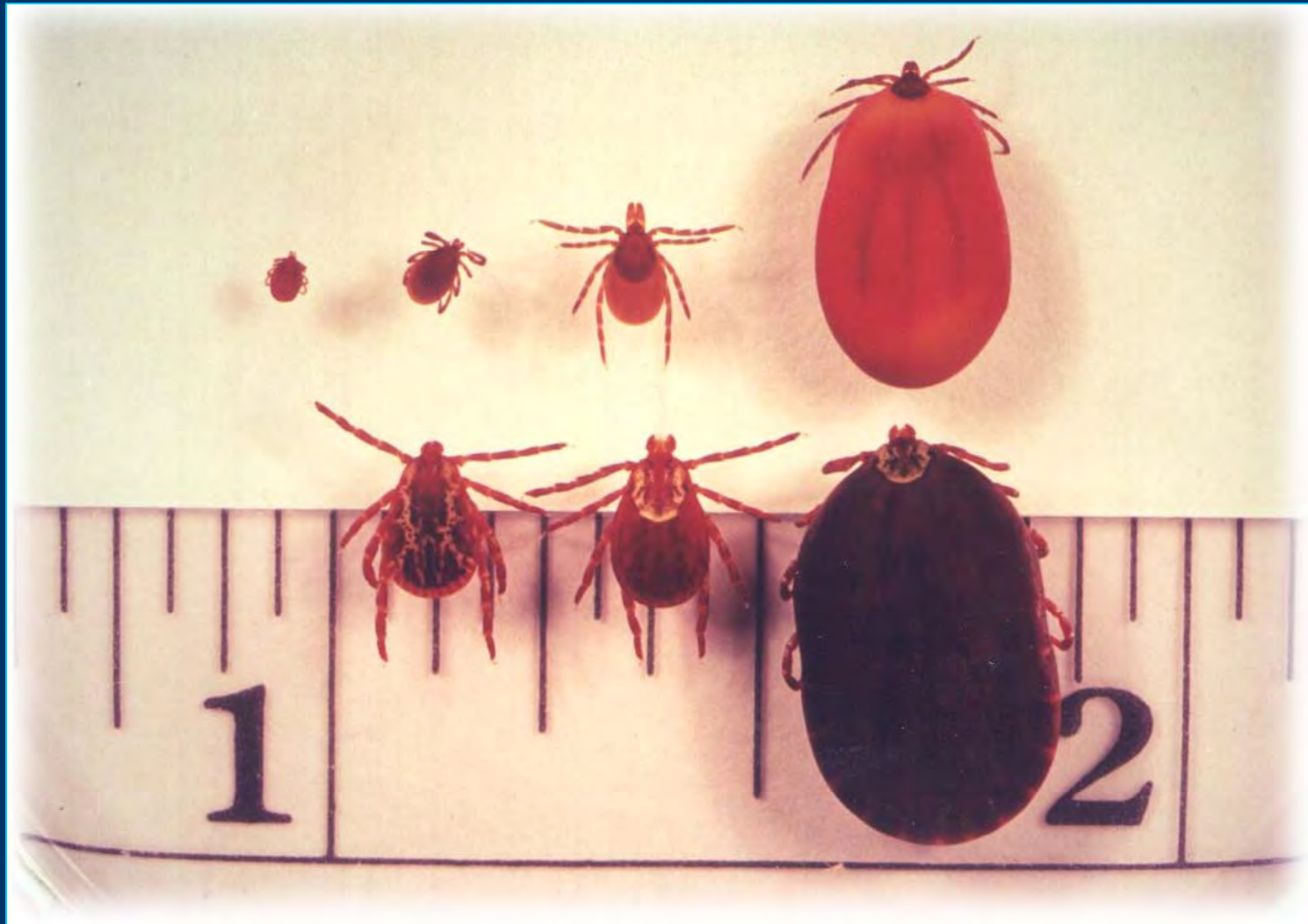
Ticks in the Northeastern United States

- **Blacklegged (or deer) ticks** (*Ixodes scapularis*) can transmit several tick-borne diseases including anaplasmosis, babesiosis and Lyme disease
- Adult tick (at left)
- Nymphal ticks (at right) most commonly bite humans



Larger than actual size.

Deer Ticks vs. Dog Ticks

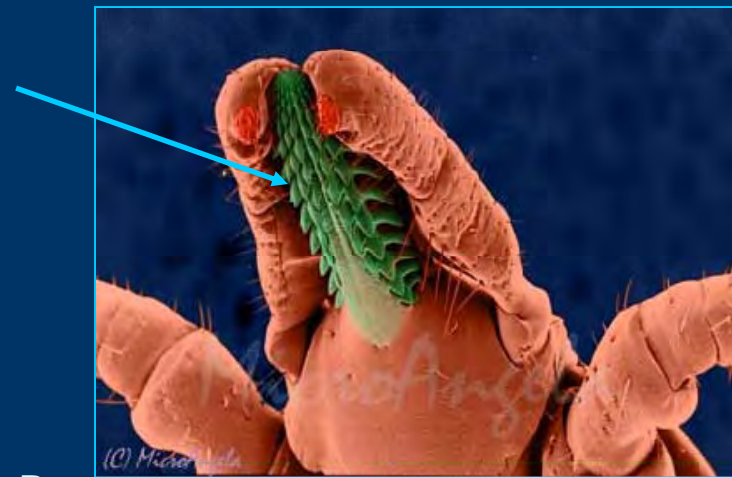


Deer Ticks Vs. Dog Ticks

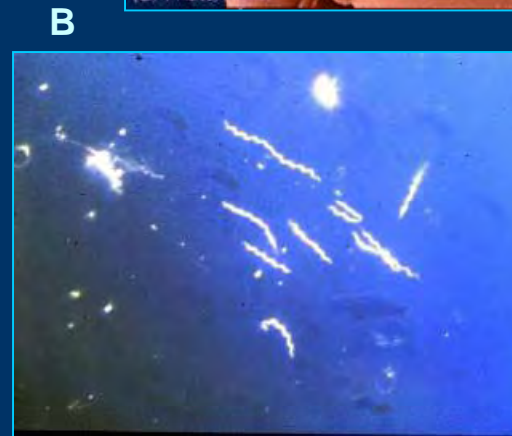
- Dog ticks have either a white scutum (dot or shield behind the head) or white 'racing stripes' down the back
- *Generally*, deer ticks prefer woods while dog ticks prefer open habitats
- In the summer, large adult dog ticks (1/8"-3/16") are commonly found as well as the small deer tick nymphs (~1/16")
- If you find ticks in fall or spring, they are probably deer ticks

Bite is Worse Than the Bark

- Hypostome barbed
- Ticks secrete an anesthesia and anticoagulant when biting
- To transmit the Lyme bacterium (*Borrelia burgdorferi*), ticks must feed for at least 24 hours!



