

Tick-Borne Disease in Maine

Good Health is Good Business Conference Series

Topics:

- The changing landscape of tick-borne disease in Maine
- Prevention recommendations
- Signs, symptoms, and treatment
- What should employers consider as it relates to work injury





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Legal Disclosure:

The information presented in this session is provided for educational purposes only and is not meant to substitute professional or medical judgment.

Northern Light Health does not know the particulars of your situation, so the information presented today is intended to be general in nature and may not apply to every individual situation.

Northern Light Health and the presenters make no guarantees or warranties regarding any information provided.

Ask us questions – give us feedback – this hour is for you

- Please use the **Q and A** function to ask your questions at anytime.

1. I am able to apply the tools and guidance provided today to support my workplace and/or employees.*

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

2. The information provided today was easy to understand and relevant.*

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

3. How likely are you to recommend the Good Health is Good Business conference series to a fellow colleague and / or Maine employer?*

- Very Likely
- Likely
- Neutral
- Unlikely
- Very Unlikely

4. How likely are you to attend one of our Good Health is Good Business zoom conferences in the future?*

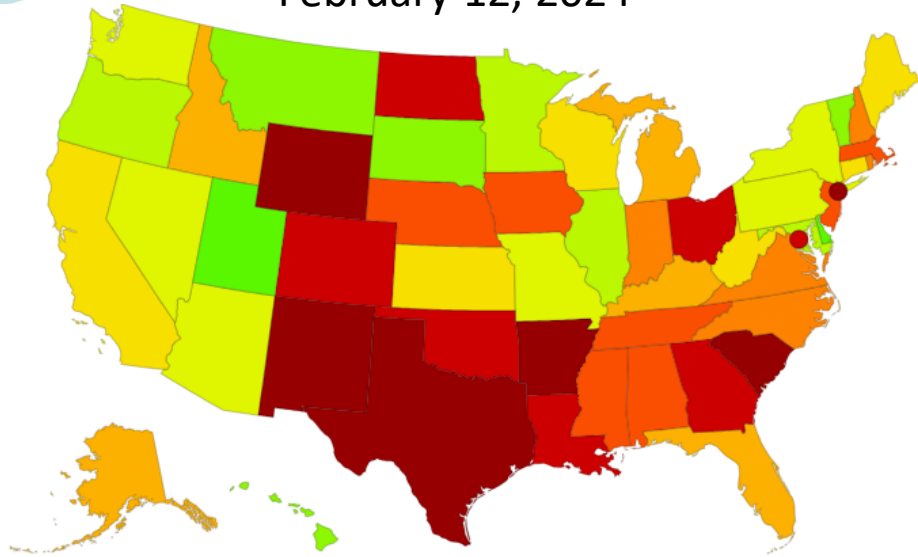
- Very Likely
- Likely
- Neutral
- Unlikely
- Very Unlikely

5. What topic(s) would you like us to focus on in the future?

Health in the Headlines

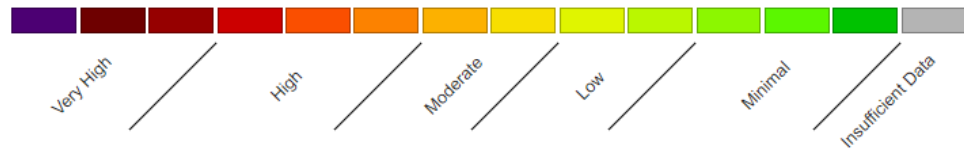
Respiratory Illness Tracker

February 12, 2024

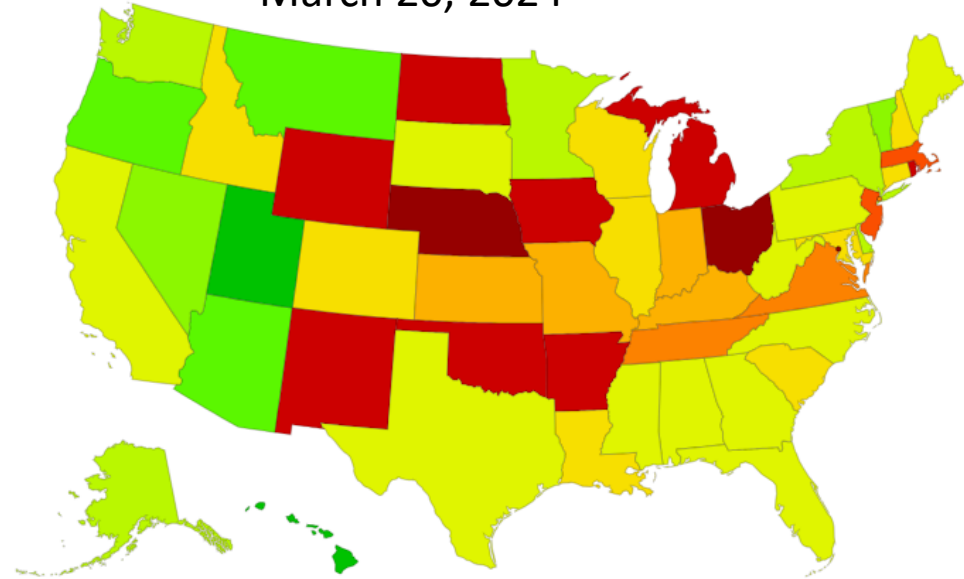


Territories **PR** **VI**

Respiratory Illness Activity Level



March 20, 2024



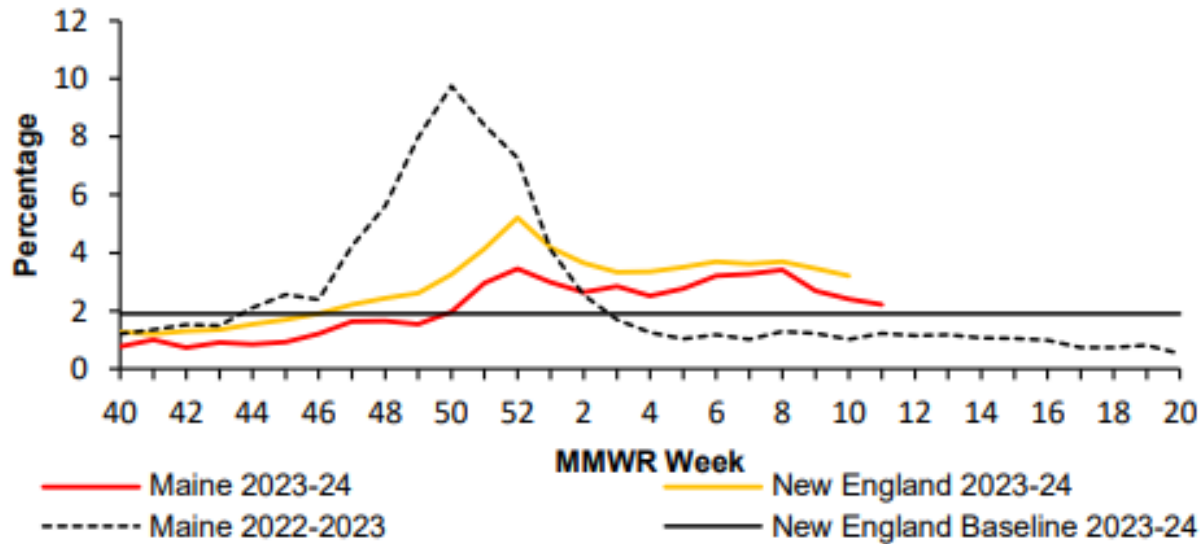
Territories **PR** **VI**

Respiratory Illness Activity Level

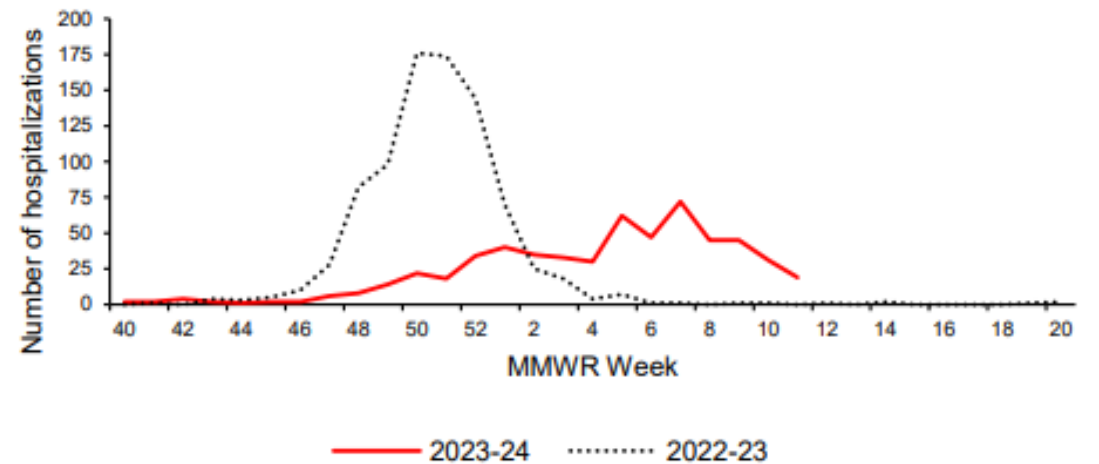


Influenza-Like Illness in Maine

Outpatient Visits for ILI –ILINet, Maine, 2022-24



Influenza Hospitalizations – Maine, 2022-24



New Information on COVID-Vaccines

CDC Summary of recent changes (last updated March 1, 2024):

All people ages 65 years and older should receive 1 additional dose of any updated (2023–2024 Formula) COVID-19 vaccine (i.e., Moderna, Novavax, Pfizer-BioNTech).

Study Published in Heart showed those who are up to date with COVID vaccination but were infected with the virus had:

A 55% decreased risk in heart failure and a 78% decreased risk of blood clots

This was most significant for the 30 days following the vaccine, but benefits lasted up to a year.

