

# TICKBORNE DISEASE OVERVIEW



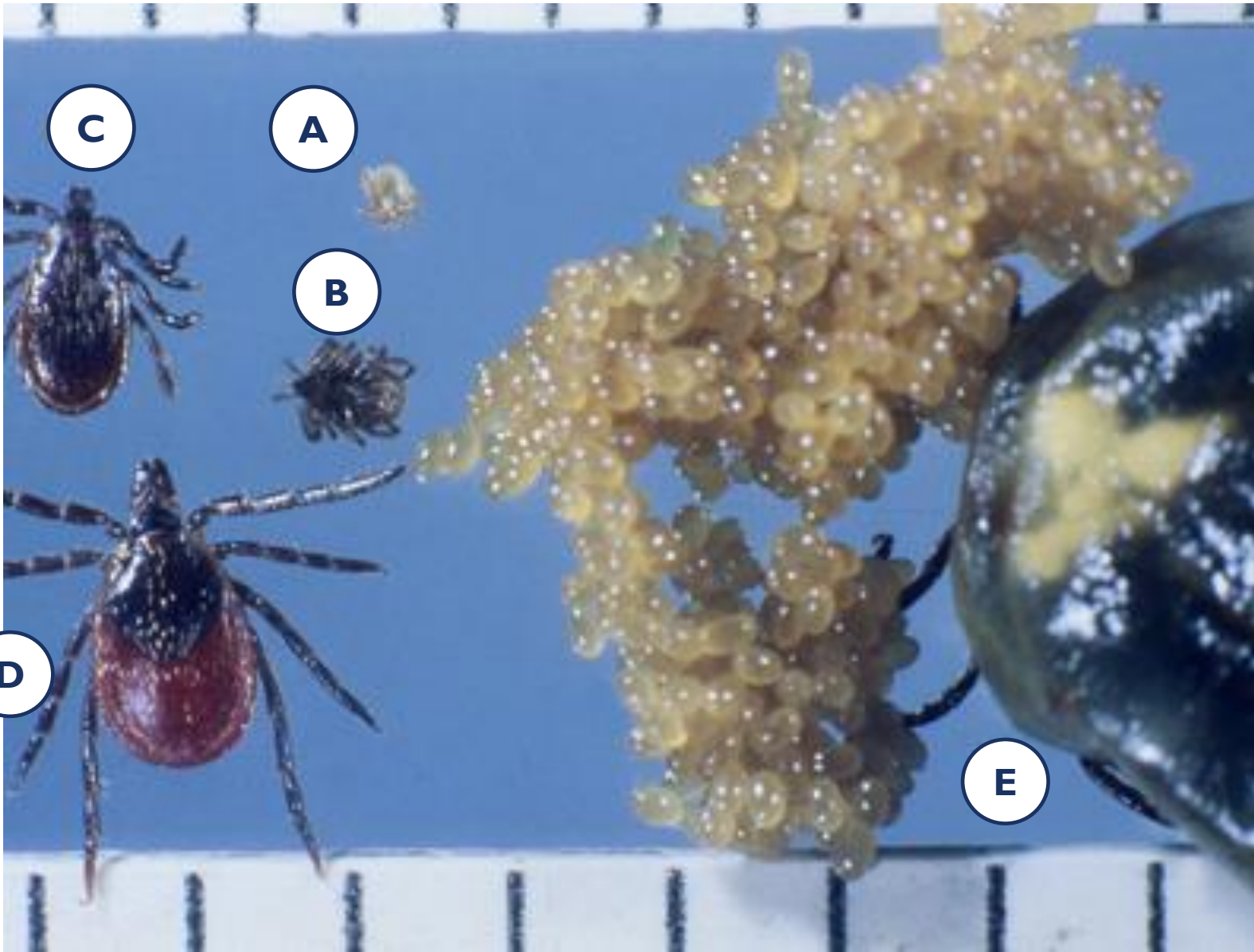
MAY 16, 2024

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## REVIEW: WHAT ARE TICKBORNE DISEASES?

- Illnesses spread to humans by the bite of an infected tick
- Some are spread through blood transfusion





# HOW DO TICKS SURVIVE?

IMAGE COURTESY OF JAMES OCCI

# HOW DO TICKS SPREAD DISEASE TO PEOPLE?





# HOW DO TICKS FIND A HOST?

## WHEN AND WHERE ARE PEOPLE USUALLY EXPOSED TO TICKS?

- Leaf litter, off path, bushy areas
- Outdoor activities
- Tick exposure can occur **year-round** in NJ



