

Tickborne Diseases: A CDC Update

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NACCHO Webinar

April 9, 2019

Objectives

- Understand the challenges
 - Expansion of tick vectors and increasing incidence of tickborne disease
 - Complexities of Lyme disease surveillance
- Learn about new CDC resources
 - Scripted presentations
 - Handouts
 - Surveillance guidelines

Increasing Tickborne Disease

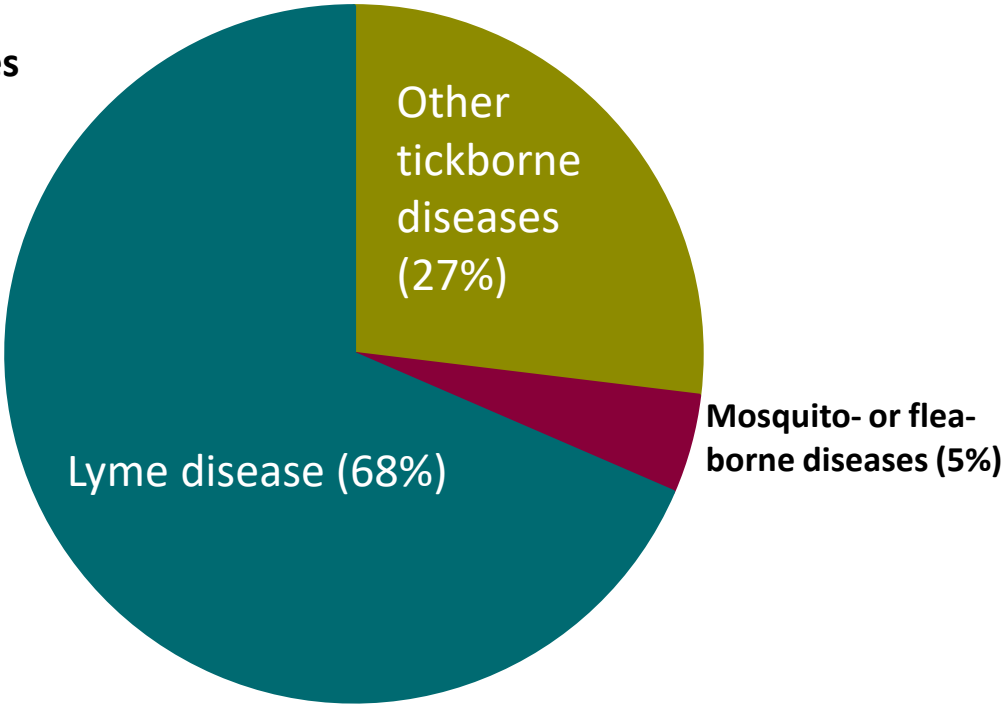
Overview of Trends, New Concerns

- Majority of vector-borne diseases in the U.S. are tickborne diseases
- Increasing number of tickborne disease cases over time
- Expanding geographic range of tickborne cases
- Growing number of tickborne agents recognized to cause human disease



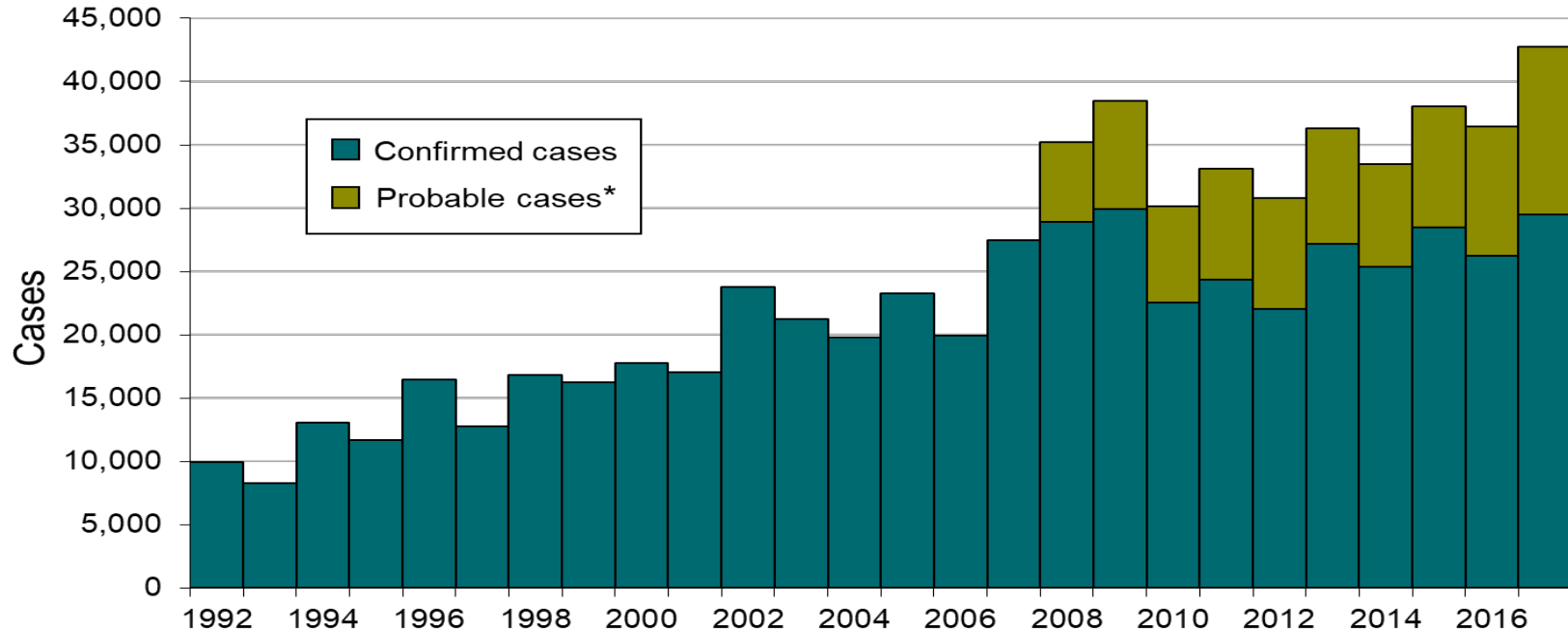
Majority of Reported Vector-Borne Diseases Spread by Ticks