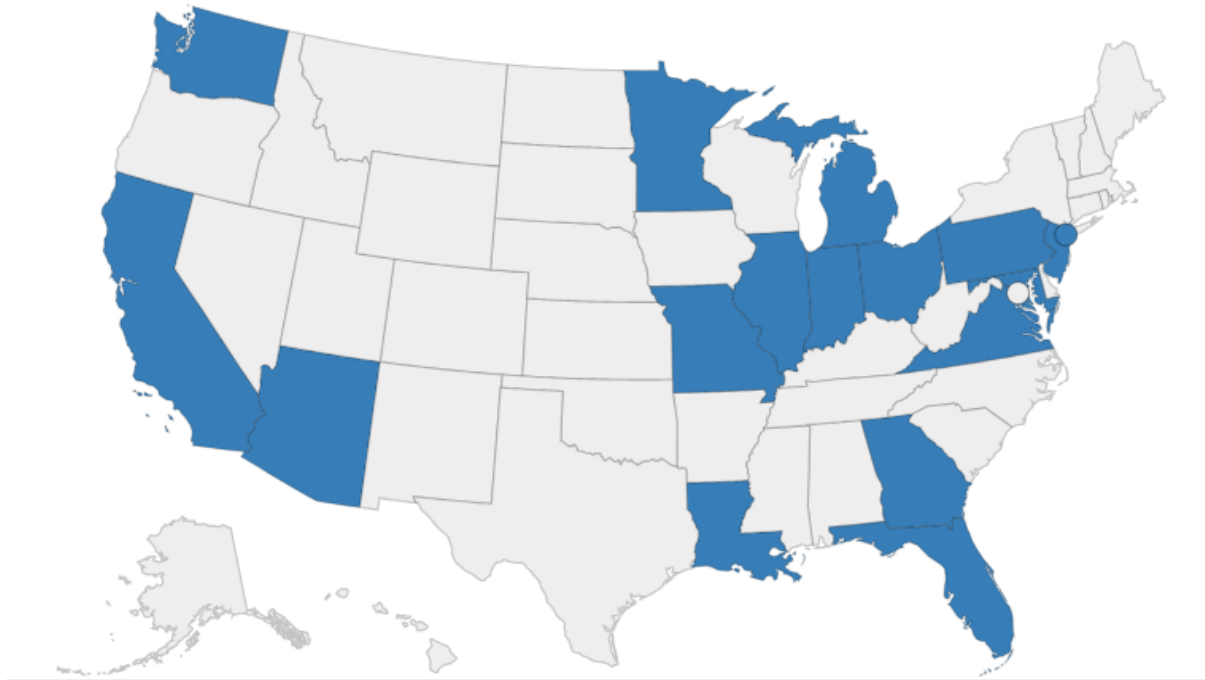
A study in JAMA found no evidence that mRNA vaccines against COVID caused an increased risk in stroke

This follows widely reported concerns based on earlier signal analysis reports of vaccine side effects.

Measles in America

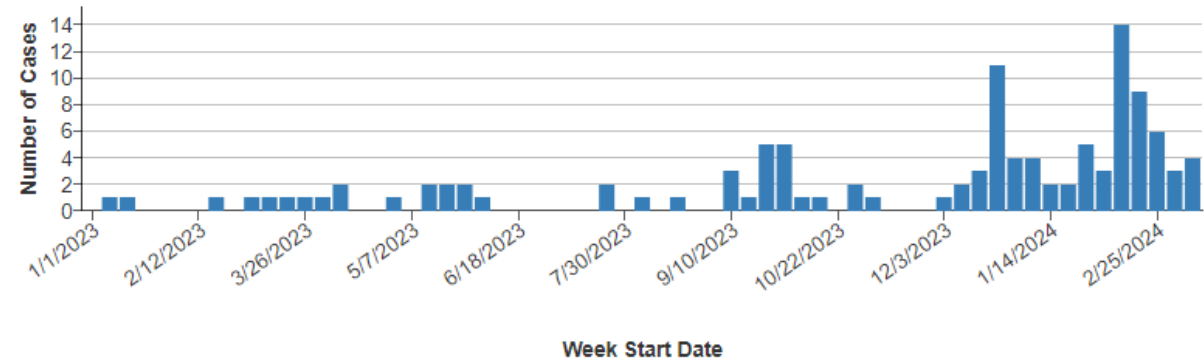
Jurisdictions Reporting Cases in 2024

As of March 14, 2024



Number of measles cases reported by week

2023-2024* (as of March 14, 2024)



Tick-borne Diseases – Maine 2024

Maine Center for Disease Control and Prevention
& the MaineHealth Institute for Research

Charles Lubelczyk, BS, MPH



MaineHealth | Institute for Research
Vector-borne Disease Laboratory 

What are ticks?

- Ticks are arachnids, related to spiders and mites
 - >850 species worldwide
 - Approximately 90 species in the US
 - Only a handful of species bite and transmit disease to people
- Found worldwide
- Existed at least 99 million years ago (early Cretaceous period – biting dinosaurs?)



What do ticks look like?

Capitulum
(mouthparts)

Legs

Scutum
(Dorsal Shield)

Abdomen

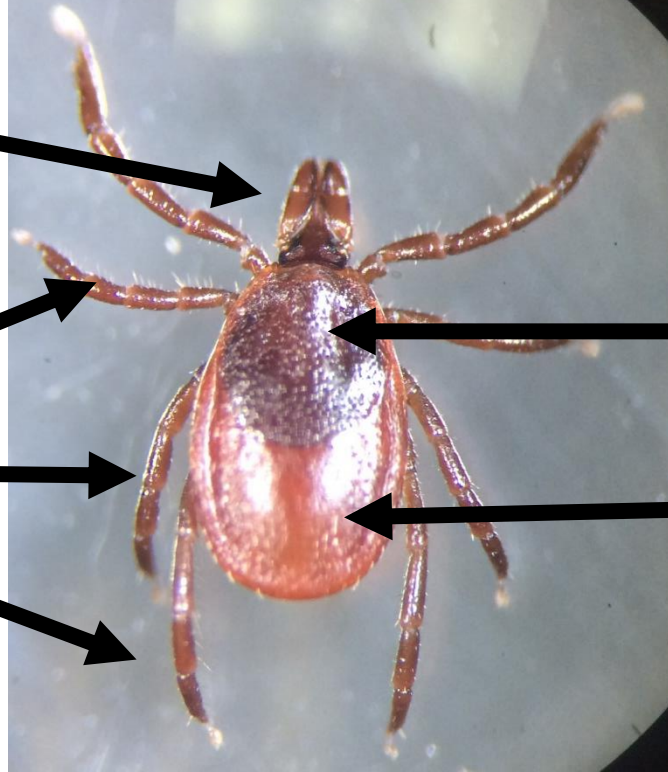
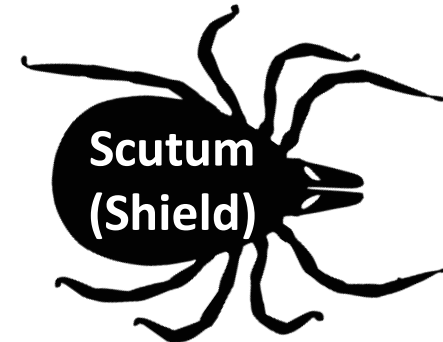
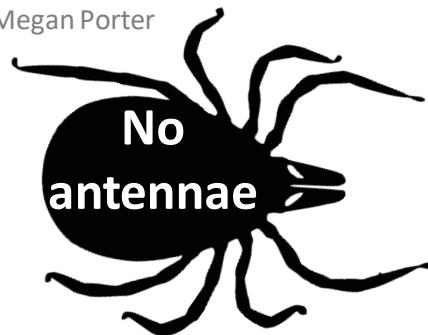


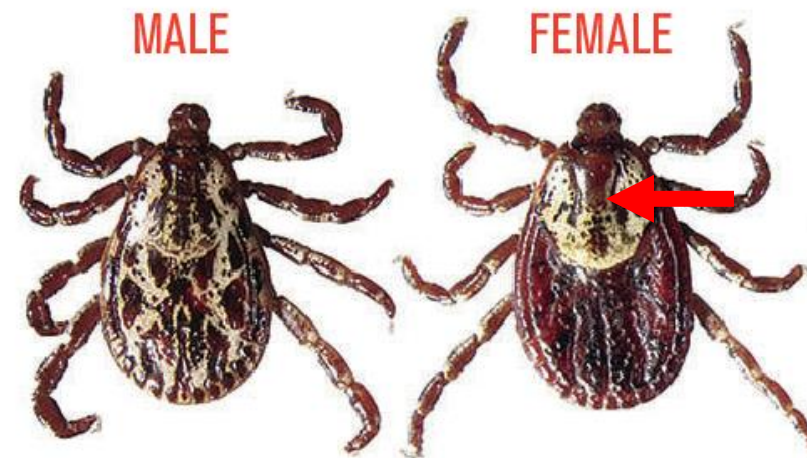
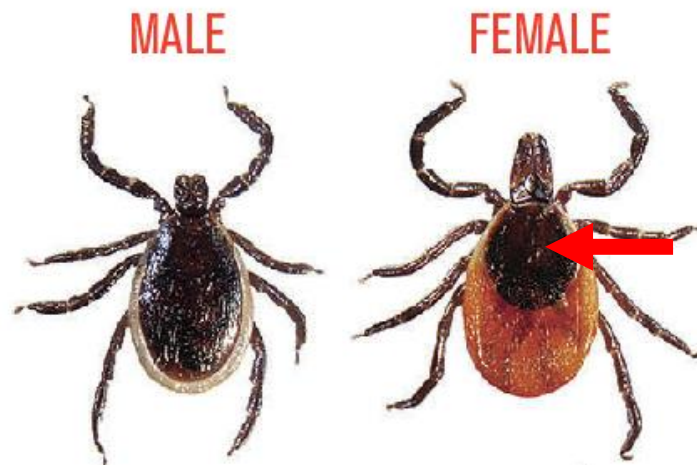
Photo Credit: Megan Porter



Male vs. Female

DEERTICK

AMERICAN DOGTICK



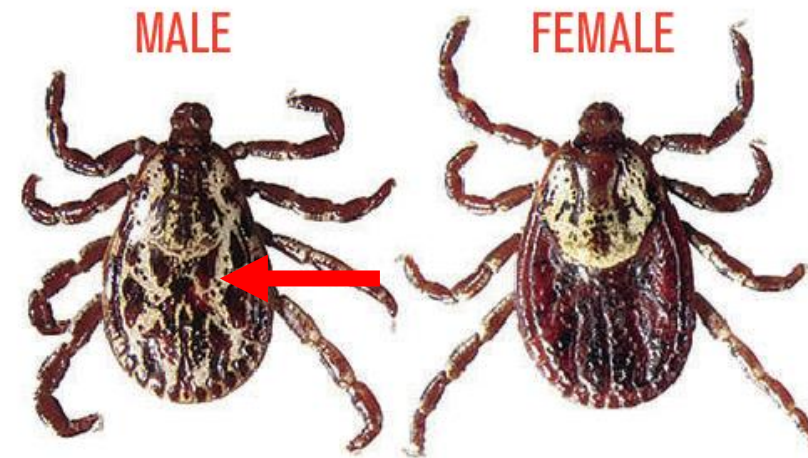
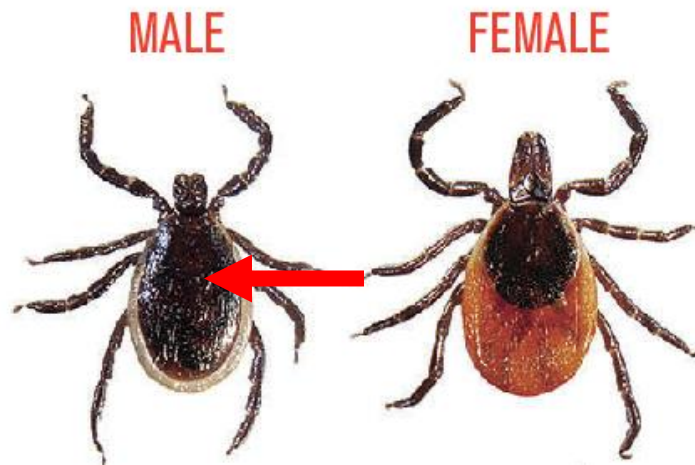
Female

- Short scutum (shield) behind head.
- The rest of the abdomen is left free to expand with blood.