## WHAT ARE USUAL SYMPTOMS OF TICKBORNE DISEASE IN PEOPLE?

Stiff neck

Muscle  
aches

Joint pain

Dizziness

Skin rash

Tiredness

Fever/chills

Headache

# WHICH DISEASE-CAUSING TICKS ARE COMMON IN NEW JERSEY?



## Blacklegged “deer” tick:

Lyme disease, babesiosis,  
anaplasmosis, Powassan virus



## Lone star tick:

Ehrlichiosis, STARI,  
tularemia, Bourbon virus,  
Heartland virus



## American dog tick:

Rocky Mountain Spotted Fever,  
tularemia



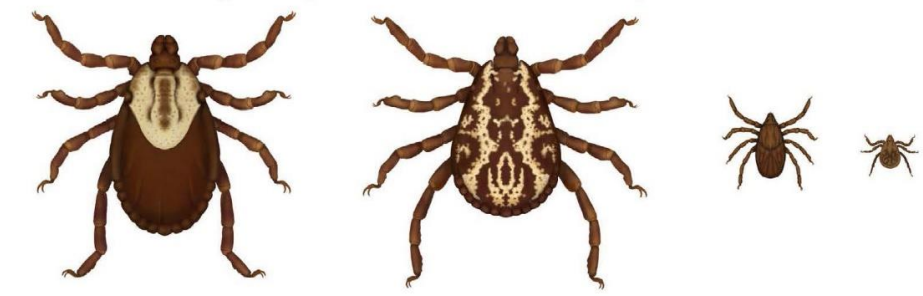
**Blacklegged tick (*Ixodes scapularis*)**



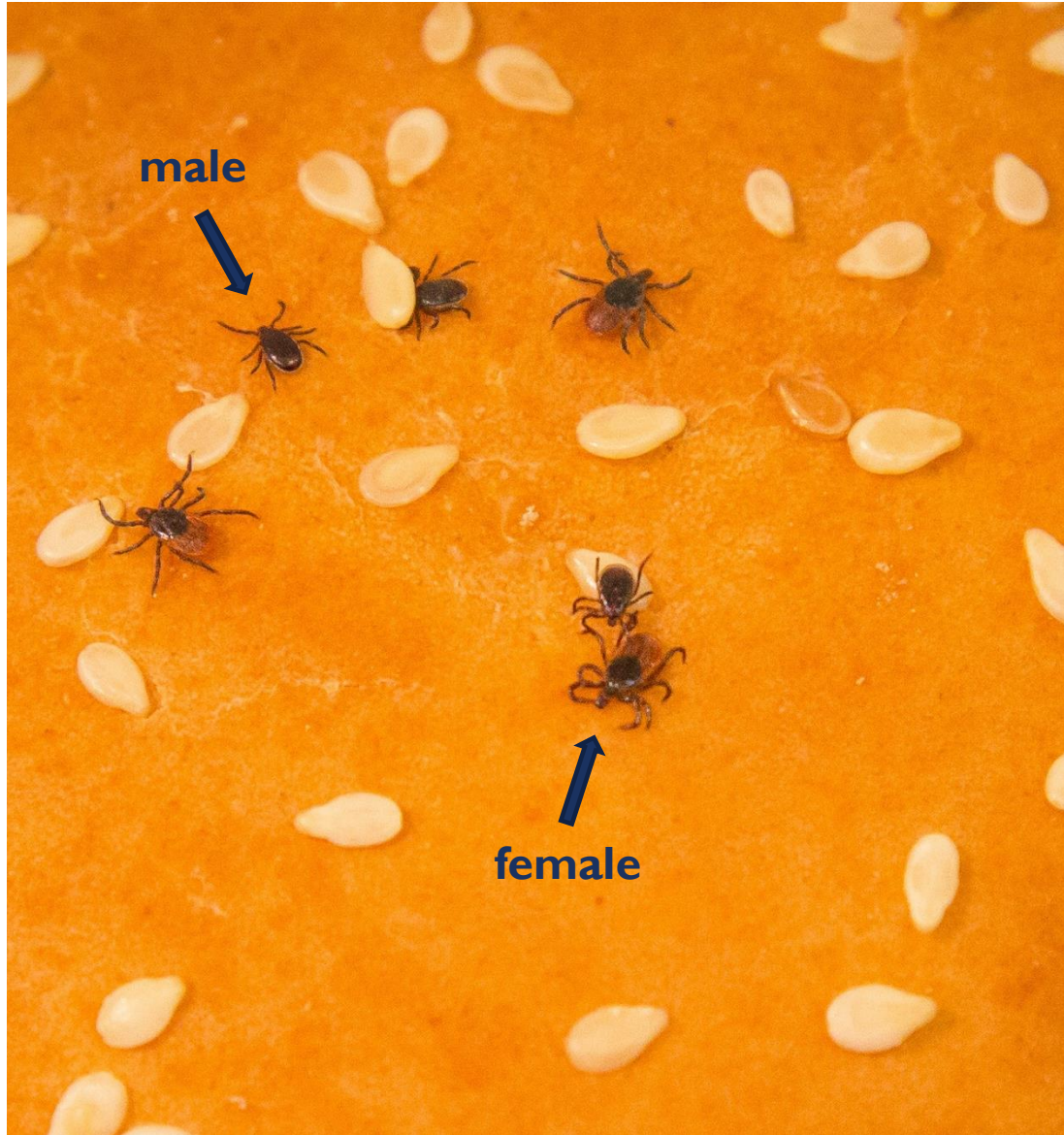
**Lone Star Tick (*Amblyomma americanum*)**



**American Dog Tick (*Dermacentor variabilis*)**



**NOTE:** Relative sizes of several ticks at different life stages.



Lyme disease

Babesiosis

Anaplasmosis

Ehrlichiosis

Spotted Fever Group Rickettsiosis

WHAT  
TICKBORNE  
DISEASES ARE  
COMMON IN NJ?