N = 62,399 cases

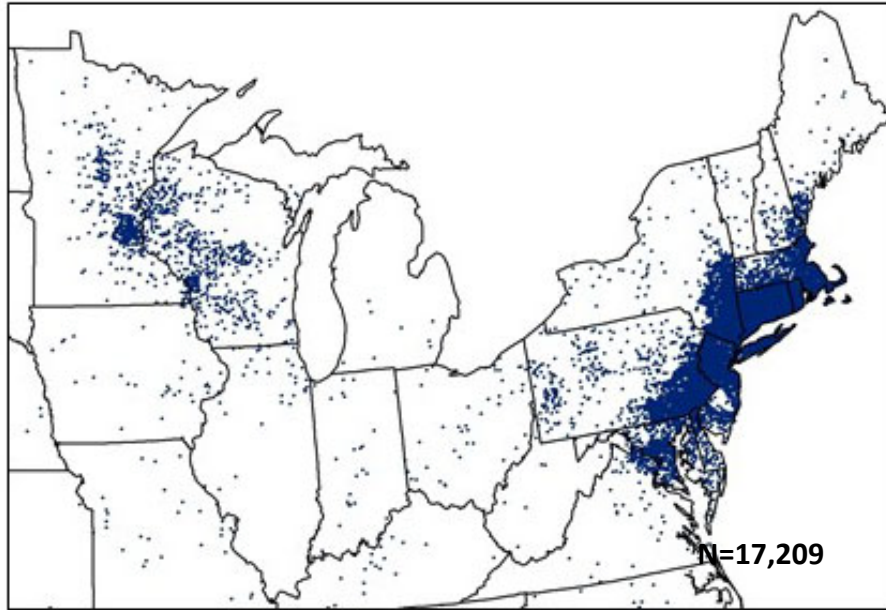


Cases of Nationally Notifiable Vector-Borne Diseases Reported in the U.S., 2017

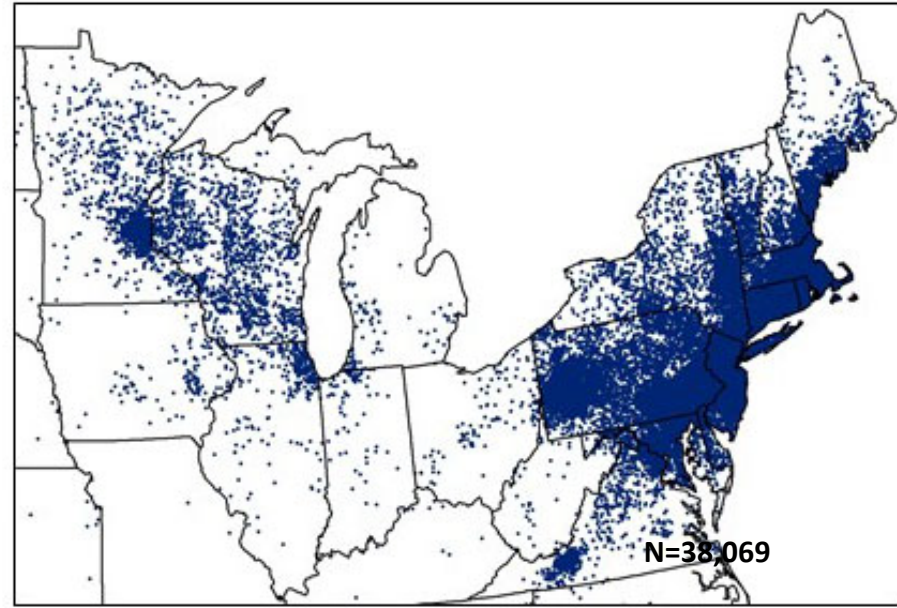
Increasing Number of Reported Lyme Disease Cases