A



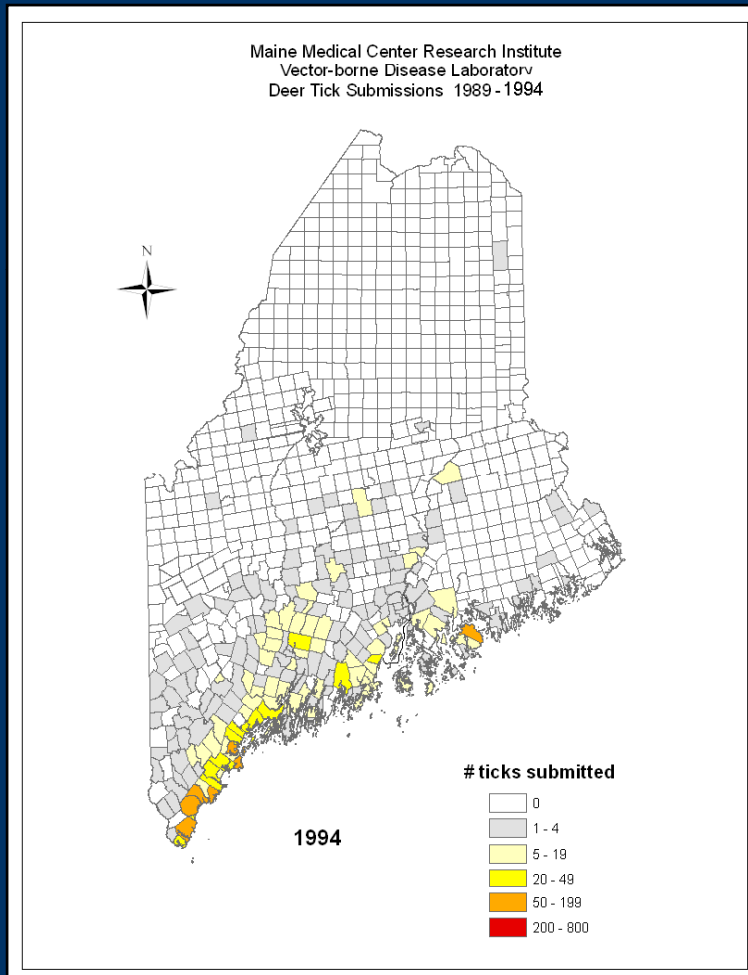
B

A) Scanning electron microscope (SEM) image of a deer tick. Courtesy of MicroAngela.

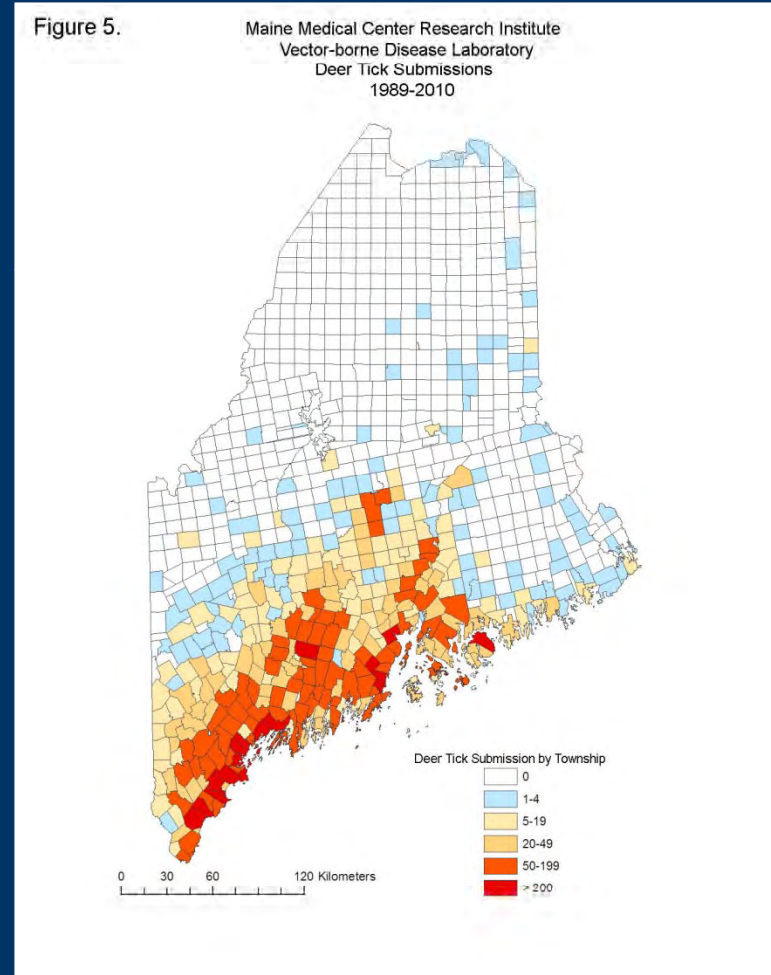
B. *Borrelia burgdorferi* spirochete. CDC.

Tick Distribution

1994



2010



Distribution Maps Courtesy of MMCRI: 2010

Ticks & Habitat

- Favorable habitat
 - Deciduous (broadleaf) forest such as oaks
 - Shrubby areas



Ticks & Habitat

- Unfavorable habitat
 - Open, dry habitats



Symptoms of Lyme Disease

Early Manifestations of Lyme Disease

- Erythema migrans (bull's eye rash)
- Muscle and joint pain
- Fatigue
- Chills, fever, and headache
- Swollen lymph nodes



EM image: CDC

Late Manifestations of Lyme Disease

- Arthritis with recurrent, brief attacks of joint swelling
- Lymphocytic meningitis
- Cranial neuritis (such as Bell's palsy)
- Encephalitis
- 2nd or 3rd degree atrioventricular block

Treatment

- Identify symptoms early, as treatment is more effective the earlier it is started
- If you have symptoms consistent with Lyme Disease – consult a physician for treatment
- Current treatment guidelines can be found on the Infectious Diseases Society of America website
<http://www.journals.uchicago.edu/doi/abs/10.1086/508667>