TICKBORNE  
DISEASES  
SPREAD BY  
BLACKLEGGED  
TICKS

## MOST COMMON IN NEW JERSEY

Lyme disease

Babesiosis

Anaplasmosis



■ Established population

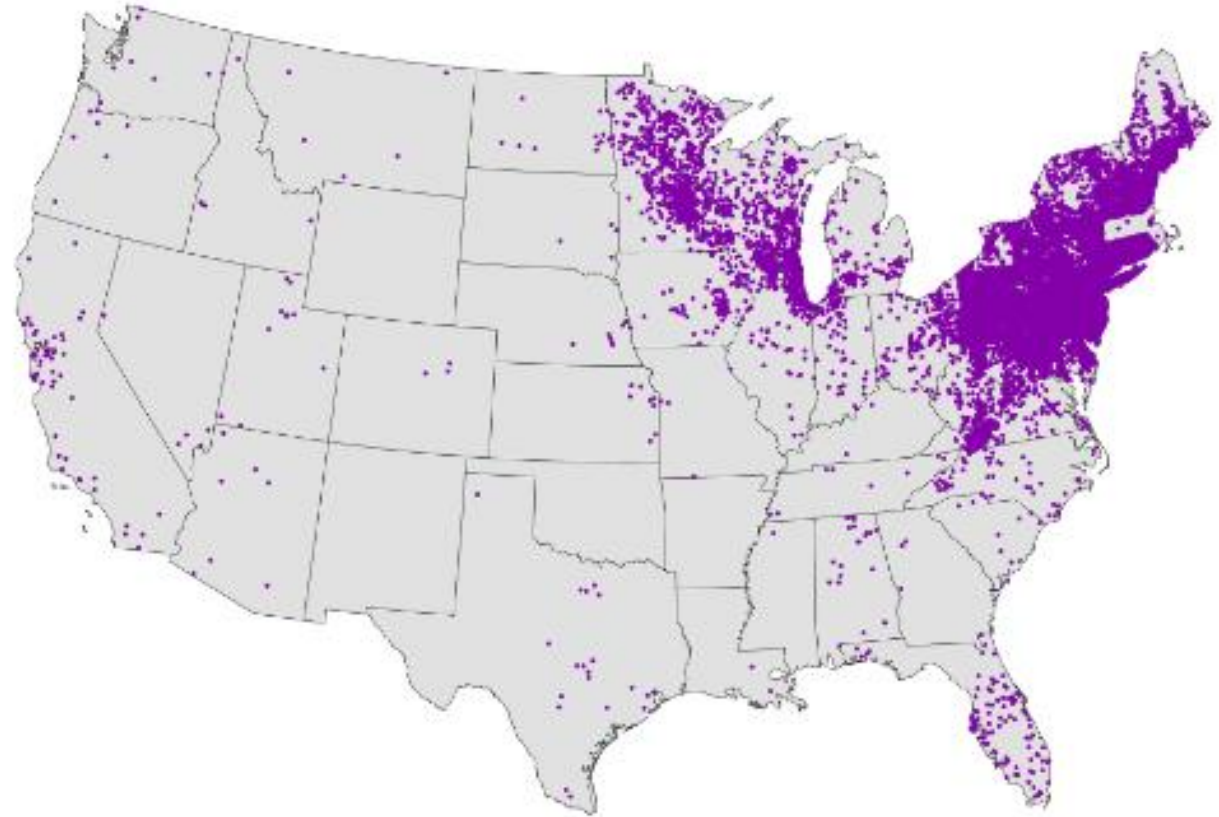
# BLACKLEGGED TICKS IN NJ



# LYME DISEASE

# LYME DISEASE FAST FACTS

- Most reported tickborne disease in NJ and US
- Caused by bacteria

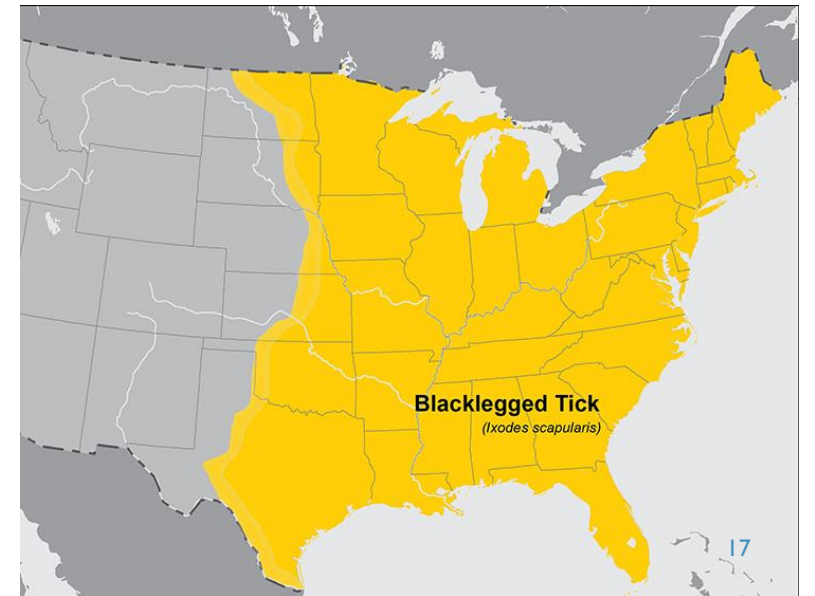


LYME DISEASE



# HOW LYME DISEASE IS SPREAD

- Bacteria (*Borrelia burgdorferi*)
- Transmitted by infected blacklegged “deer” ticks (*Ixodes scapularis*)
- Typically, ticks will need to be attached 36-48 hours in to spread disease



# LYME DISEASE EARLY SIGNS & SYMPTOMS

Fatigue

Chills and  
fever

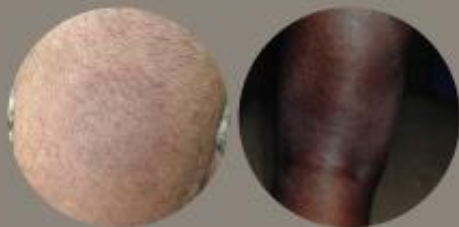
Headache

Muscle and  
joint pain

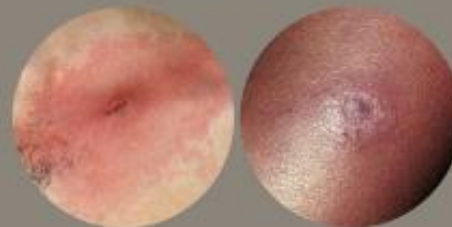