Expanding Geographic Range of Lyme Disease Cases

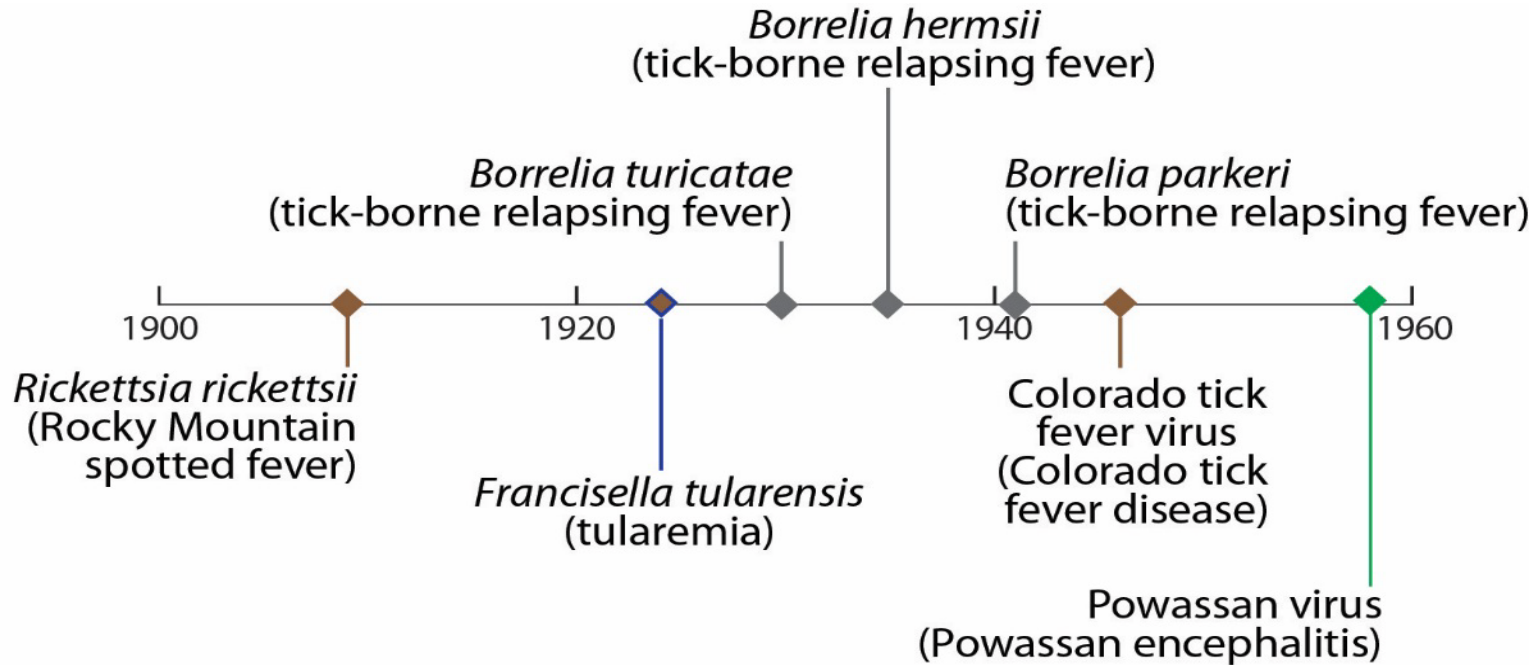


2001

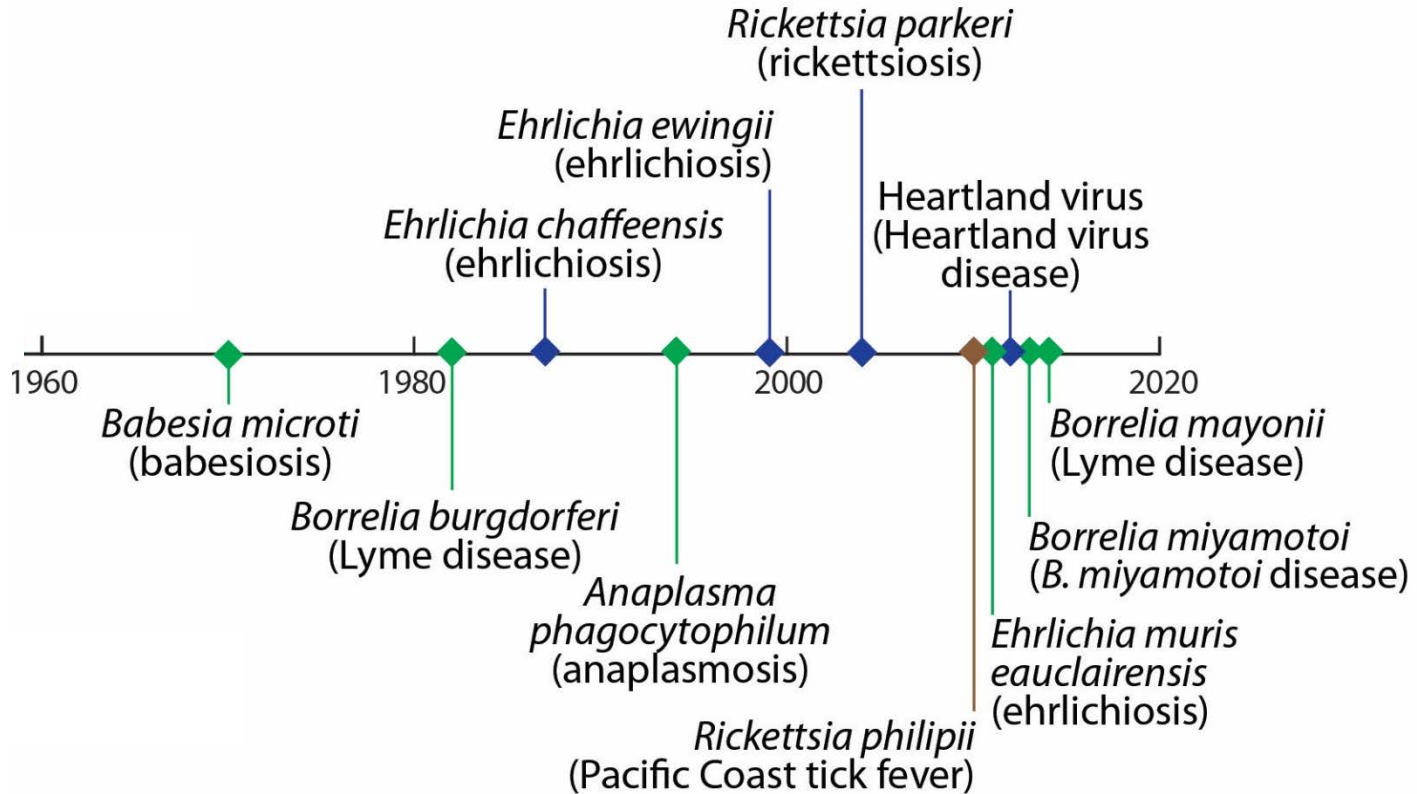


2015

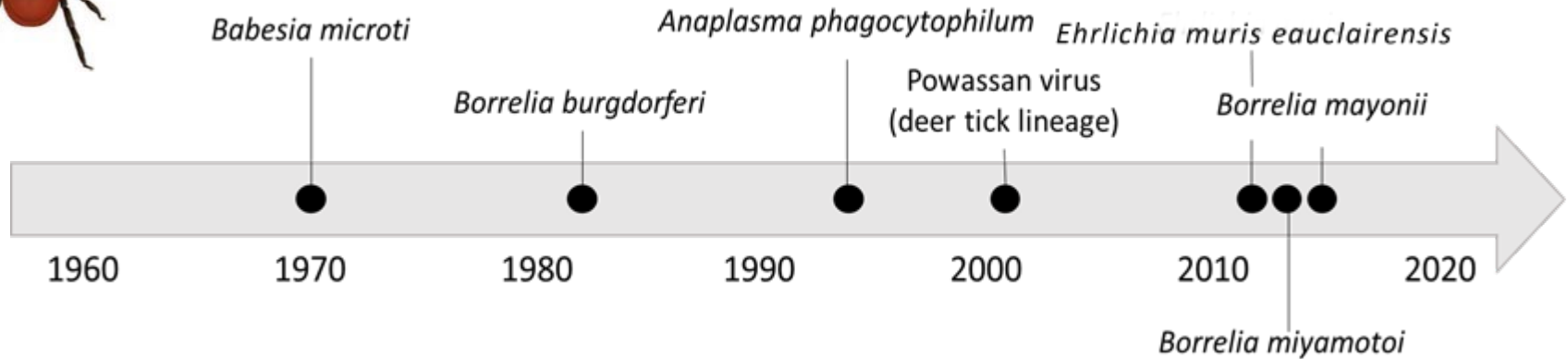
Growing Number of Tickborne Agents Recognized to Cause Human Disease, 1909-1960