Lyme Disease Distribution

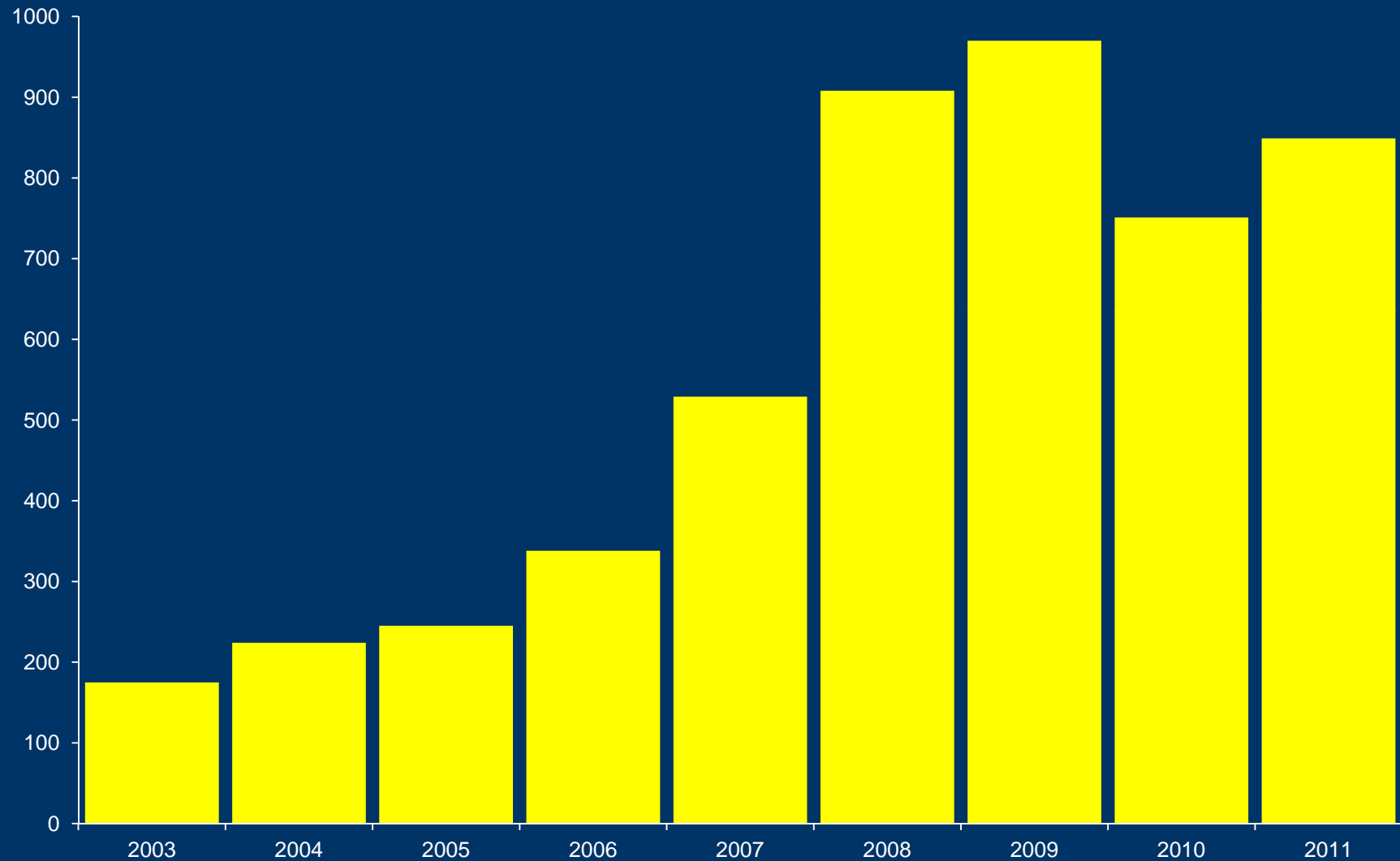
Reported Cases of Lyme Disease -- United States, 2010



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

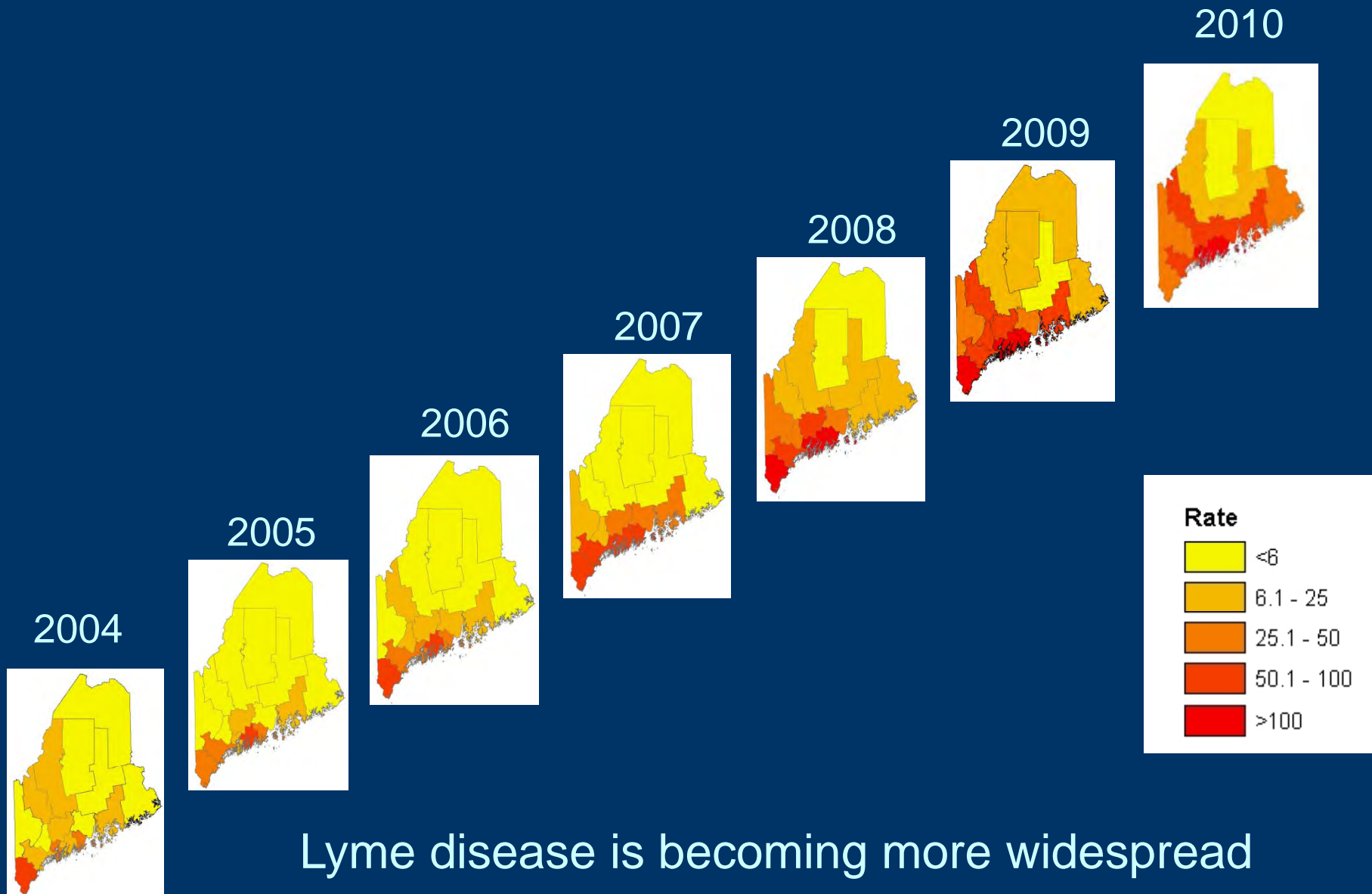
US Centers for Disease Control and Prevention, 2010.