Rash  
(erythema  
migrans)

# The Many Forms of Lyme Disease Rashes (Erythema Migrans)

Faint colors and borders



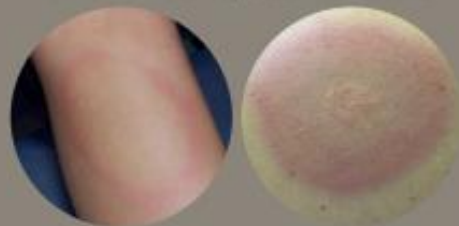
Crusted centers



More than one rash



Different shapes and colors



Appearing anywhere on the body



## LATE LYME DISEASE

Headaches, neck stiffness

Additional erythema migrans (EM) rashes

Facial palsy

Arthritis

Intermittent pain in tendons, muscles, joints, bones

Heart palpitations, irregular heartbeat (Lyme carditis)

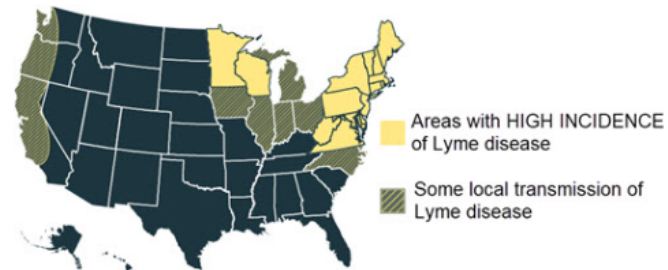
Inflammation of the brain and spinal cord

Nerve pain

Shooting pains, numbness, or tingling in the hands or feet

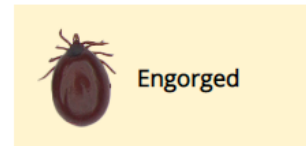
Benefits of prophylaxis may outweigh risks when **all of the following circumstances are present:**