Growing Number of Tickborne Agents Recognized to Cause Human Disease. 1960-2018

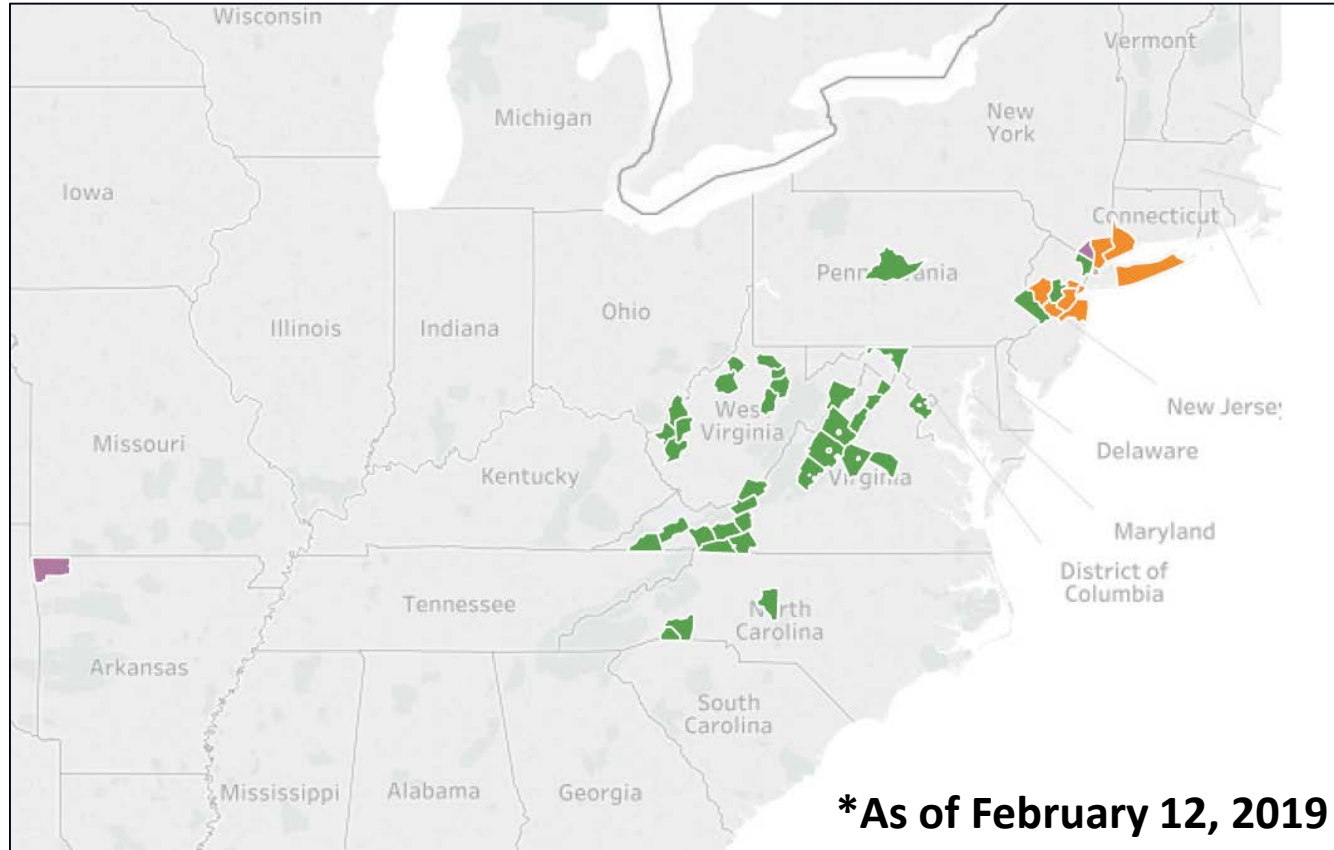


Ixodes scapularis: An Increasing Public Health Concern



Invasive Tick Species

Multistate Infestation with the Exotic Disease-Vector Tick *Haemaphysalis longicornis**