Lyme Disease Cases – Maine, 2003-2011*

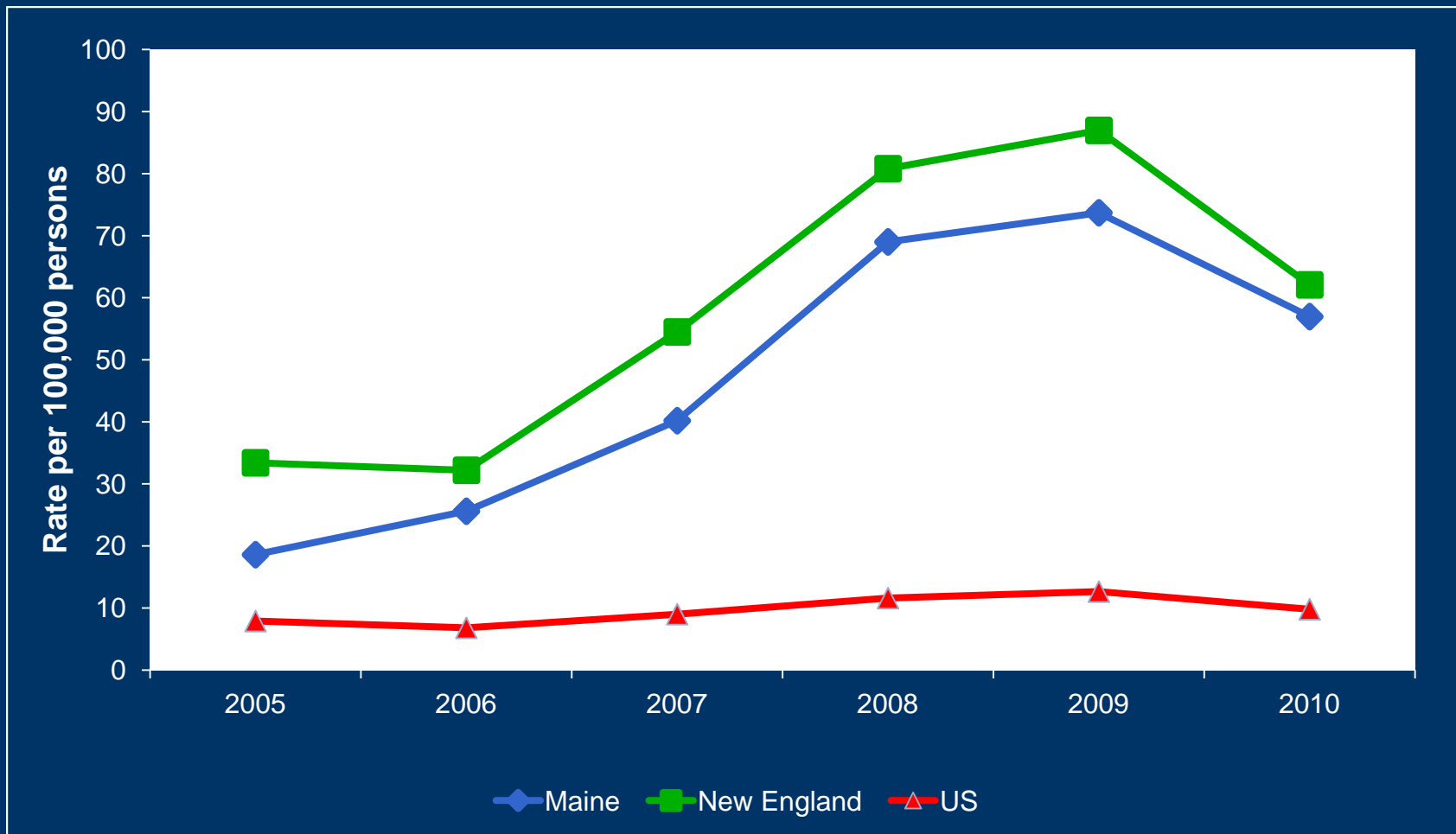


*2011 data preliminary as of 11/7/2011

Lyme Disease in Maine

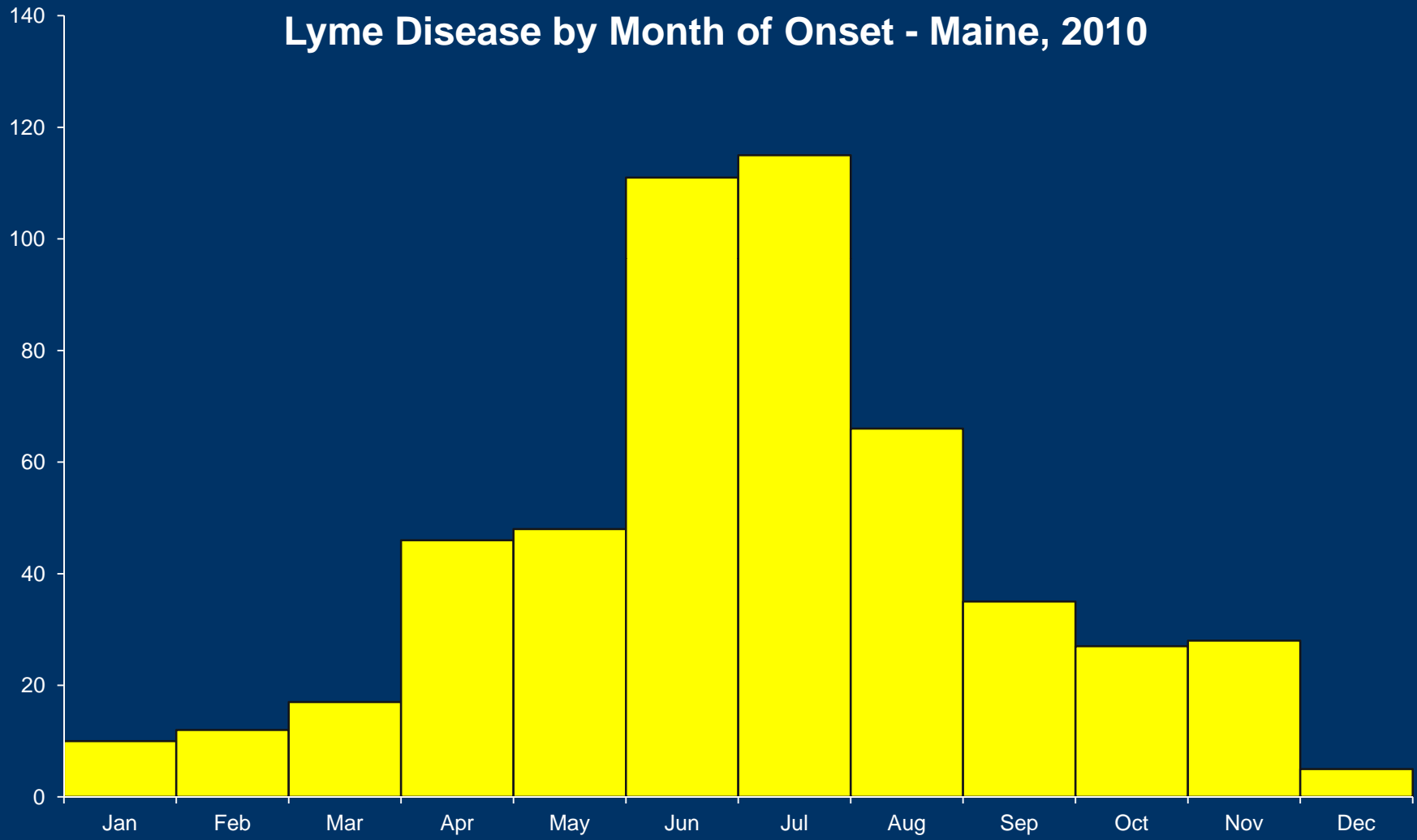


Lyme Disease Incidence in Maine and the United States: 2005 - 2010



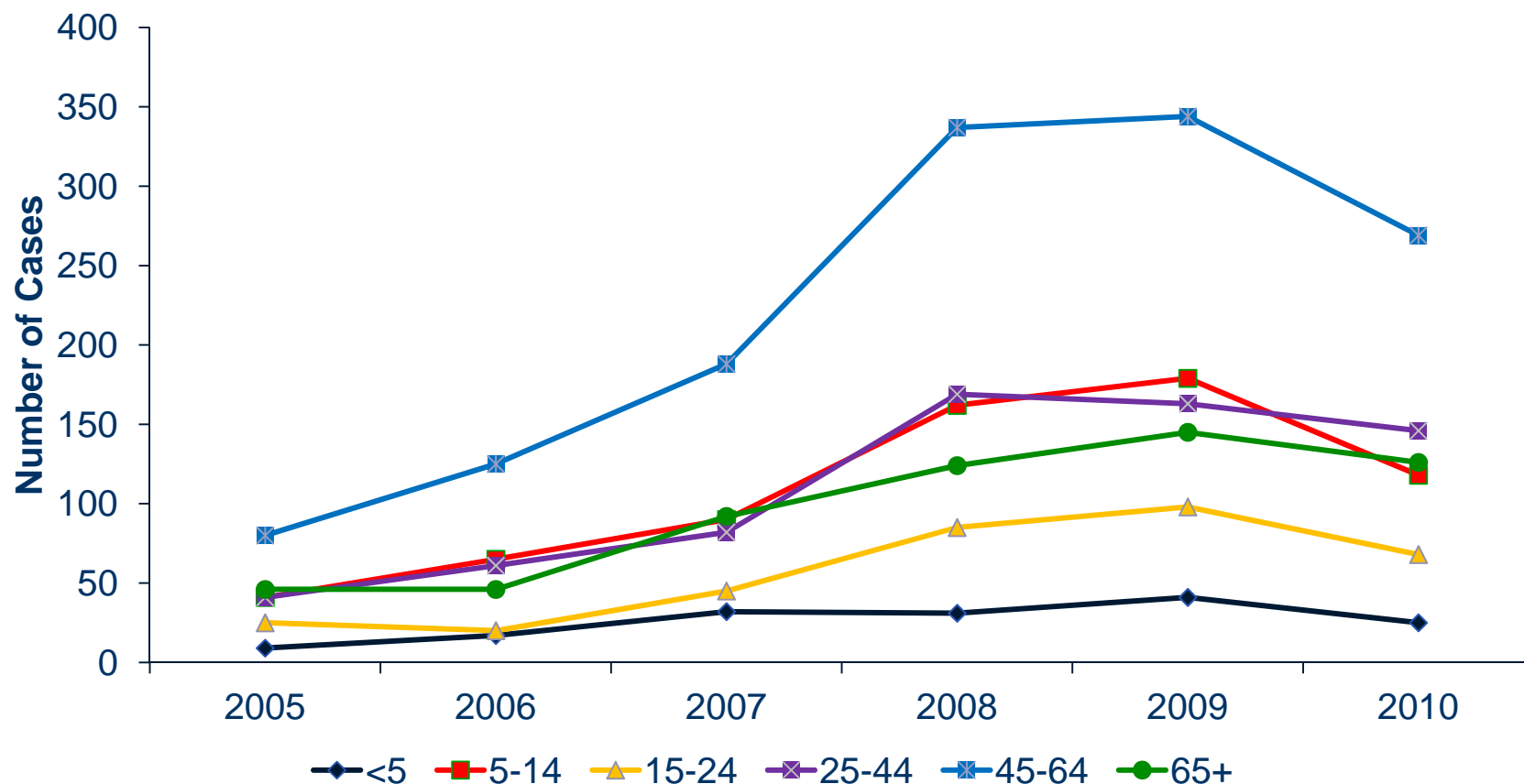
Seasonality of Cases

Lyme Disease by Month of Onset - Maine, 2010

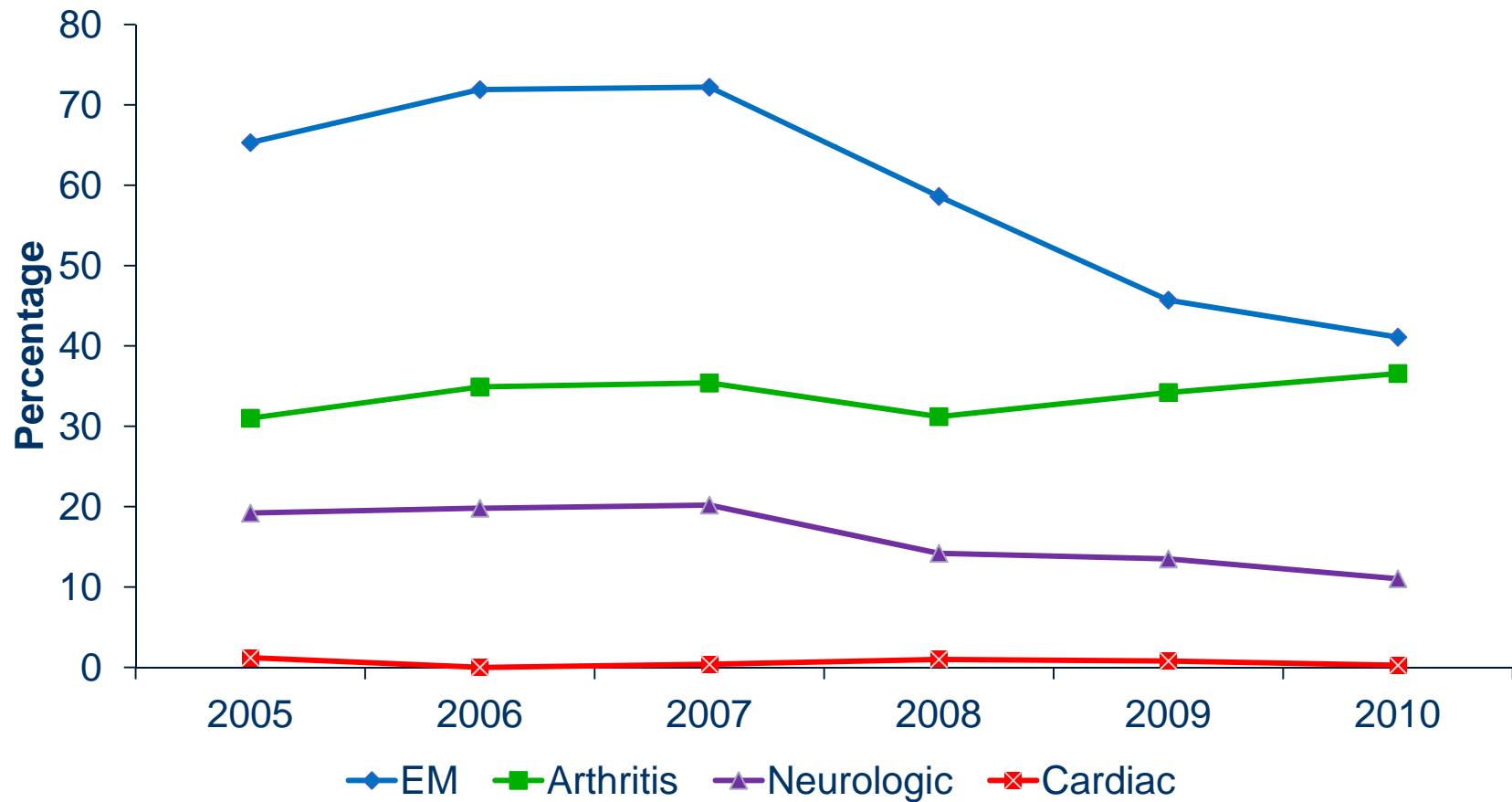


Age Distribution of Lyme Disease

Number of Reported Lyme Disease Cases by Age Group - Maine, 2005-2010



Lyme Disease Symptoms



No Ticks for ME

1. Wear protective clothing
2. Use an EPA approved repellent
3. Perform daily tick checks
4. Use caution in tick-infested areas



Personal Protection

- Dress appropriately when outdoors
- Use repellants containing DEET, oil of lemon eucalyptus, IR3535, picaridin, or permethrin
- Thoroughly wash and dry clothes



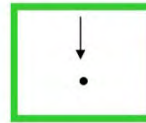
Personal Protection

**Don't Forget to Check
for Ticks!!**

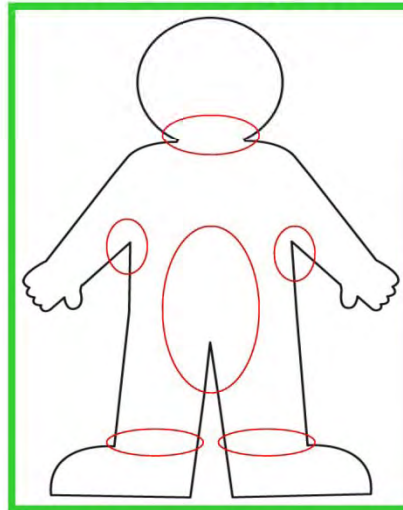
**They look a little
something like this:**



**But their actual size is
more like this:**



**Places on your body where
ticks commonly hide**