Male vs. Female

DEERTICK

AMERICAN DOGTICK



Male

- Scutum (shield) covers entire back.
- Some ticks have lots of decoration here.

Photo Credit: Griffin Dill

What about the “big” ticks?

As a tick feeds,
it can swell

UP
TO **10X**

its body size.

Check the color and pattern on the **shield** (scutum) behind the head to help identify your tick - this never changes in size.



How do ticks bite?

Long feeding time

- Up to 10 days

Barbed hypostome

- Has arrow-like teeth that help keep the tick in place under the skin
- Only part of the tick that is in the host body

Chemicals in saliva help with feeding

- Anesthesia: makes bite painless
- Anticoagulant: prevents blood from clotting



Photo Credit: Megan Porter

Photo Credit: MicroAngela

How do ticks move?

Ticks do not fly, jump, or climb trees!



Questing: Ticks use their front two legs to sense when a person or animal is nearby

Ticks will **crawl** to a feeding spot on a person's skin

Video Credit: Megan Porter

Ticks in Maine

**Most
Common:**

MALE

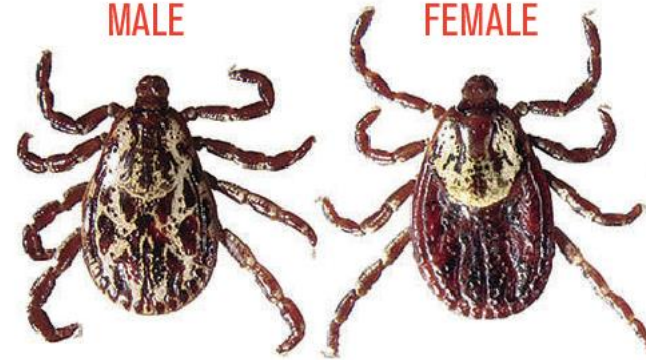
FEMALE



Deer or Blacklegged Tick
Ixodes scapularis

MALE

FEMALE



American Dog Tick
Dermacentor variabilis

**Less
Common:**

Male

Female



Woodchuck Tick
Ixodes cookei

Ticks of Concern



Lone Star Tick
Amblyomma americanum

Photo Credit: US CDC



Asian Longhorn Tick
Haemaphysalis longicornis

Where do deer ticks live?



Deer ticks prefer:

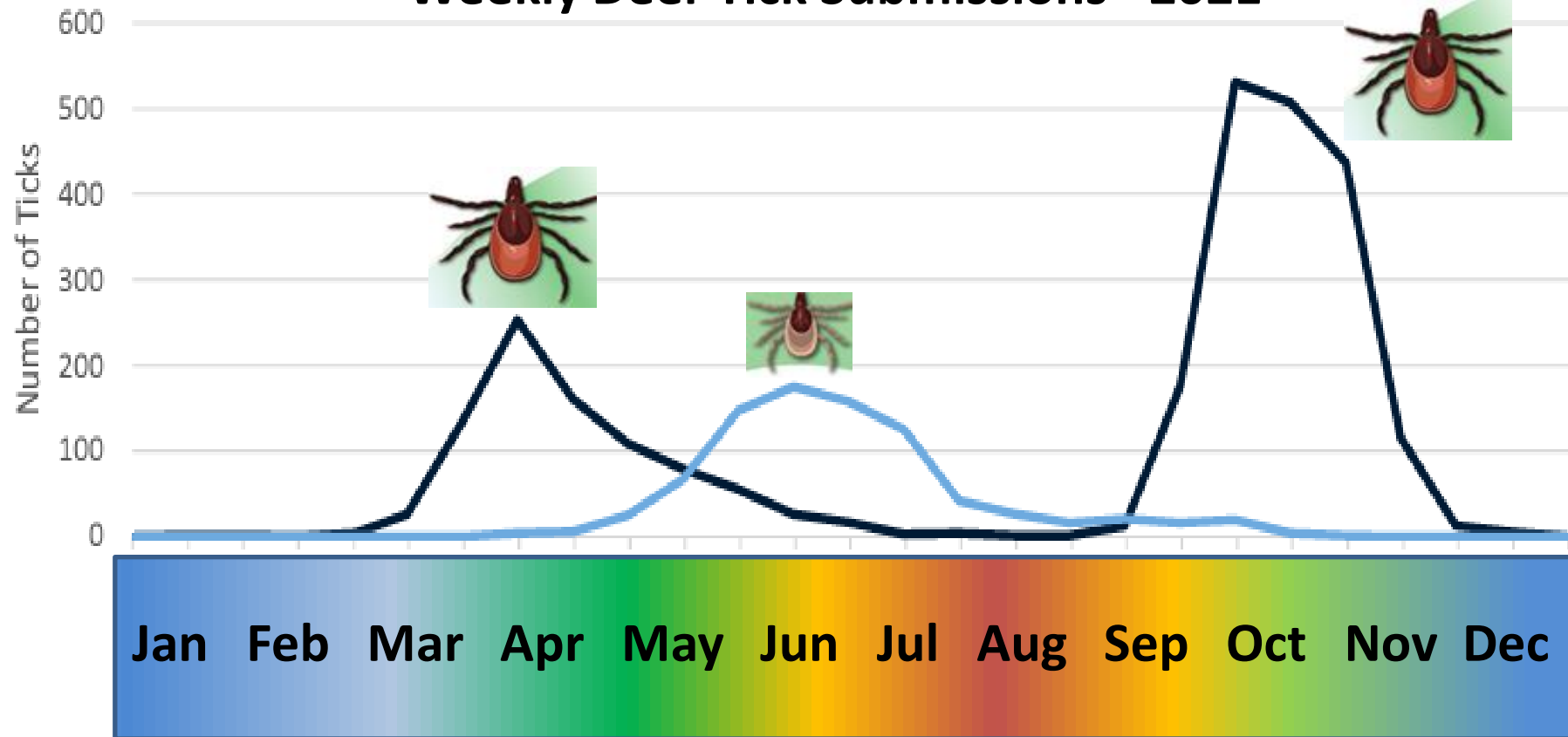
Leafy canopy

Shrubs

Leaf litter

Deer Tick Seasonality




Weekly Deer Tick Submissions - 2021



Information from University of Maine
Cooperative Extension Tick Laboratory,
US CDC

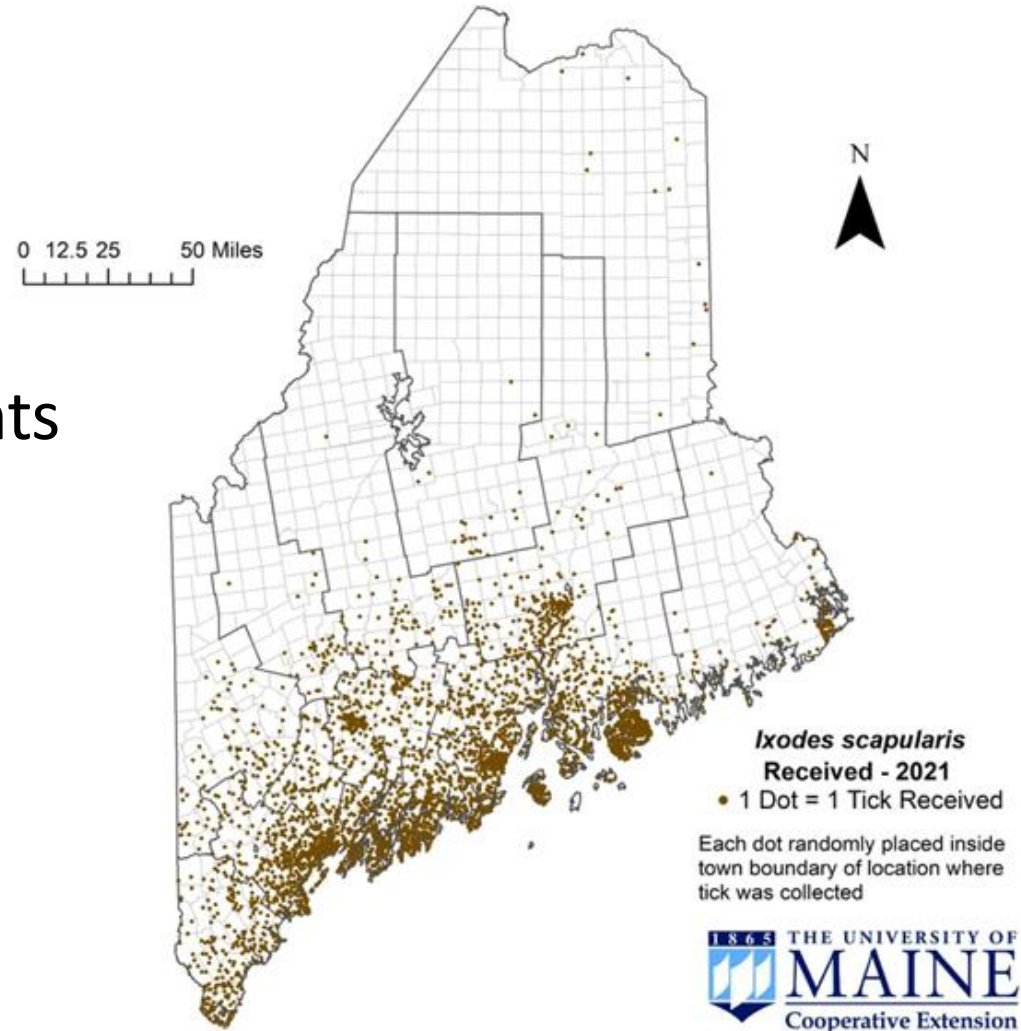
— Adults — Nymphs

Tick Ecology

	Deer Tick 	Dog Tick 	Woodchuck Tick 
Habitat	<ul style="list-style-type: none"> Mixed forests Woodland edges Suburban landscapes 	<ul style="list-style-type: none"> Open fields Lawns Forested areas 	<ul style="list-style-type: none"> In and around the dens/nests of their hosts
Activity	Can be active any time temperature above freezing	April to August	Summer months
Peak	April or May with another in late October	May and June	July

Deer Tick Distribution in Maine

In 2021, Maine residents submitted deer ticks from every county.