Number of Counties With Confirmed Local *H. longicornis**

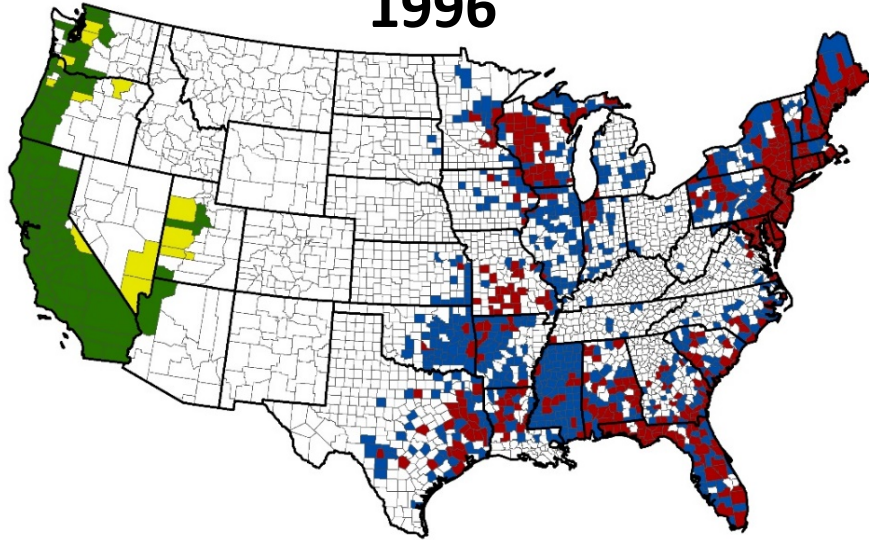


*As of February 12, 2019

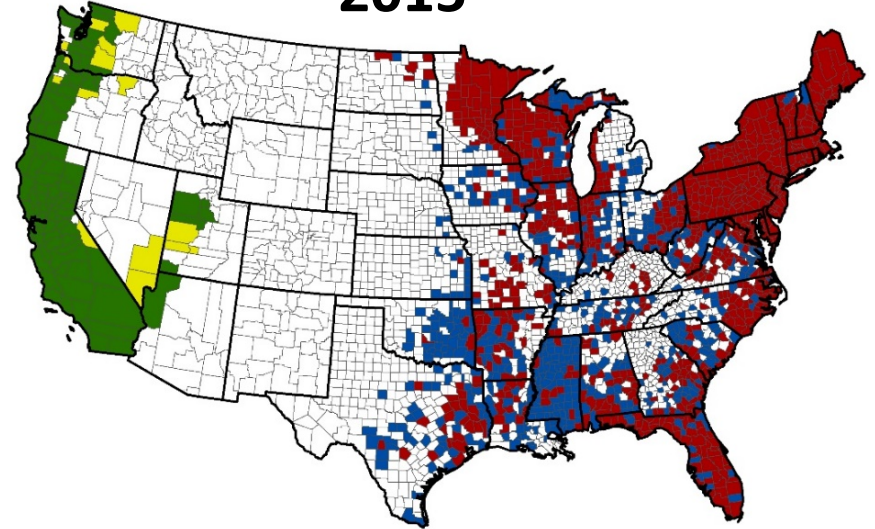
Expanding Tick Vector Range

Distribution of Lyme Disease Vectors Has Expanded

1996



2015



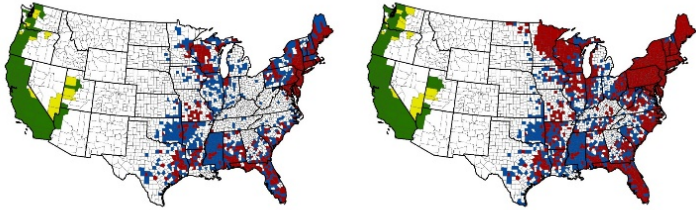
  **Established:** ≥ 6 or more ticks or >1 life stage recorded in a single year

  **Reported:** <6 ticks of a single life stage recorded in a single year

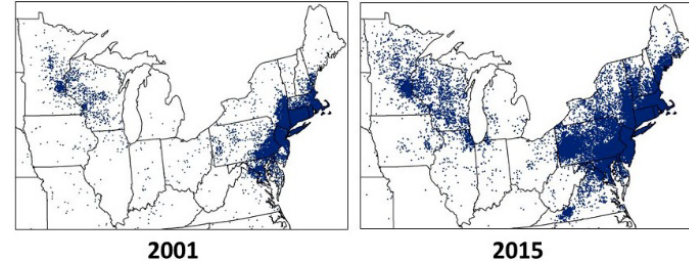
Dennis DT, Nekomoto TS, Victor JC, et al. J Med Entomol. 1998 Sep;35(5):629-38.

Eisen RJ, Eisen L, Beard CB. J Med Entomol. 2016 Mar;53(2):349-86.

Distributions of ticks and tickborne pathogens change over time.



Likelihood of human encounters with ticks and tickborne pathogens change over time and space.



Tick surveillance is intended to monitor trends in presence, abundance, and infection prevalence in medically important ticks to direct public health action.