WHAT TO DO IF YOU FIND ONE ON YOUR BODY:

- Grasp the tick with tweezers as close to the skin as possible.
- Pull gently but firmly until the tick lets go.
- Do not handle the tick with bare hands or squeeze the tick.
- Apply antiseptic to the bite.

Tick-Safe Landscaping

- Regularly remove brush, leaf litter and tall grass
- Create a dry border between the woods and the lawn
- Consider using a chemical control agent to reduce the number of ticks
- Remove plants that attract deer and construct physical barriers that may discourage deer from entering your yard

tick ID

KNOW THEM. PREVENT THEM.



Deer Tick (Black-Legged Tick)



nymph



adult male



adult female

- Deer ticks may transmit the agents that cause Lyme disease, anaplasmosis, and babesiosis
- **What bites:** nymphs and adult females
- **When:** anytime temperatures are above freezing, greatest risk is spring through fall

ACTUAL SIZE

nymph
(1/32"–1/16")

adult
(1/8")



engorged adult
(up to 1/2")

Dog Tick



adult male



adult female

- Dog ticks do not transmit the agent that causes Lyme disease
- **What bites:** adult females
- **When:** April–August through fall

(examples are not actual size, dog tick nymphs are rarely found on humans or their pets)

prevent the bite

- Wear light-colored protective clothing
- Use EPA-approved insect repellent on skin or clothing
- Use caution in tick infested areas
- Perform daily tick checks
- Protect your pets, use repellents, acaricides, and a Lyme disease vaccine for dogs



tick removal

Remove ticks immediately. They usually need to attach for 24 hours to transmit Lyme disease. Consult a physician if you remove an engorged deer tick.

Using a tick spoon:

- Place the wide part of the notch on the skin near the tick (hold skin taut if necessary)
- Applying slight pressure downward on the skin, slide the remover forward so the small part of the notch is framing the tick
- Continuous sliding motion of the remover detaches the tick

Using tweezers:

- Grasp the tick close to the skin with tweezers
- Pull gently until the tick lets go

1-800-821-5821 | www.mainepublichealth.gov

Other Tick-borne Diseases

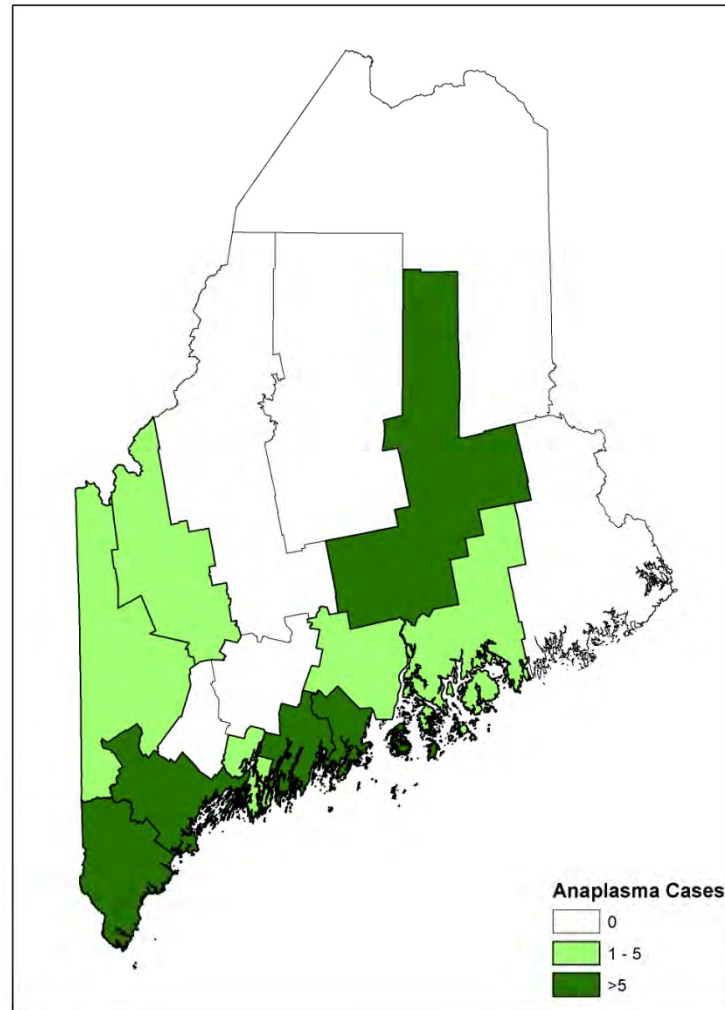
- Anaplasmosis
- Babesiosis
- Ehrlichiosis
- Powassan
- Rocky Mountain Spotted Tick Fever