Tickborne Diseases and Climate

Factors that influence tick populations:



Precipitation



Humidity



Temperature
(degree days)



Host populations

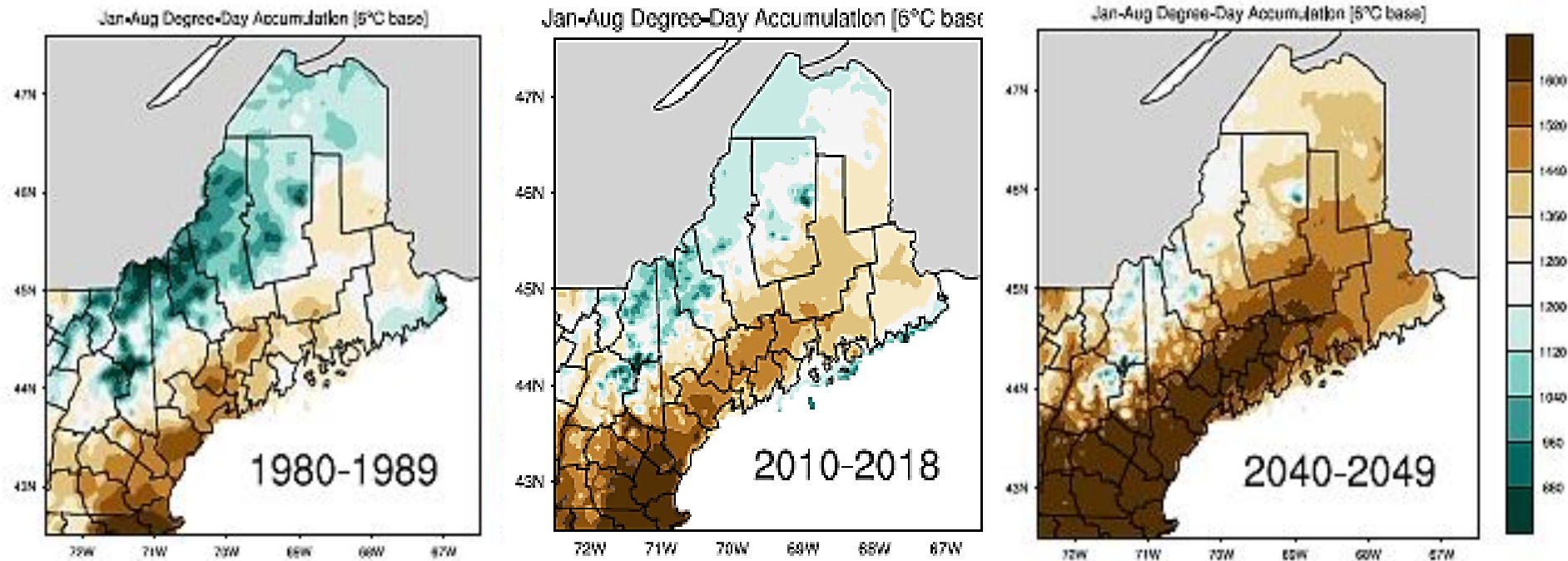


Habitat availability



Photo Credit: US CDC

Degree Days in Maine



Scientific Assessment of Climate Change and Its Effects in Maine. A Report by the Scientific and Technical Subcommittee of the Maine Climate Council. 2020.

Tickborne Diseases in Maine

Common

- Lyme Disease
- Anaplasmosis
- Babesiosis

Rare

- Ehrlichiosis*
- Hard Tick Relapsing Fever (*Borrelia miyamotoi*)
- Powassan encephalitis

* Disease is not normally found in Maine

Potential Threat**

- Spotted Fever Rickettsiosis
- Tularemia
- Heartland Virus

** Possible for disease to emerge in Maine in the future (cases that do occur are often imported from travel)

Tickborne Diseases in Maine



Deer Tick

- Lyme disease
- Anaplasmosis
- Babesiosis
- Hard Tick Relapsing Fever
- Powassan



Dog Tick

- ~~Spotted Fever~~
- ~~Rickettsiosis*~~
- ~~Tularemia*~~

*The pathogens that cause these diseases not found in ticks in Maine



Woodchuck Tick

- Powassan



Lone Star Tick

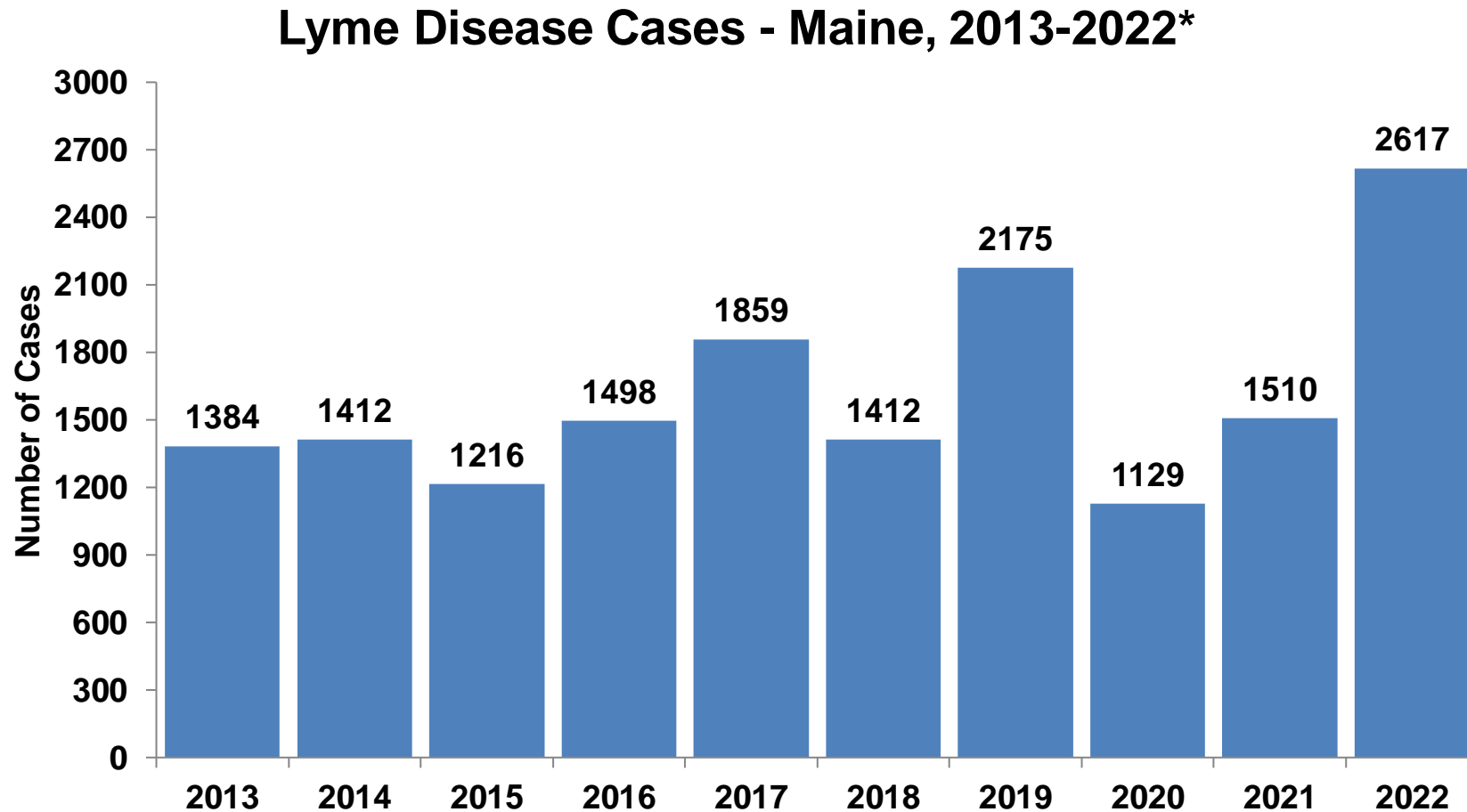
- Ehrlichiosis*
- Tularemia*
- Heartland virus*