Uses of Tick Surveillance Data in Public Health

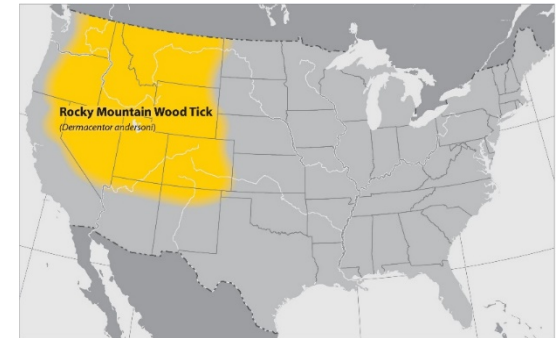
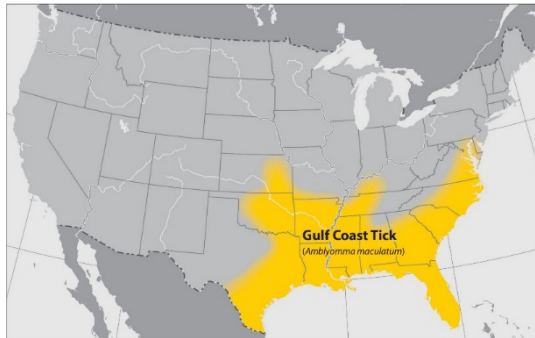
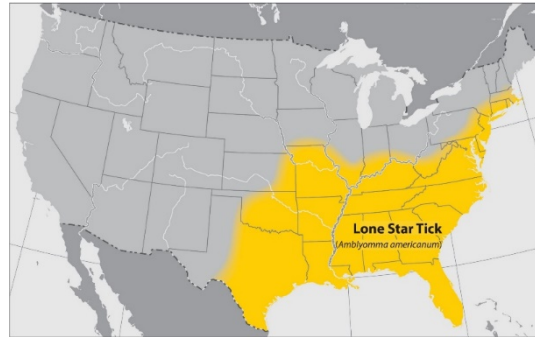
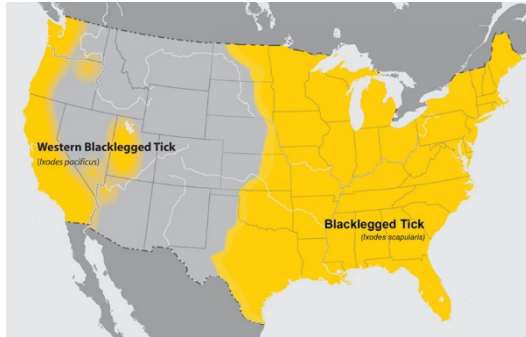
- **Provide actionable, evidence-based information to clinicians, the public, and policy-makers**
 - Tracking changes in tick distribution, abundance
 - Detecting which pathogens are present in ticks and quantifying prevalence
 - Identifying when ticks are active
- **Explain and predict epidemiological trends**
 - Rarity of Lyme disease in the south, despite presence of the vector
 - Risk of exposure to agents of tickborne diseases that are not notifiable
 - Predicting future expansion of ticks and tickborne disease cases

Ticks of Public Health Significance

- **Frequent human biters**
- **Capable of:**
 - Acquiring human pathogens during blood feeding on zoonotic hosts
 - Maintaining infection between life stages
 - Transmitting pathogens through a tick bite
- **Of more than 80 species of ticks described in the U.S., roughly a dozen are ticks of public health significance**



Range Maps of Ticks that Bite Humans in the U.S.



Three Species as Vectors of Majority of Human Diseases

Lyme disease

Anaplasmosis

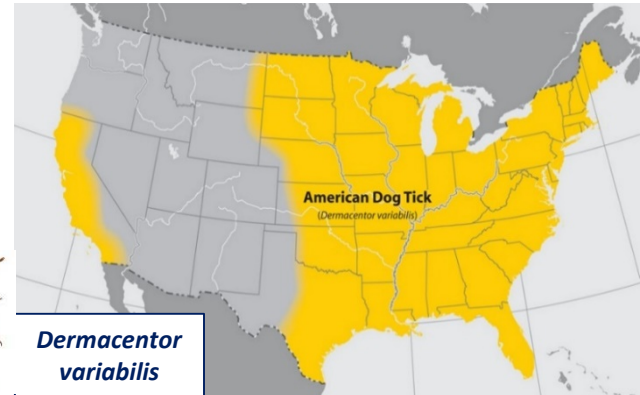
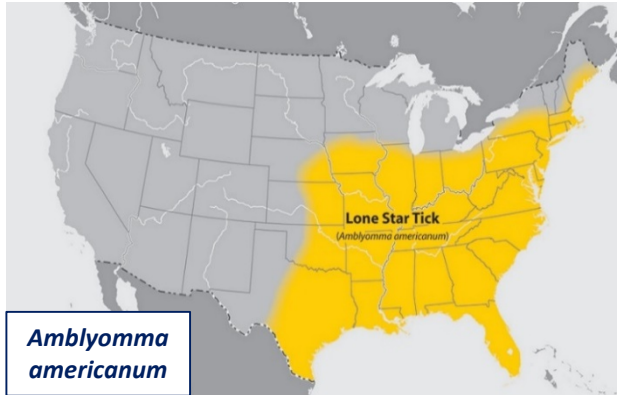
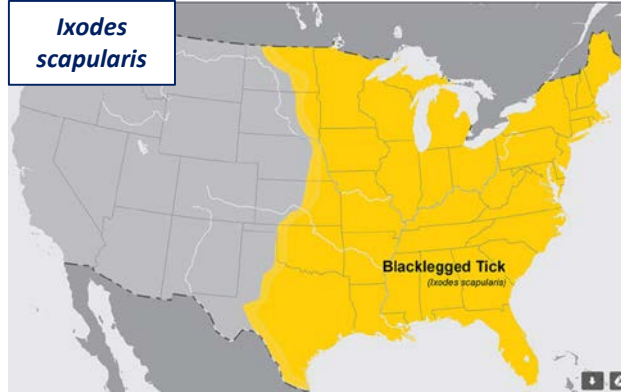
Babesiosis

Borrelia miyamotoi disease

Powassan disease

Ehrlichiosis (*E. muris*
euclairensis)

Ixodes
scapularis



Ehrlichiosis; Heartland virus disease; Tularemia

Rocky Mountain spotted fever; Tularemia

CDC Goals for Tick Surveillance

- **Update species distribution maps (reported and established counties)**
- **Define which pathogens are present in ticks and at what prevalence**
- **Assess regional differences in the density of host-seeking infected ticks**