1. Where the tick bite occurred, are ticks likely to be infected with *Borrelia burgdorferi*?



2. Was the tick removed within the last 72 hours?

3. Was the tick's body engorged with blood (not flat)?



4. Was the tick an *Ixodes* (blacklegged) tick?



5. Is doxycycline safe for the patient? Considerations include allergy to doxycycline, pregnancy, and lactation.

# ANTIBIOTIC TO PREVENT LYME DISEASE AFTER TICK BITE



# BABESIOSIS

# BABESIOSIS FAST FACTS

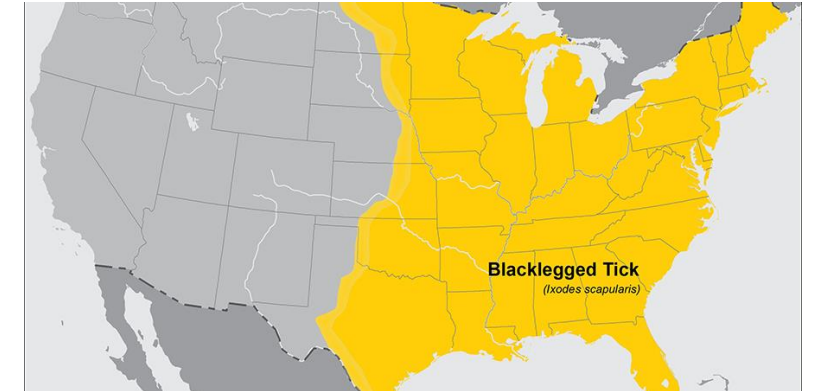
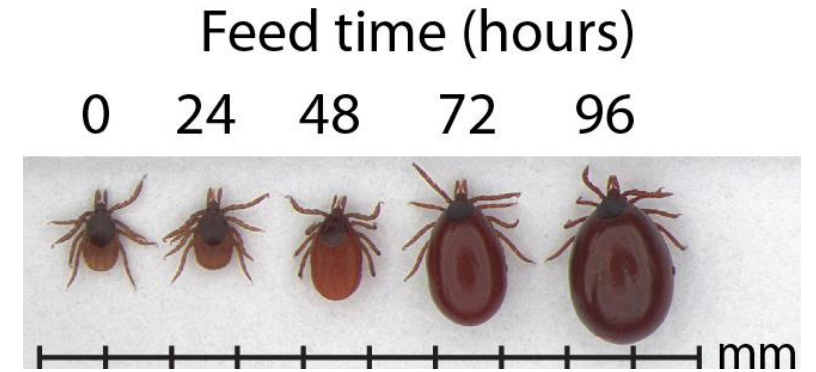
- People and animals can become infected
- Caused by parasites



BABESIOSIS

# HOW BABESIOSIS IS SPREAD

- Parasites (*Babesia*)
- Transmitted by infected blacklegged “deer” ticks (*Ixodes scapularis*)
- Blood transfusion or organ transplant (rare)