Photo Credit: Griffin Dill and US CDC

Distribution of Lyme in United States - 2020



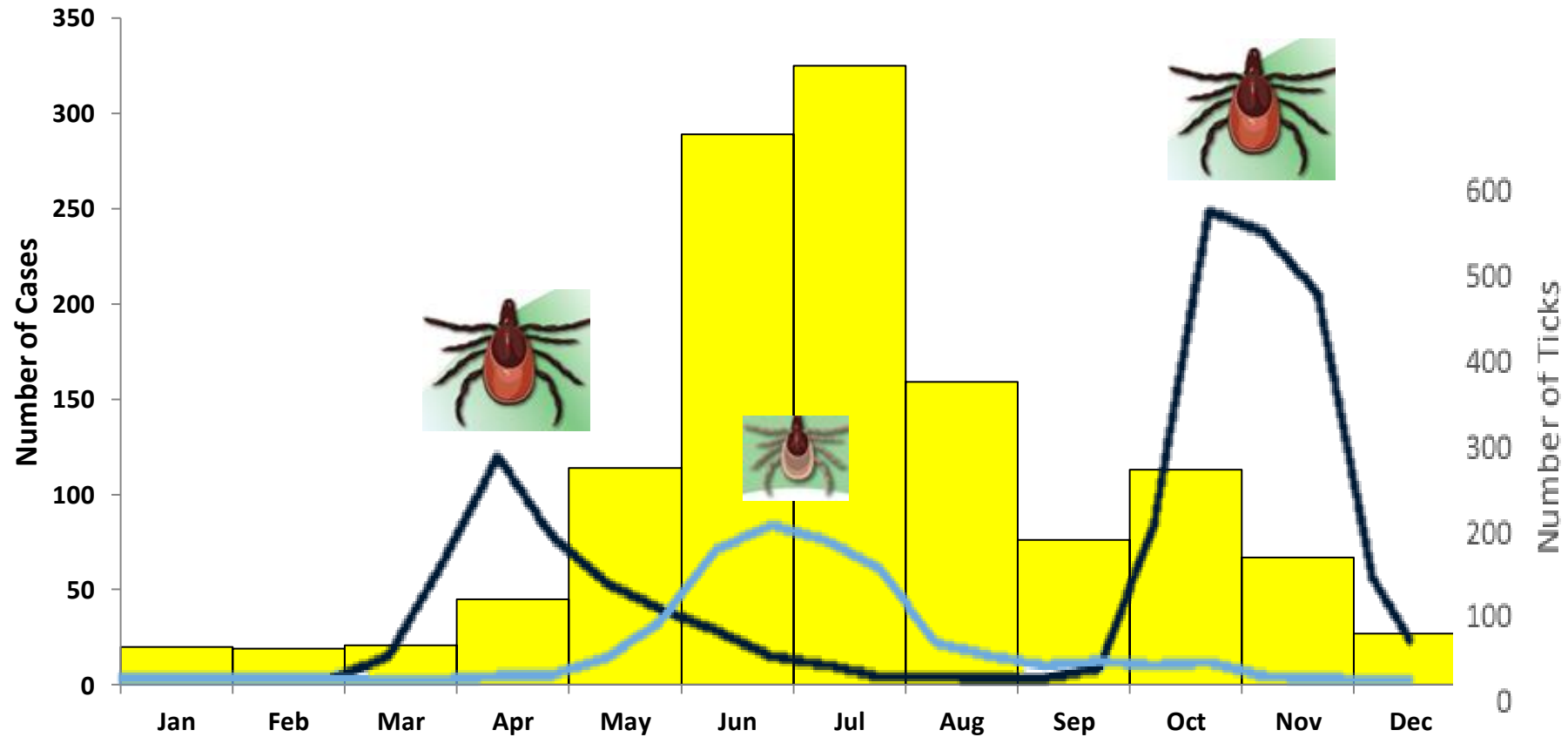
Lyme Disease Cases – Maine, 2013-2022*



*data as of 3/7/2023

Lyme Disease by Onset Month – Maine, 2021

Lyme Disease by Month of Onset - Maine, 2021



Anaplasmosis

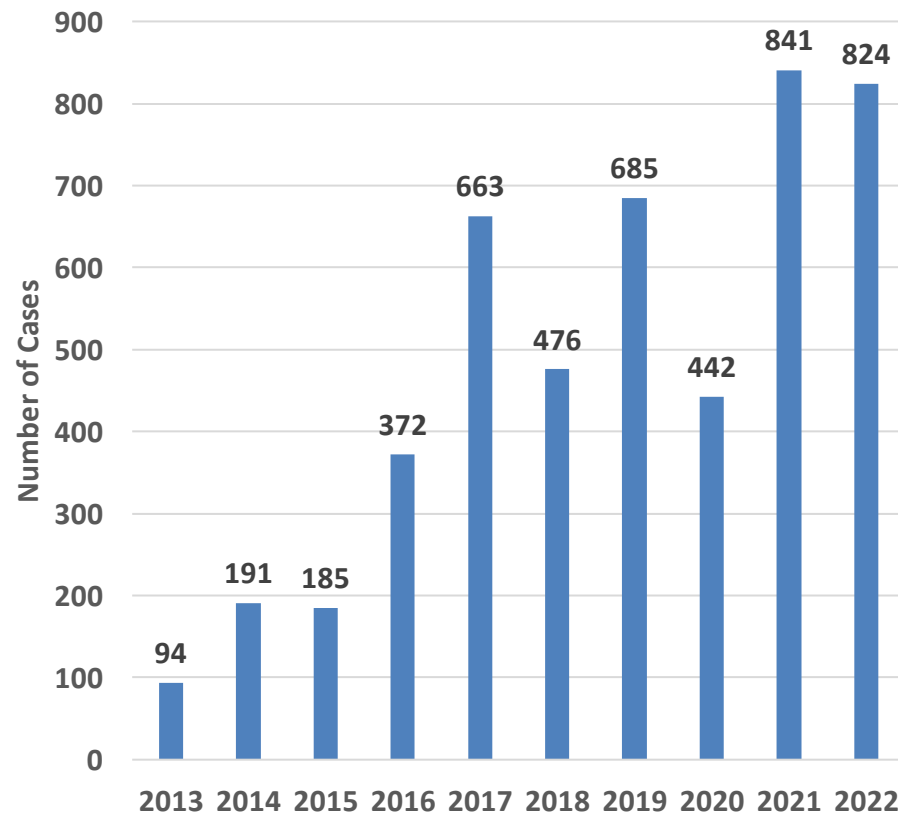


Caused by the bacterium
Anaplasma phagocytophilum

Spreads from infected **deer tick**
within 24 hours during bite

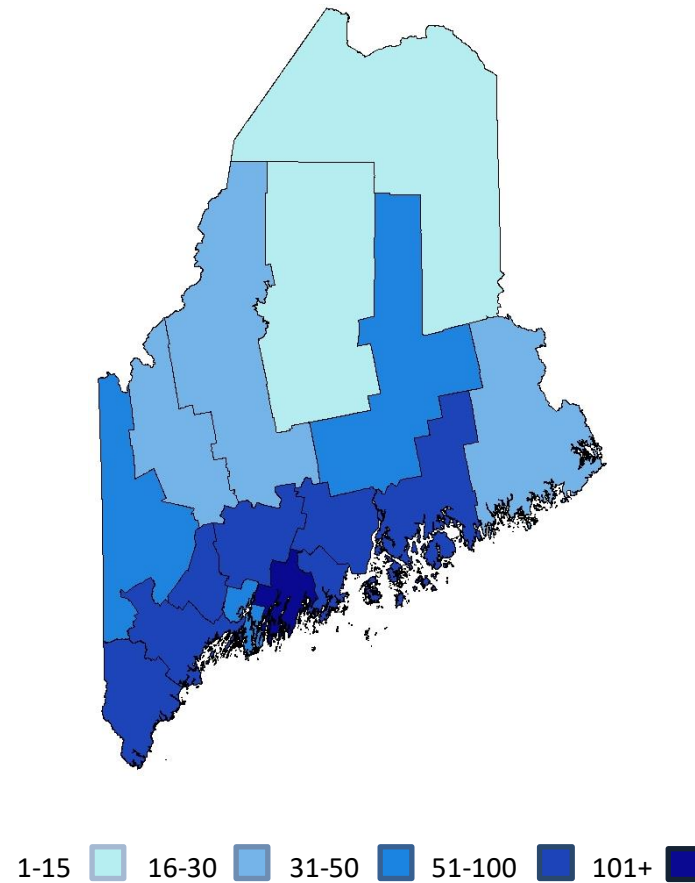
Anaplasmosis in Maine

Anaplasmosis Cases by Year - Maine, 2013-2022*



*data as of 3/8/2023

Anaplasmosis Cases by County – Maine, 2022*



Babesiosis

Caused by *Babesia* species parasites that infect red blood cells

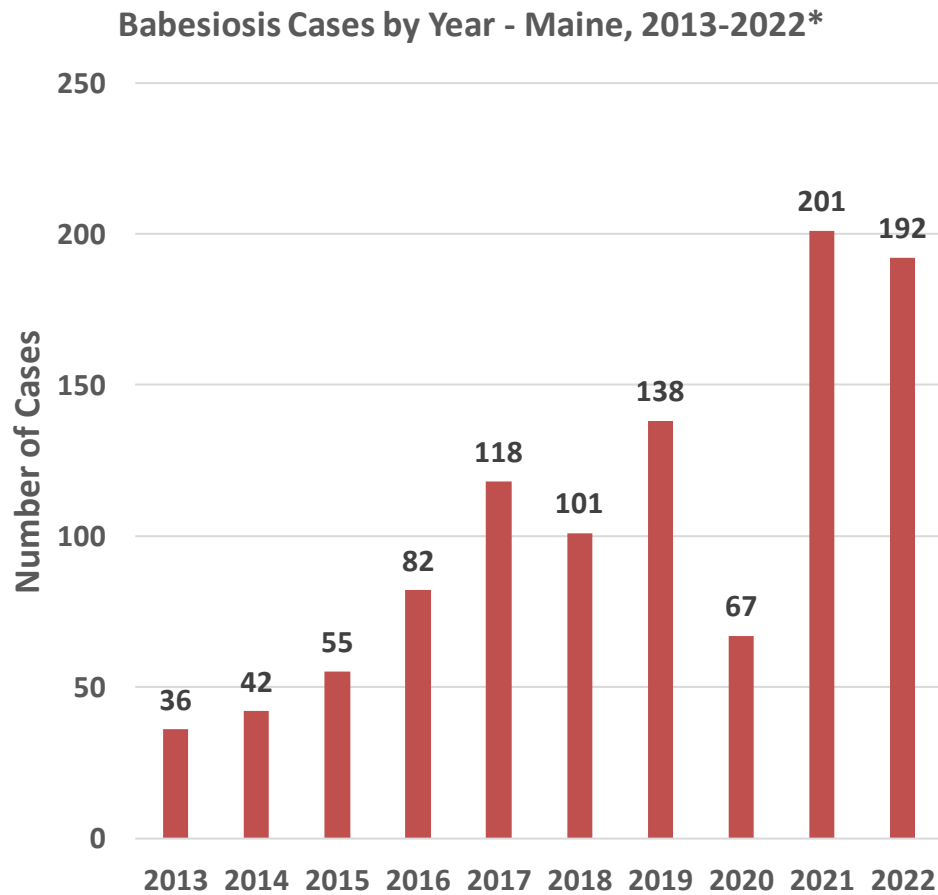
Infected **deer tick** must stay attached for **36-48 hours** to spread this parasite

Can also (rarely) spread through:

- **Contaminated blood transfusions**
- **From mother to child during pregnancy**