Anaplasma Cases

2005: 4
2006: 10
2007: 9
2008: 17
2009: 15
2010: 17
2011: 16*

*2011 data preliminary as of
11/7/11

Anaplasma Cases, Maine 2005- 2010



Babesia Cases

2005: 11

2006: 9

2007: 11

2008: 11

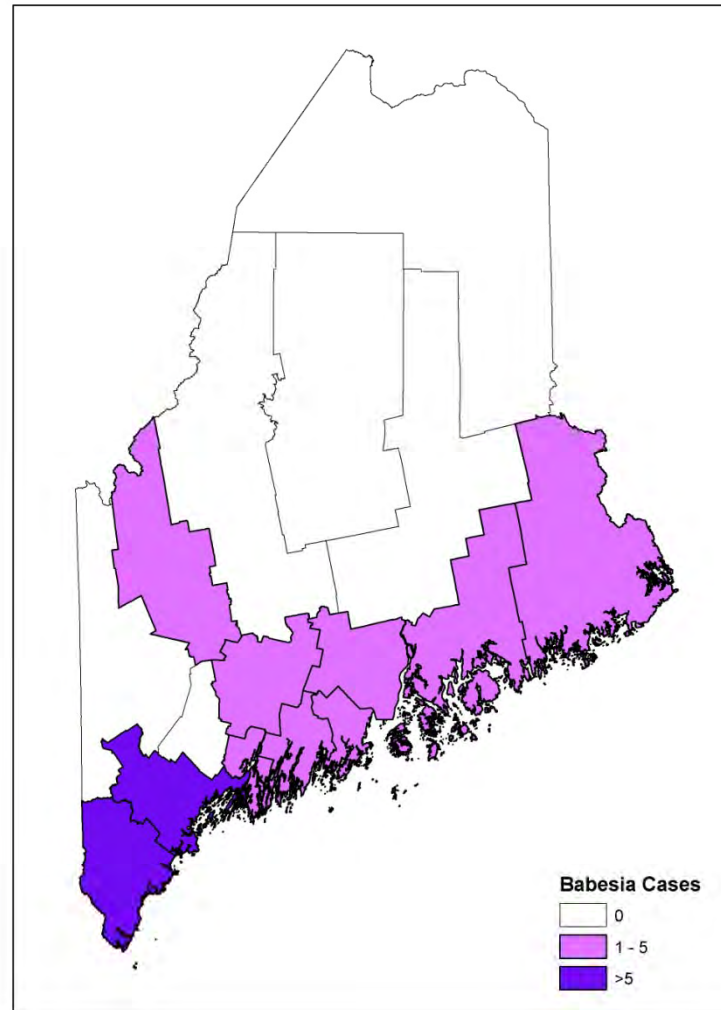
2009: 3

2010: 5

2011: 7*

*2011 data preliminary as of
11/7/11

Babesia Cases, Maine 2005 - 2010

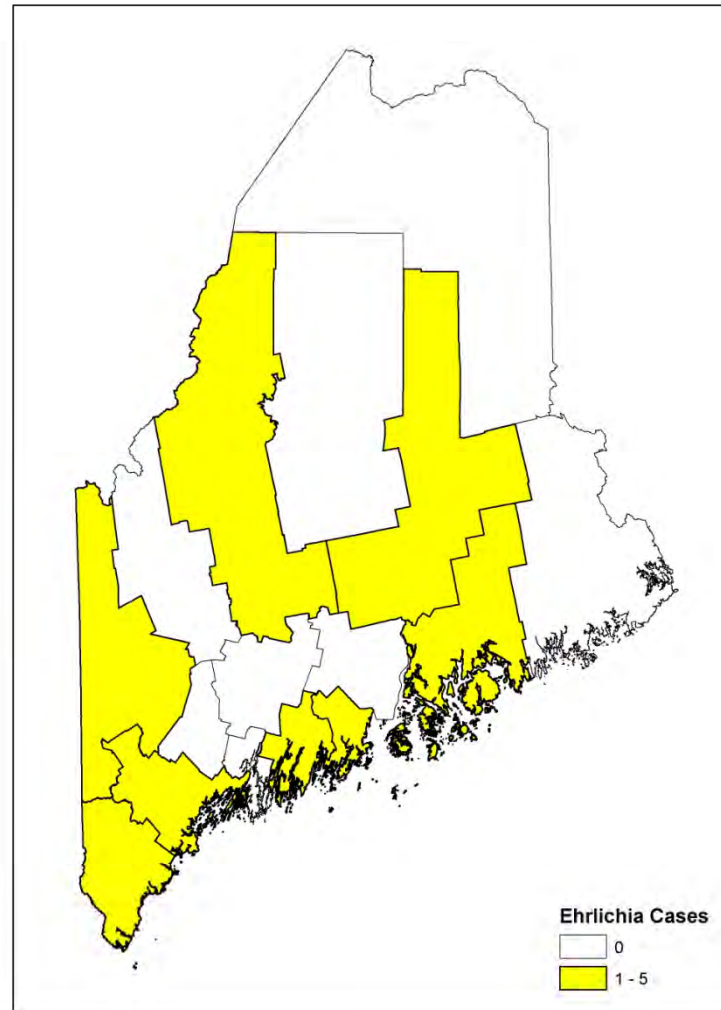


Ehrlichia Cases

2005: 1
2006: 4
2007: 3
2008: 1
2009: 1
2010: 4
2011: 1*

*2011 data preliminary as of
11/7/11

Ehrlichia Cases, Maine 2005 - 2010



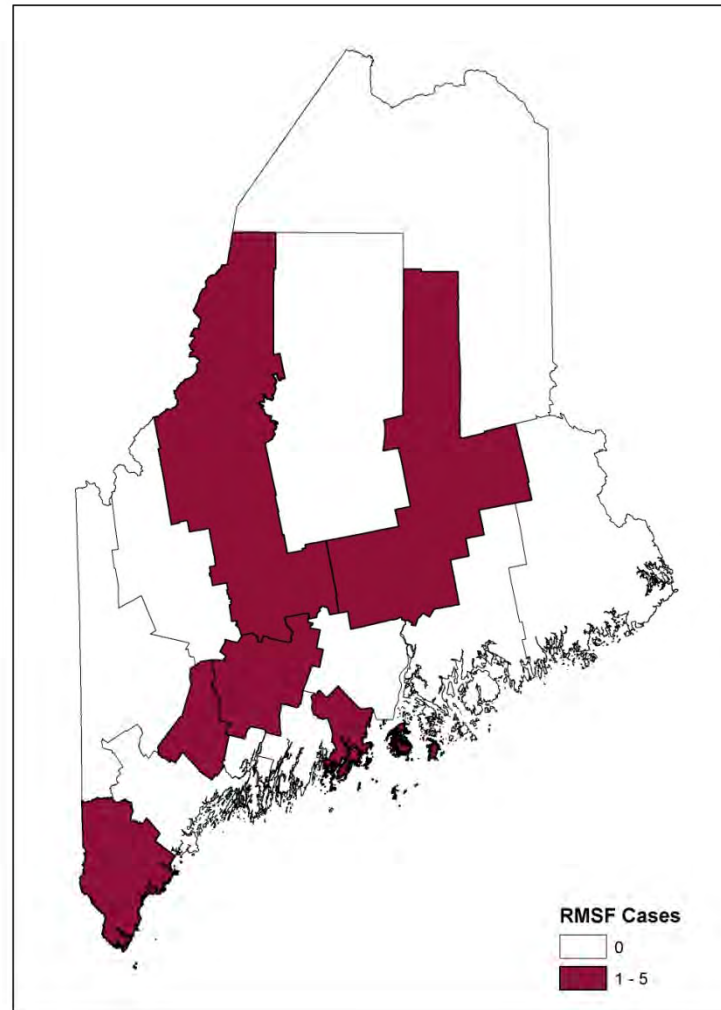
Rocky Mountain Spotted Fever Cases

2005: 0
2006: 0
2007: 1
2008: 1
2009: 5
2010: 2
2011: 0*

RMSF became reportable in 2008
All cases are probable

*2011 data preliminary as of
11/7/11

Rocky Mountain Spotted Fever Cases, Maine 2005 - 2010



Mosquito-borne diseases



- Eastern Equine Encephalitis
 - One of the most serious mosquito-borne diseases in the United States
 - Many persons infected will have no obvious symptoms