Challenges of Lyme Disease Surveillance

Lyme Disease Surveillance Challenges Vary by Jurisdiction

- **Valuable information generated in low-incidence and emerging jurisdictions**
 - Investigation to understand local risk and associated messaging
 - Evidence-based information dissemination
- **Contrasting utility in many high-incidence jurisdictions**
 - LD occurs in the same places year after year: the risk is well understood
 - Case counts generate minimal new public health action
 - Clinical and public educational activities and outreach happen to the extent resources allow

CDC Is Exploring a Broad Concept of Lyme Disease Surveillance

- **Traditional passive public health surveillance**
- **Novel data streams to assess the frequency, geographic distribution, and clinical manifestations of diagnosed Lyme disease**
 - Medical insurance claims data
 - Advanced molecular detection of pathogens in human specimens
 - Syndromic surveillance
 - Systematic tick surveillance

Opportunities for Local Outreach and Education

- **Academic institutions**
- **Schools and health educators**
- **Commercial entities**
- **Special interest groups**

New CDC Resources:

Updated NACCHO Lyme Disease Toolkit

NACCHO Toolbox: Lyme Disease Toolkit



NACCHO Lyme Disease Toolkit

- **Info-sheets: What to do after a tick bite**
- **Tick surveillance guidance**
 - *Ixodes scapularis*
 - *Ixodes pacificus*
- **Scripted presentations**
 - Tickborne disease prevention & Lyme disease
 - Lyme disease surveillance in low incidence states: A resource for health departments

<http://toolbox.naccho.org/>
Search “Lyme disease”

Tick Surveillance Guidance



Surveillance for *Ixodes scapularis* and pathogens found in this tick species in the United States

Table of Contents

Contributors and Reviewers	4
Intended Audience and Objectives	4
Public Health Importance of <i>Ixodes scapularis</i>	5
Life Cycle of <i>Ixodes scapularis</i>	8
Tick Surveillance Objectives	9
Classify County Status for <i>Ixodes scapularis</i>	10
Identify Presence and Prevalence of Human Pathogens in <i>Ixodes scapularis</i> Ticks	10
Estimate the Density of Host-Seeking (Infected) <i>Ixodes scapularis</i> Ticks	11
Document Host-Seeking Phenology of <i>Ixodes scapularis</i> Ticks	12
Tick Collection Methods	13
Drag Sampling or Flagging	13
Background and methods	13
Acceptable to use to address the following key surveillance objectives:	14

Scripted Presentations

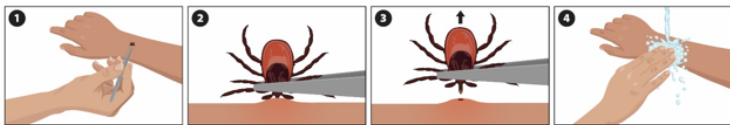
- **Tickborne disease prevention & Lyme disease**
 - 40-slide deck with script
 - For use in local presentations and outreach
- **Lyme disease surveillance in low incidence jurisdictions**
 - 40-slide deck with script
 - For training epidemiologists and disease investigators

Handouts

Tick Bite: What to Do

1. Remove the tick as soon as possible

1. Use fine-tipped tweezers to grasp the tick as close to the skin as you can.
2. Pull upward with steady, even pressure. Don't twist or jerk the tick.
3. After removing the tick, clean the bite area and your hands with rubbing alcohol or soap and water.
4. Dispose of the tick by flushing it down the toilet. If you would like to bring the tick to your healthcare provider for identification, put it in rubbing alcohol or place it in a sealed bag/container.



2. Consider calling your healthcare provider

In general, CDC does not recommend taking antibiotics after tick bites to prevent tickborne diseases. However, in certain circumstances, a single dose of doxycycline after a tick bite may lower your risk of Lyme disease. Consider talking to your healthcare provider if you live in an area where Lyme disease is common.

3. Watch for symptoms for 30 days

Call your healthcare provider if you get any of the following:

- Rash
- Fever
- Fatigue
- Headache
- Muscle pain
- Joint swelling and pain

Treatment for tickborne diseases should be based on symptoms, history of exposure to ticks, and in some cases, blood test results. Most tickborne diseases can be treated with antibiotics.

Common questions after a tick bite

Should I get my tick tested for germs?

Some companies offer to test ticks for specific germs. CDC strongly discourages using results from these tests when deciding whether to use antibiotics after a tick bite.

- Results may not be reliable. Laboratories that test ticks are not required to meet the same quality standards as laboratories used by clinics or hospitals for patient care.
- Positive results can be misleading. Even if a tick contains a germ, it does not mean that you have been infected by that germ.
- Negative results can also be misleading. You might have been bitten unknowingly by a different infected tick.

Tick testing for germs can be expensive. Your money might be better spent on tick bite prevention efforts, including insect repellents and permethrin-treated clothing.

Can I get sick from a tick that is crawling on me but has not yet attached?

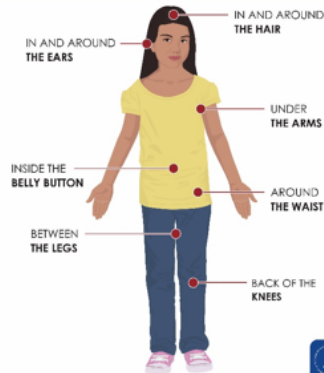
Ticks must bite you to spread their germs. A tick that is crawling on you but not attached or full of blood could not have spread germs. However, if you have found a tick crawling on you, it's a sign there may be others: do a careful tick check.

How long does a tick need to be attached before it can spread infection?

Depending on the type of tick and germ, a tick needs to be attached to you for different amounts of time (minutes to days) to infect you with that germ.

Your risk for Lyme disease is very low if a tick has been attached for fewer than 36 hours. Check for ticks daily and remove them as soon as possible.