# BABESIOSIS SIGNS & SYMPTOMS

Fever, chills

Sweats

Headache

Body aches

Joint aches

Loss of  
appetite

Nausea

Fatigue

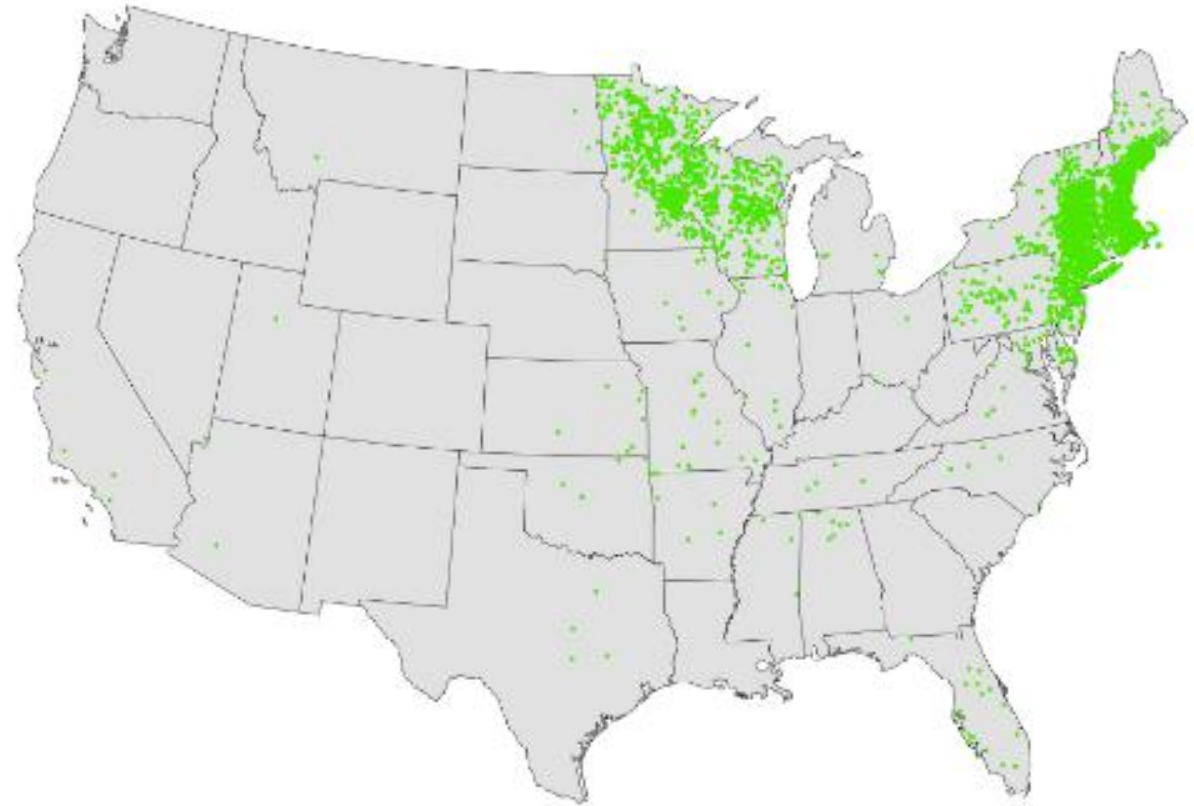
Destruction  
of red blood  
cells



# ANAPLASMOSIS

# ANAPLASMOSIS FAST FACTS

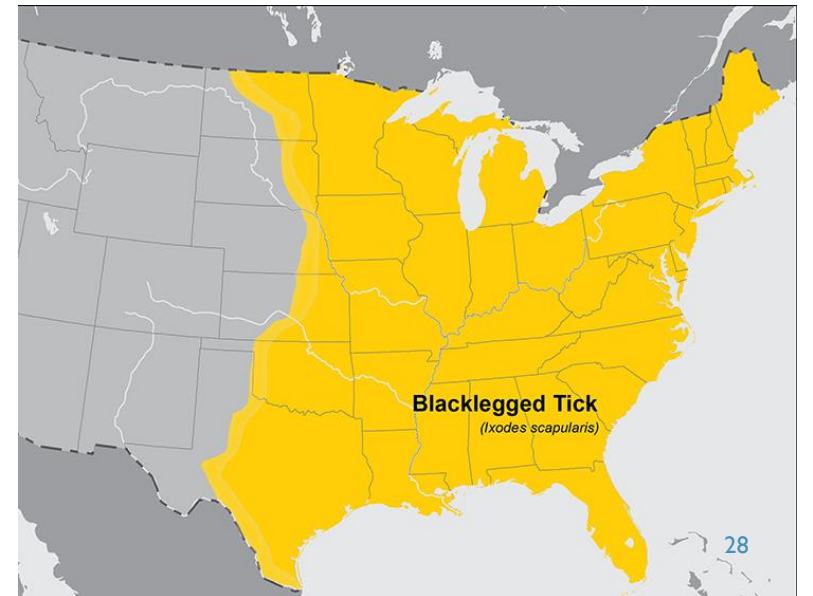
- People and animals can become infected
- Caused by bacteria



ANAPLASMOSIS

# HOW ANAPLASMOSIS IS SPREAD

- Bacteria (*Anaplasma phagocytophilum*)
- Transmitted by infected blacklegged “deer” ticks (*Ixodes scapularis*)
- Blood transfusion, organ transplant (rare)