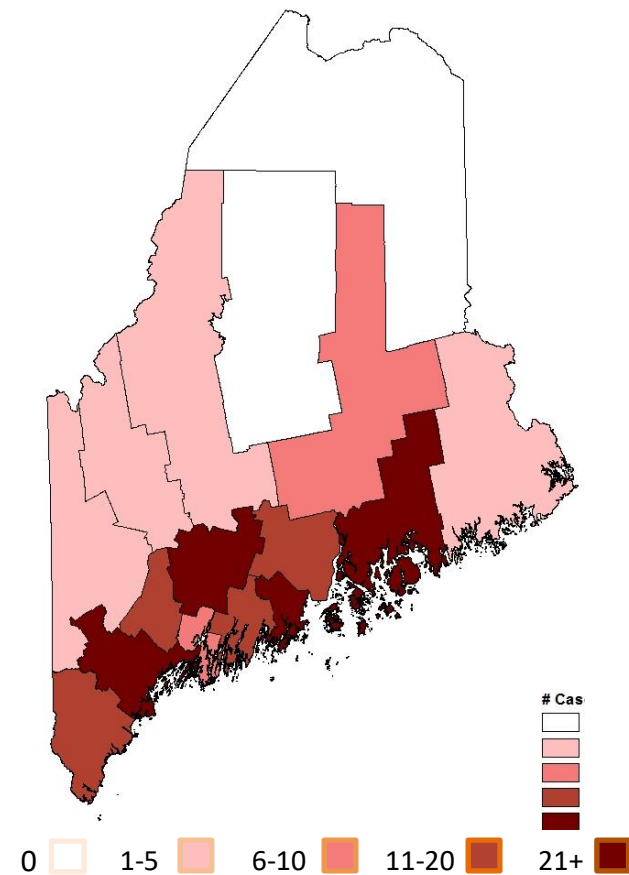


Babesiosis in Maine



*data as of 3/8/2023

Babesiosis Cases by County – Maine, 2022*



Other Tickborne Diseases in Maine

Hard Tick Relapsing Fever (*Borrelia miyamotoi* disease)

- First identified in 1995, first case in Maine 2016
- Symptoms
 - Fever and chills
 - Headache
 - Muscle and joint pain
 - Fatigue (feeling very tired)

2018	2019	2020	2021	2022*
8 cases	12 cases	10 cases	9 cases	12 cases

Other Tickborne Diseases in Maine



Powassan Encephalitis

- Symptoms
 - Fever
 - Headache
 - Nausea/vomiting
 - Body aches
- Severe disease
 - Confusion
 - Swelling of brain (encephalitis)
 - Death
- For those with severe disease:
 - 1 in 10 cases die
 - Half of survivors have permanent brain damage
- At least one case in Maine every year since 2015
 - Record number of cases for a single year in Maine in 2022

2018	2019	2020	2021	2022*
0 cases	1 case	1 case	3 cases	4 cases

Alpha-Gal Syndrome

Type of food allergy to **red meat, milk,** and other products from mammals.

Allergy starts when a **lone star tick bites** a person.

In some people, this triggers an immune system reaction that leads to an allergic reaction.



Photo Credit: US CDC

Alpha-Gal Syndrome

Products that **may contain alpha-gal**:



Red meat, milk, and milk products

Other food products (gelatin, mammal fat products, meat broth/stock/gravy)



Additives, stabilizers, or coatings in some medicines or vaccines

Some medical products (heart valves from pigs or cows, monoclonal antibodies, heparin, some antivenins)

Foods that **do not contain alpha-gal**:

- Poultry, eggs, fish and seafood, fruits and vegetables

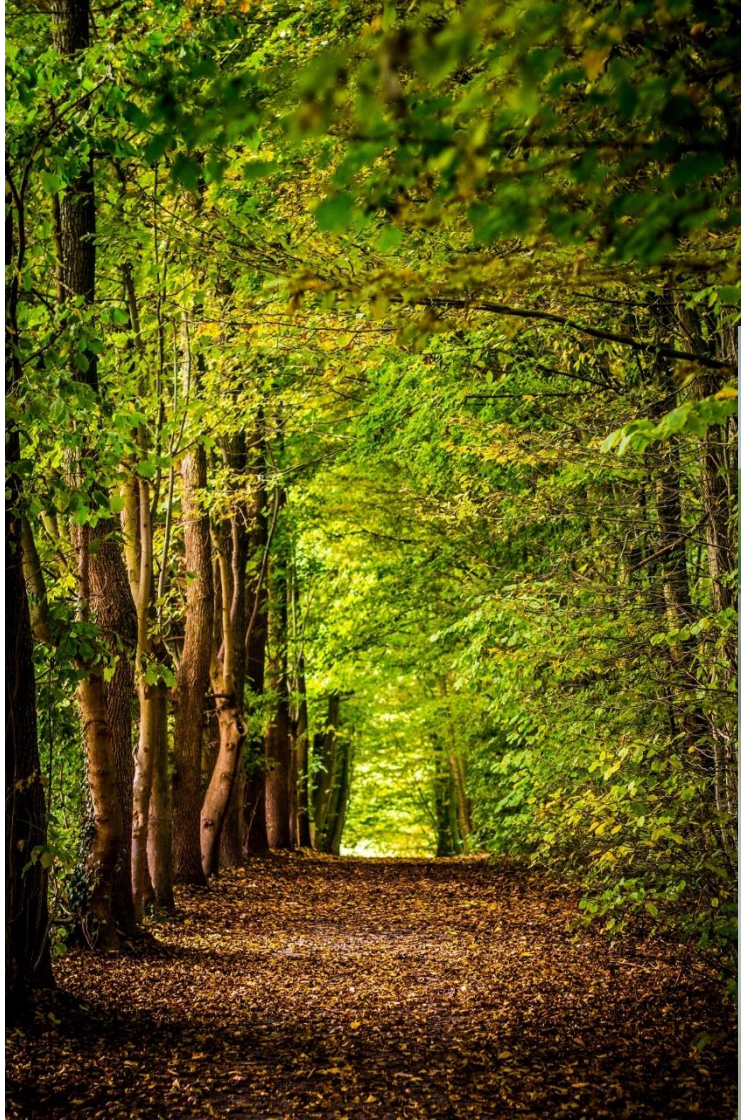
Tick Bite Prevention - Before

- **Wear protective clothing**
 - Light colored (white/khaki)
 - Long sleeves and pants
 - Close-toed shoes
 - Tuck pants into socks
- **Treat clothes with permethrin**
 - Not for use on skin
- **Talk to a veterinarian about tick prevention for pets**
 - Pets can bring ticks inside too



Photo Credit: Maine CDC, Megan Porter

Tick Bite Prevention - During



- Wear EPA-approved repellent
- Know when you are in tick habitat
- Stay on trails
- Check often for ticks



Tick Bite Prevention - After

Check for ticks

- When you come home
- Before going to bed
- Check pets too!

Take a shower

- May wash off unattached ticks
- Helps with tick check

Put clothes in dryer before washing

- On high heat for 10-15 minutes
- Heat kills ticks that are hiding in clothes
- Wash clothes normally after

Ticks look like this:



But their size is more like this:

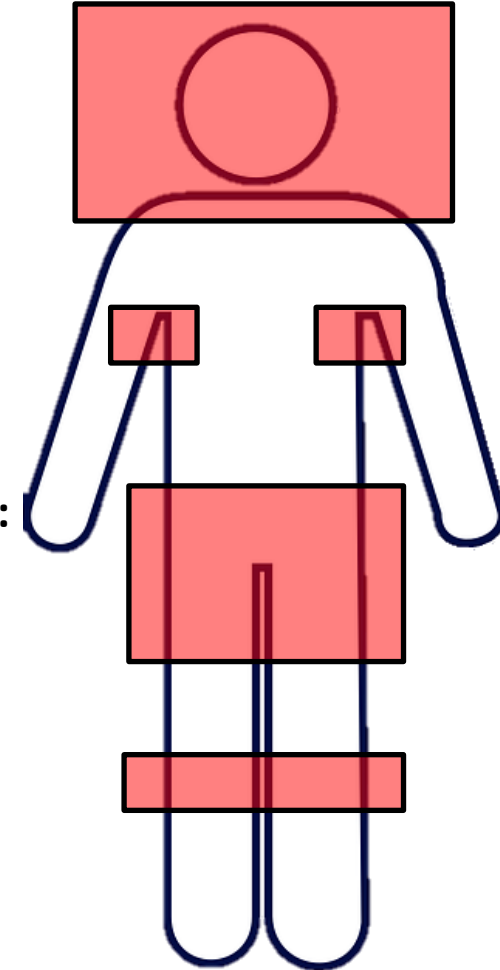
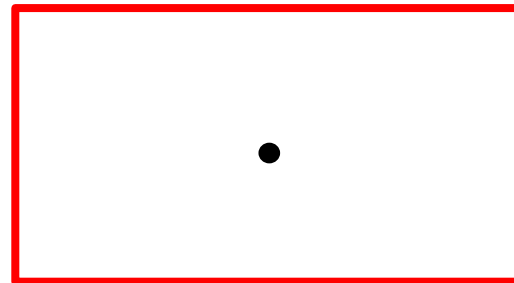


Photo Credit: Griffin Dill

What if you find a tick attached?

Do:

- Stay calm
- Use a tick spoon or fine-tipped tweezers to remove the tick
- Monitor for fever, chills, and other symptoms for 30 days

Do Not:

- Wait to remove the tick
- Use nail polish, matches, petroleum jelly, etc. to remove the tick



Photo Credit: Bieneke Bron

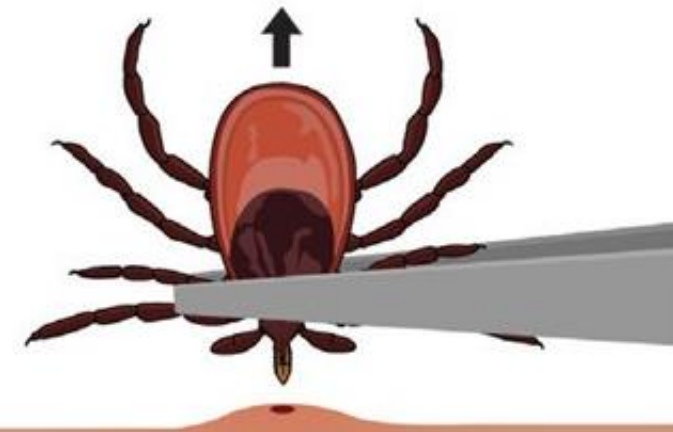
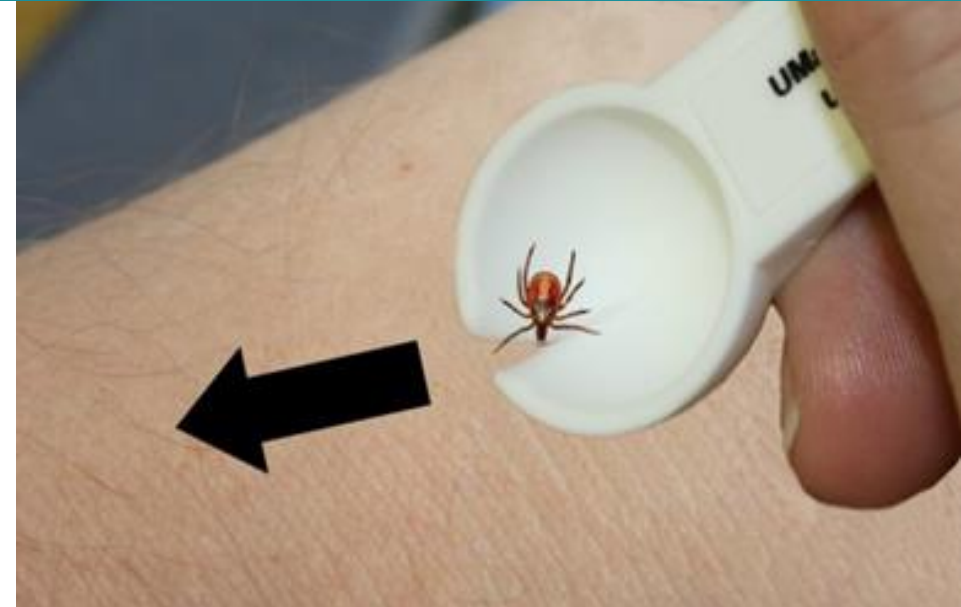
Tick Removal

Tick Spoon:

- Fit notch of spoon around head of tick
- Gently scoop forward with steady pressure

Fine-Tipped Tweezers:

- Grab the tick as close to the skin as possible
- Use firm, steady pressure and pull straight out



What to do with my tick?