- West Nile Virus
 - Occurs throughout the United States
 - Many persons infected will have no obvious symptoms

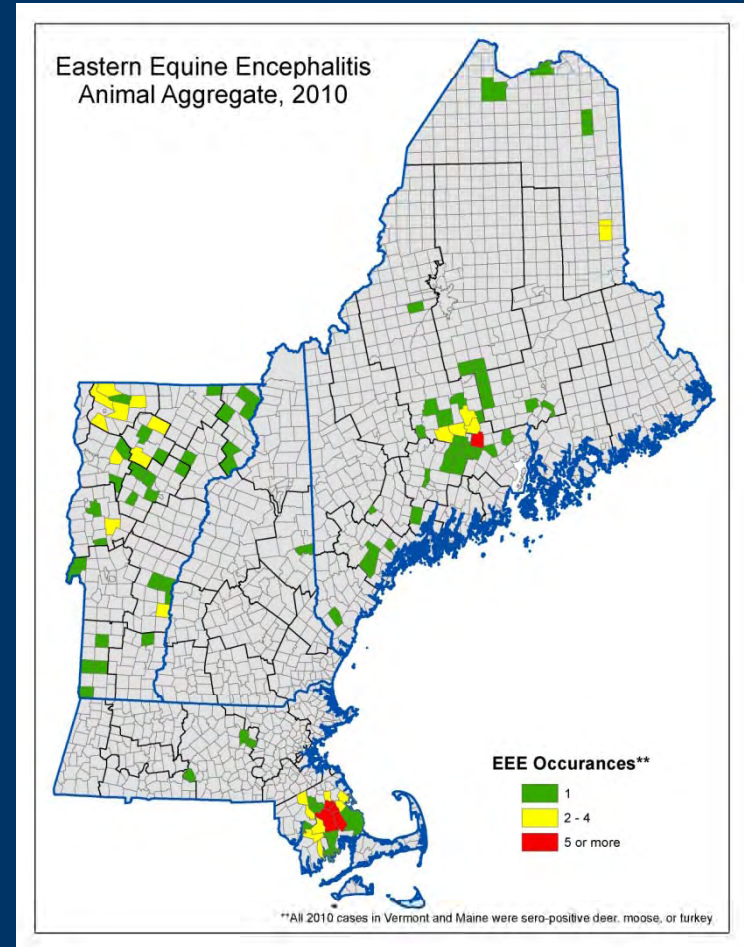
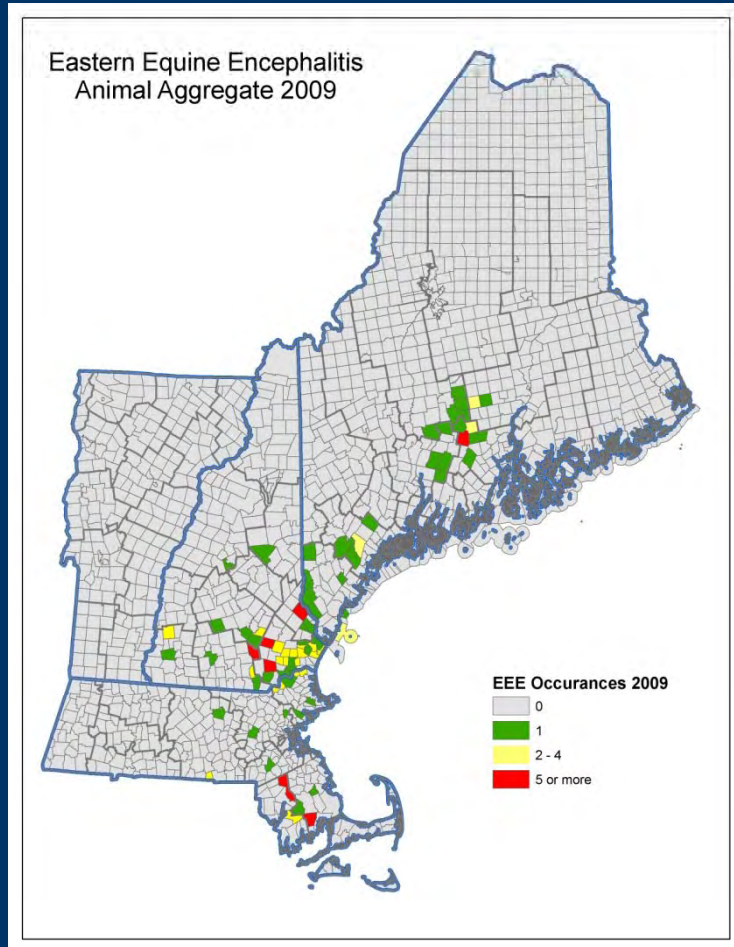
Mosquito-borne diseases cont.

- No human cases of EEE or WNV in Maine residents
 - One EEE fatality in MA resident likely exposed in Maine
- WNV – positive mosquito pools, birds
- EEE – positive mosquito pools, birds, horses, llamas
- Maine does routine mosquito surveillance

EEE - serosurvey

- Maine is interested in the geographical range of EEE – so in collaboration with federal CDC, MMCRI, and USDA we have done several serosurveys
 - Deer and moose serosurvey 2009, 2010, 2011
 - Turkey serosurvey 2011

EEE in non-humans, 2009 and 2010



For More Information

- Maine CDC disease reporting and consultation line: 1-800-821-5821
- Maine Medical Center Research Institute – Vector-borne Disease Lab: 207-662-7142
- Sara Robinson, Vectorborne Epidemiologist:
sara.robinson@maine.gov