# ANAPLASMOSIS EARLY SIGNS & SYMPTOMS

Fever, chills

Severe headache

Muscle aches

Nausea, vomiting,  
diarrhea, loss of  
appetite

# ANAPLASMOSIS SEVERE ILLNESS (DELAYED ANTIBIOTIC TREATMENT)

Respiratory failure

Bleeding problems

Organ failure

Death

TICKBORNE  
DISEASES  
SPREAD BY  
LONE STAR  
TICK



- Established population
- Ticks detected

# LONE STAR TICKS IN NJ

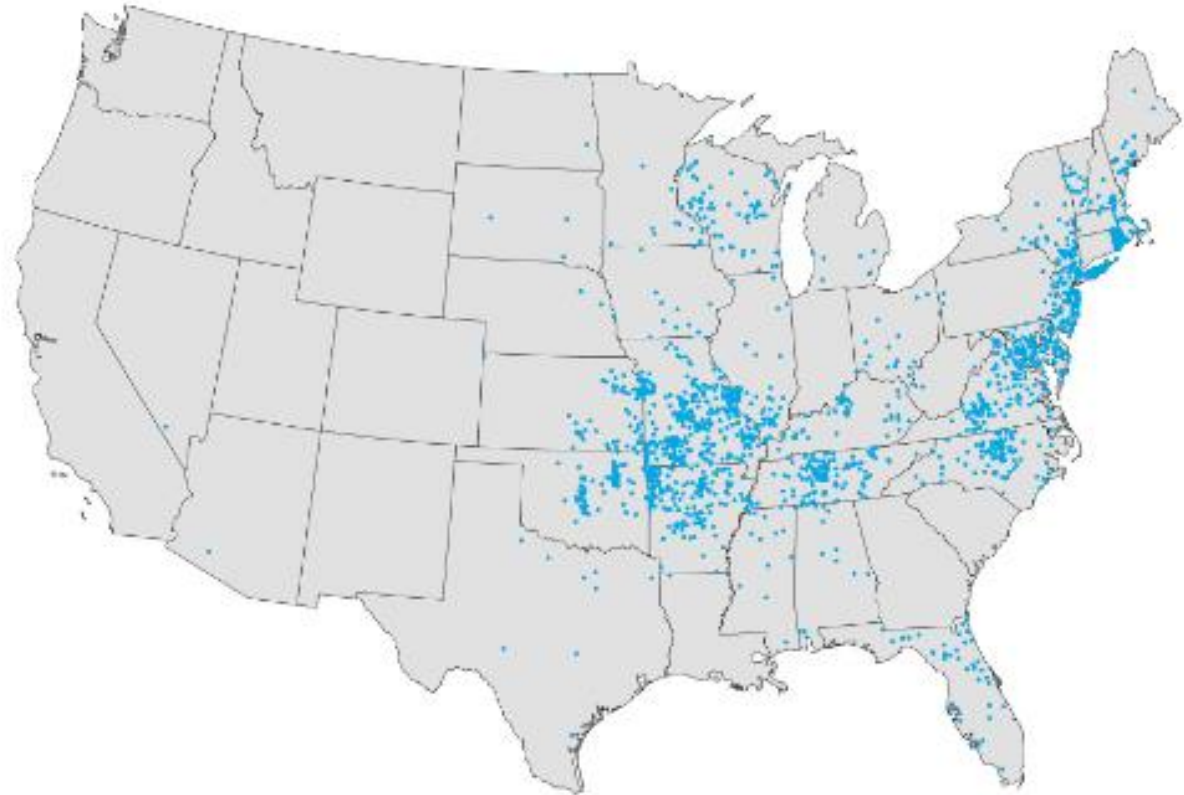




# EHRlichiosis

# EHRlichiosis FAST FACTS

- People and animals can become infected
- Caused by types of bacteria



EHRlichiosis

## HOW EHRLICHIOSIS IS SPREAD

- Bacteria (*Ehrlichia chaffeensis* and *Ehrlichia ewingii*)
- Transmitted by infected lone star ticks (*Amblyomma americanum*)
- Blood transfusion, organ transplant (rare)



# EHRlichiosis Early Signs & Symptoms

Fever, chills

Severe headache

Muscle aches

Nausea, vomiting,  
diarrhea, loss of  
appetite

Confusion

Rash (more  
common in  
children)

## EHRlichiosis RASH



Gollamudi, K., & Shaikh, R. (2017). Ehrlichiosis: A Child With a Maculopapular Rash on His Trunk. *International Journal Of Clinical Pediatrics*, 6(1-2), 33-35.

Damage to brain or nervous system

Respiratory failure

Uncontrolled bleeding

Organ failure

Death

EHRlichiosis  
SEVERE ILLNESS  
(DELAYED  
ANTIBIOTIC  
TREATMENT)