Kill and preserve your tick:

- Put tick in a container with rubbing alcohol
- Tick will die and is preserved if you would like to submit for testing

Tick testing:

- University of Maine Cooperative Extension Tick Laboratory
 - Tick identification free of charge
 - Tick testing for \$15 fee (only Maine residents)

www.ticks.umaine.edu



Photo Credit: Megan Porter

Remember: clinical decisions should **NOT** be made based on tick testing services

Make Your Yard Safer

1

Keep the lawn mowed.

2

Keep leaves raked and get rid of leaf piles.

3

Move wood piles away from the house.

4

Move birdfeeders away from house, garden, and yard toys.

5

Create border with crushed stone or woodchips.



For More Information

Maine CDC

- Vectorborne Disease Information: www.maine.gov/dhhs/vectorborne
- Information for Schools: <https://www.maine.gov/dhhs/shm>
- Disease Reporting Consultation Line: 1-800-821-5821
- Disease Reporting Consultation Email: disease.reporting@maine.gov

MaineHealth Institute for Research Vectorborne Disease Lab

- www.mhir.org

University of Maine Cooperative Extension

- www.ticks.umaine.edu



A Tick “TED” Talk

Scott J. Melton, MD, PhD



Tickborne Diseases in Maine



Deer Tick

- Lyme disease
- Anaplasmosis
- Babesiosis
- Hard Tick
- Relapsing Fever
- Powassan



Dog Tick

- Spotted Fever
- Rickettsiosis*
- Tularemia*



Woodchuck Tick

- Powassan



Lone Star Tick

- Ehrlichiosis*
- Tularemia*
- Heartland virus*

Photo Credit: Griffin Dill and US CDC

Lyme Borreliosis



Borrelia burgdorferi

Geographically localized

- *~20-30,000 cases reported annually*
- *95% of cases occur in 14 states*
- *Coastal, lake, and river environs*
 - *New England*
 - *Mid-Atlantic*
 - *Upper Midwest*

Lyme Disease Presentations

Early, localized

Erythema migrans

Early, disseminated

Multiple erythema migrans

Cardiac

Neurologic

Late

Lyme arthritis

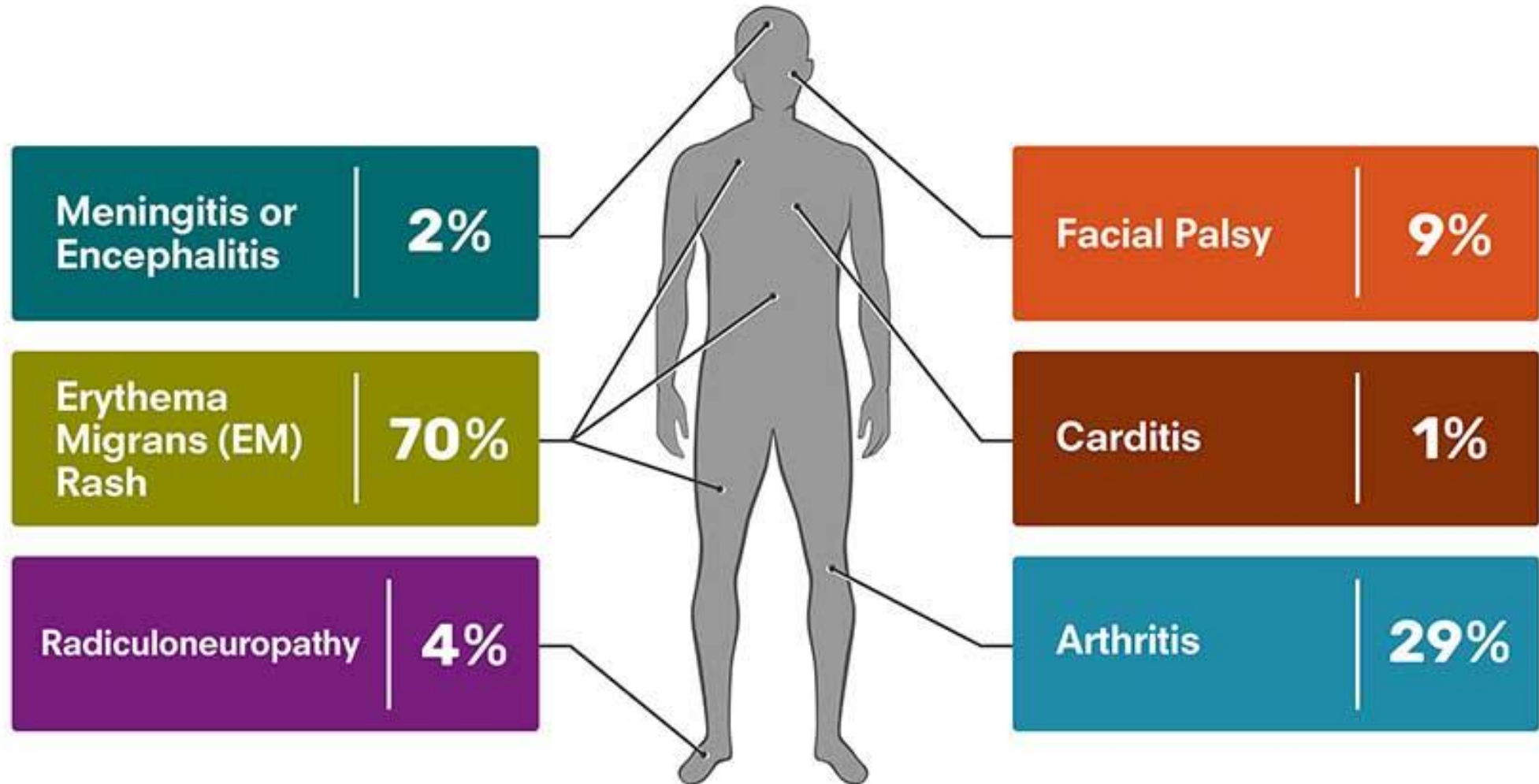
Neurologic (rare)

Dermatologic (Europe)



LYME DISEASE

Relative frequency of clinical features among confirmed cases - United States, 2008-2018



18-year-old male living in suburban Maryland presents to a medical clinic in July complaining of a rash growing to 12 cm, first noted 4 days ago. Otherwise, patient has no symptoms. Patient works as a landscaper, noted a tick bite 10 days ago. Was seen in urgent care and given cephalexin 2 days ago.



shutterstock.com • 1643295511

Early Localized Lyme Disease: Erythema migrans

Classic



Most common



Typical Erythema migrans



Erythema migrans

Primary Lesion: Occurs 3-30 days (average of 7-14d) at site of tick bite

> 5cm = more secure diagnosis

Differential diagnosis includes: cellulitis, tinea, erythema marginatum, tick hypersensitivity reaction

Clinical diagnosis: Characteristic rash + epidemiology + consistent history

- serologic testing at this point is not recommended
- acute serology - 40-70% in early Lyme disease

Most lesions with minimal local symptoms

- around 70% experience flu-like symptoms (fever, headache, myalgias)

Early Localized Lyme Disease: Treatment

Oral Antibiotics

Doxycycline 100 mg for 10 days

Amoxicillin 500 mg for 14 days

Cefuroxime axetil 500 mg for 14 days

Alternative: Azithromycin 500 mg daily for 7 days

Early Disseminated Lyme Disease



Multiple Erythema migrans

often smaller and less red than the primary lesion

Patients are always ill:

- Fever
- Flu-like symptoms
- Headache

Early Neuroborreliosis - Facial Nerve Palsy

Facial nerve palsy occurs in up to 25% of patients with Lyme disease¹

Serology can take 4-6 weeks to turn positive

If untreated, recheck if negative and suspicious

Most would get better without antibiotic therapy²

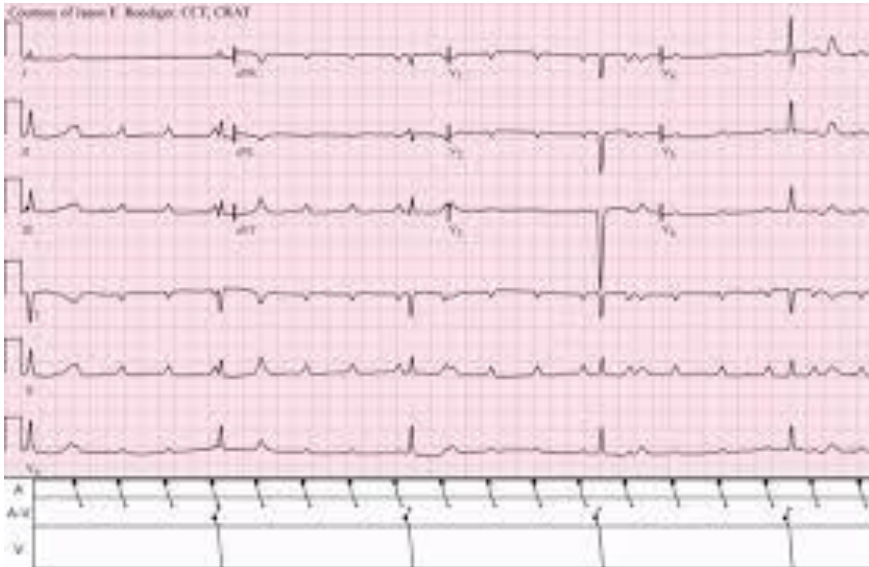
Main role of antibiotics is to prevent later disease



Early, Disseminated Lyme disease- Lyme carditis

19 y/o male collapsed outside of VT college cafeteria

A lacrosse athlete, had not been well for approx. 1 month



Lyme Carditis

1st, 2nd, or 3rd degree block

- may be variable
- third-degree block more often identified since these are usually symptomatic
- May need temporary pacer
- Complete heart block usually resolves within several days of antibiotic, lesser blocks may take weeks.