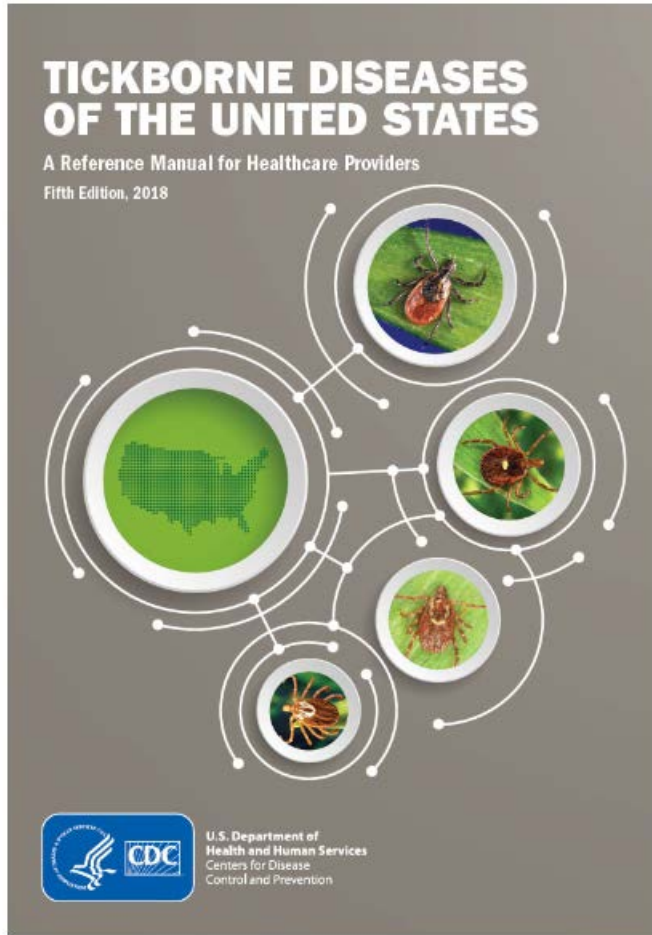
WHERE TO CHECK FOR TICKS



C129305-A

Other CDC Resources: www.cdc.gov/ticks

Reference Manual for Healthcare Providers



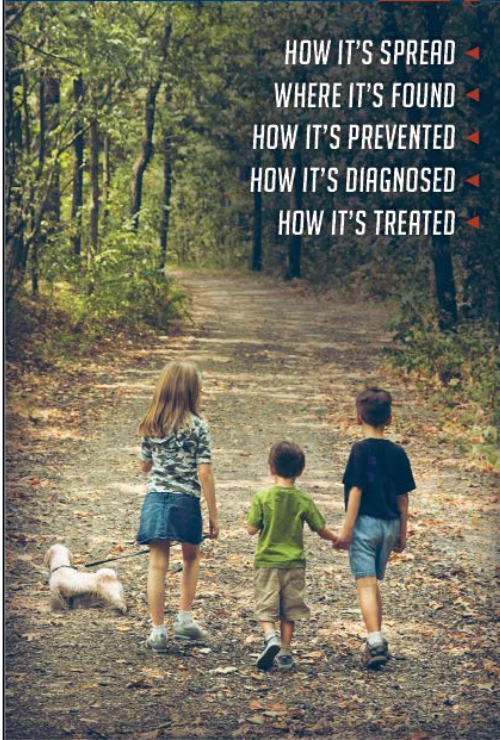
<http://toolbox.naccho.org/>

Search “tick”

www.cdc.gov/ticks

LYME DISEASE: WHAT YOU NEED TO KNOW

- HOW IT'S SPREAD ▶
- WHERE IT'S FOUND ▶
- HOW IT'S PREVENTED ▶
- HOW IT'S DIAGNOSED ▶
- HOW IT'S TREATED ▶

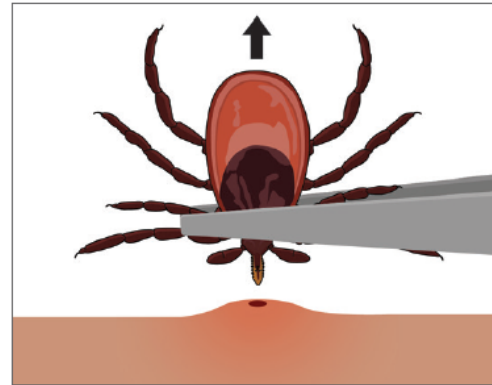
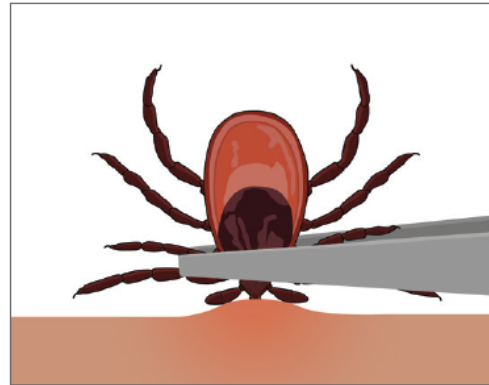


U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

Lyme Disease Brochure

TICK REMOVAL

Grasp the tick firmly and as close to the skin as possible. With a steady motion, pull the tick's body away from the skin. Do not be alarmed if the tick's mouthparts remain in the skin. Cleanse the area with rubbing alcohol or soap and water.



<https://www.cdc.gov/lyme/toolkit>

Trail Sign



PREVENT TICK BITES!

- **WEAR REPELLENT**
- **CHECK FOR TICKS DAILY**
- **SHOWER SOON AFTER
BEING OUTDOORS**
- **CALL YOUR DOCTOR IF YOU
GET A FEVER OR RASH**

For more information: www.cdc.gov/ticks



Centers for Disease
Control and Prevention
National Center for Emerging and
Zoonotic Infectious Diseases

CS270477-A

www.cdc.gov/ticks



**For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348
www.cdc.gov**

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.