Lyme Carditis- Treatment

Outpatients can be treated with oral antibiotics such as doxycycline

Hospitalized patients should be treated initially with IV antibiotic, however, can be transitioned to oral antibiotics once there is evidence of clinical improvement

Duration is 14-21 days of total antibiotic therapy.

Late Lyme Disease-Lyme Arthritis

Recurrent mono- or oligo- arthritis

Knee most common

- Large, cool effusions
- Baker's cysts may develop

Other large joints possible as well as TMJ

Affects 50-60% of untreated patients

May remit and recur over weeks to months without antibiotic treatment



Lyme Arthritis Treatment

Initial treatment: Oral antibiotic therapy for 28 days

Partial response: Mild residual joint swelling

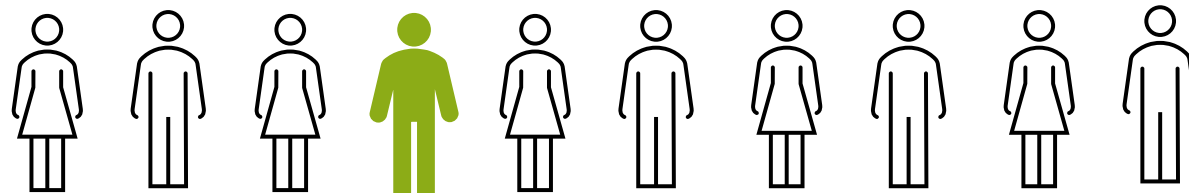
Minimal response: Moderate to severe joint swelling with minimal reduction of the joint effusion

- IV antibiotic for 14 to 28 days

Post-Antibiotic Lyme Arthritis

Approximately 10% of patients do not respond to repeated antibiotic therapy

Thought to be an autoimmune phenomenon



Late Lyme Disease: Neurologic

Encephalopathy:

Objective cognitive dysfunction

Often due to systemic illness, rather than true Central Nervous System infection

Encephalitis: rare

Objective neurological or cognitive dysfunction

White matter changes on MRI or abnormal CSF

CSF typically has lymphocytic pleocytosis and positive Bb Ab

Peripheral neuropathy: rare (controversial)

Pain or paresthesia

Diffuse axonal changes on EMG/NCV

Lyme Disease: Expectations

Time	Symptomatic
Erythema migrans (d0)	73%
3 months	24%
≥ 6 months	11.5% (0-40.8%)
15 years	Equivalent to general population

Wormser, et al. Ann Intern Med 2003; 138:697

Cerar, et al Am J Med 2010; 123:79

Wormser et al. Clin Infect Dis 2015; 61 (2): 244

- Need to manage expectations
- No benefit for additional antibiotics
- Post-infectious syndromes are not unique to Lyme disease

Chronic Lyme Disease

Vague term, often used by some to encompass a broad range of symptoms

Often without a good clinical history or reliable evidence of lyme disease by laboratory testing

Offered as an explanation for chronic fatigue, pain, headaches, brain fog, sleep problems, depression

Often a misdiagnosis of some other legitimate disease such as MS, ALS, autoimmune disorder, Alzheimer's, Autism, Parkinson's

Lyme Disease Prophylaxis

Determine if this is a high-risk bite vs equivocal or low risk bite

High risk defined as:

Within 72 hours

Tick bite was from an identified vector

Occurred in a highly endemic area

Tick was attached for ≥ 36 hours

Otherwise, a “watch and wait” approach is recommended

Lyme Testing

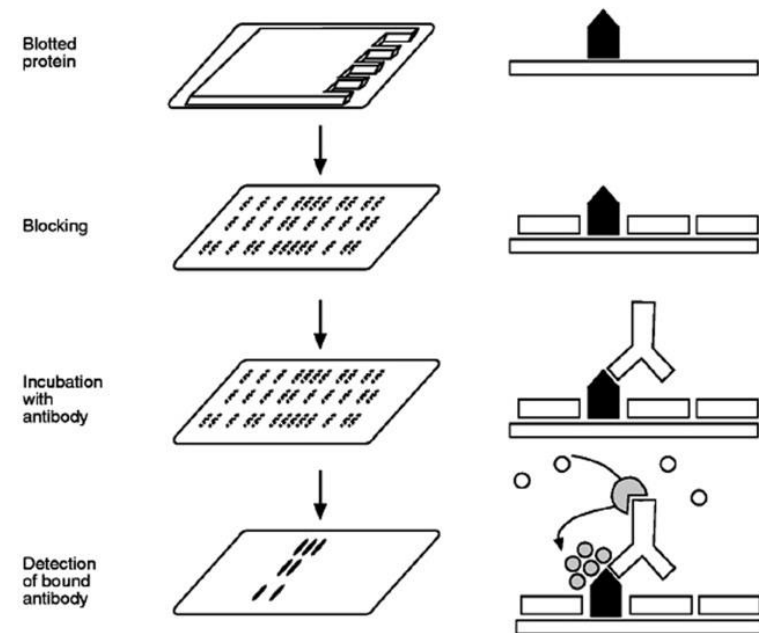
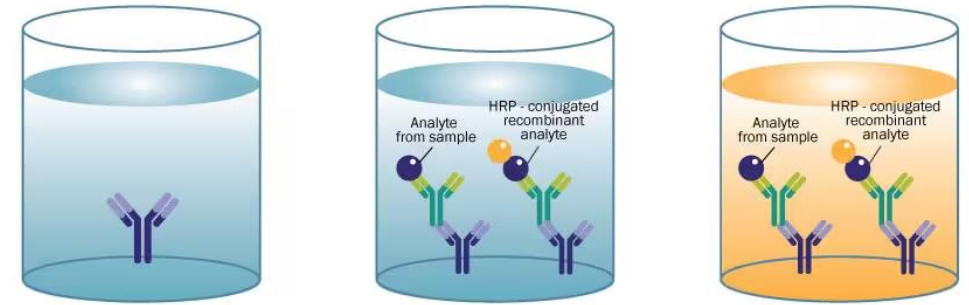
Two step process

First is a screening antibody test

- Very sensitive but not very specific

Second is a confirmatory Western blot

- Less sensitive, but more specific than the screening test
- Not a simple yes/no test, requires interpretation



Anaplasmosis Symptoms

Symptoms range from mild to severe.
Very few people experience **ALL** of these symptoms.

Common



Fever and Chills



Headache

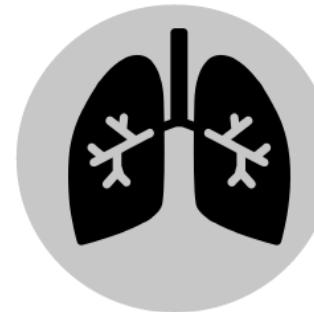


Muscle Pain

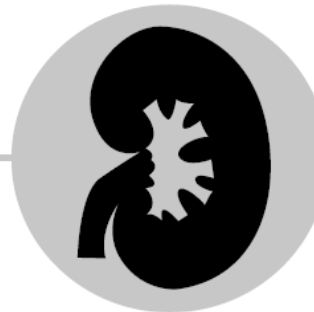


Nausea and
Abdominal Pain

Less
Common,
Severe



Difficulty Breathing



Kidney Failure



Neurologic Problems

Babesiosis Symptoms

Symptoms start within a few weeks or months after a bite and can last days to months.



Fever and Chills



Anemia (Having a Lower Red Blood Cell Count Than Normal)



Headache



Feeling Very Tired

Highest risk:

- Elderly people
- People without a healthy spleen
- People with a weak immune system

Discussion: Ask us your questions using the Q and A function



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Vice President of
Operations, ACO
Northern Light Health



Chuck Lubelczyk, BS, MPH
Vector Ecologist
MaineHealth Institute for
Research



Scott J. Melton, MD, PhD
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Howard Jones, MD, MPH
Medical Director
Northern Light Work
Health



Jim Jarvis, MD, FAAFP,
Senior Physician Executive
Northern Light Health
Director, Clinical Education
Northern Light Eastern
Maine Medical Center

Tools you can use:

<https://wellness.northernlighthealth.org/Good-Health-is-Good-Business>

Good Health Is Good Business – Business to Business Zoom Conference Series

Good Health is Good Business is designed to provide Maine employers and community leaders with information and resources to help support employee health and well-being. Join us to learn more about emergent health issues and engage with experts in the field and business leaders about topics that interest you!

Attendees are asked to join the conference by Zoom and listen to audio using your computer only. Please do not dial in while also connected via your computer. The dial-in number is for those not joining by computer. This will help accommodate a larger number of participants. See you Thursday!



March 21, 2024

Tick Borne Illness

Topics will include:

- The changing landscape of tick-borne disease in Maine
- Prevention recommendations
- Signs, symptoms, and treatment

[Register Now](#)

Past Webinars



February 15, 2024

Developing the workforce through mentorship and succession planning

[View Resources](#)



January 18, 2024

Navigating the Challenges of Pharmaceutical Costs

[View Resources](#)



December 14, 2023

Supporting Employee Mental Health

[View Resources](#)

Register and Save the Date – Thursday, April 25th

Topics will include:

- The importance of climate resiliency and sustainability
- Developing a team and culture to support climate initiatives
- Assessing benefits and risks
- Steps to create a climate resiliency plan



One-hour Zoom conferences
and moderated forum with Q and A
presented by Northern Light Health

ZOOM Business to Business Conference Series

GOOD HEALTH IS GOOD BUSINESS

Learn how to support your employees and your customers to operate a safe and healthy business.

Corporate Responsibility for Climate Resiliency and Sustainability

Thursday, April 25th at 11 am

The Zoom meeting ID will be sent to you upon registering



Topics will include:

- The importance of climate resiliency and sustainability
- Developing a team and culture to support climate initiatives
- Assessing benefits and risks
- Steps to create a climate resiliency plan

Attendees are asked to join the conference by Zoom and listen to audio using your computer only. Please do not dial in while also connected via your computer. The dial-in number is for those not joining by computer. This will help accommodate a larger number of participants. See you Thursday!

Please contact Felicia Hailey for more information fhailey@northernlight.org