TICKBORNE  
DISEASES  
SPREAD BY  
AMERICAN  
DOG TICK



- Established population
- Ticks detected

# AMERICAN DOG TICKS IN NJ

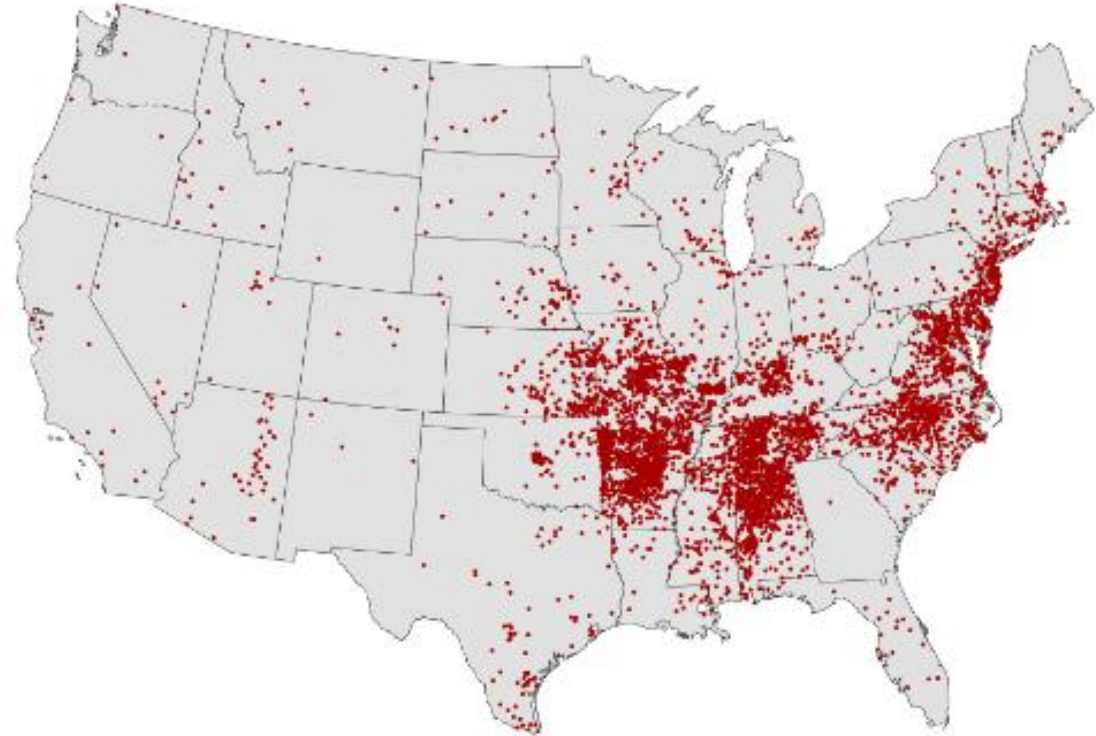




# SPOTTED FEVER GROUP RICKETTSIOSIS (SPOTTED FEVERS)

# SPOTTED FEVERS FAST FACTS

- Group of diseases, including Rocky Mountain Spotted Fever and *Rickettsia parkeri* rickettsiosis
- Caused by bacteria



SPOTTED FEVER RICKETTSIOSIS (INCLUDING  
ROCKY MOUNTAIN SPOTTED FEVER)

# HOW ROCKY MOUNTAIN SPOTTED FEVER IS SPREAD

- Bacteria (*Rickettsia rickettsii*)
- Transmitted by infected American dog ticks (*Dermacentor variabilis*)
- Blood transfusion (rare)



## SPOTTED FEVERS SIGNS & SYMPTOMS

Dark scab at  
site of tick  
bite (eschar)\*

Fever

Headache

Rash

Muscle aches



## DARK SCAB (ESCHAR)

MOST SPOTTED FEVERS EXCEPT ROCKY MOUNTAIN SPOTTED FEVER

# EMERGING TICKBORNE SYNDROMES



# ALPHA-GAL SYNDROME

## WHAT IS ALPHA-GAL?

- Sugar molecule found in most mammals
- Found in meat, products from mammals
- Not found in fish, reptiles, birds, or people





## ALPHA-GAL SYNDROME (AGS) FAST FACTS

Alpha-gal allergy, red meat allergy or tick bite meat allergy

Potentially life-threatening allergic reaction

Symptoms occur after eating red meat/products with alpha-gal

Most patients advised to stop eating meat



# How AGS Develops

May be triggered by bite of the lone star tick (*Amblyomma americanum*)

Other tick species not ruled out

More research is needed

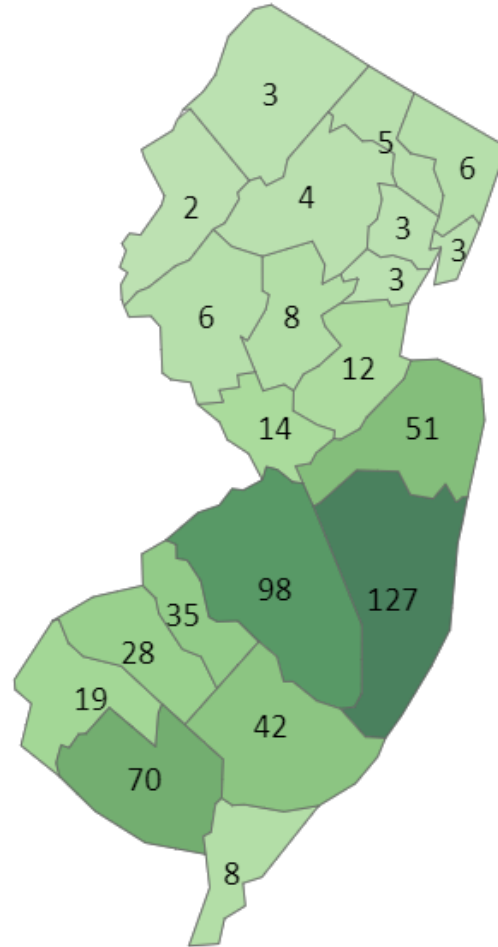


## Lone star tick



- Established population
- Ticks detected

## Confirmed AGS cases (2022-2023)



# AGS SURVEILLANCE IN NJ

# AGS SYMPTOMS

Anaphylaxis

Hives or itchy  
rash

Nausea or  
vomiting

Heartburn or  
indigestion

Diarrhea

Cough, shortness  
of breath, or  
difficulty breathing

Drop in blood  
pressure

Swelling of the  
lips, throat,  
tongue, or eye lids

Dizziness or  
faintness

Severe stomach  
pain

# TICKBORNE DISEASE PREVENTION

# PREVENTING TICKBORNE DISEASE IN STUDENTS

- ✓ Know where ticks live
- ✓ Keep paths clear
- ✓ Apply insecticides
- ✓ Educate students
- ✓ Encourage tick checks
- ✓ Be aware of symptoms





**ON THE SCALP**

**IN AND AROUND  
THE HAIR**

**IN AND AROUND  
THE EARS**

**UNDER THE ARMS**

**INSIDE BELLY BUTTON**

**AROUND THE WAIST**

**BETWEEN THE LEGS**

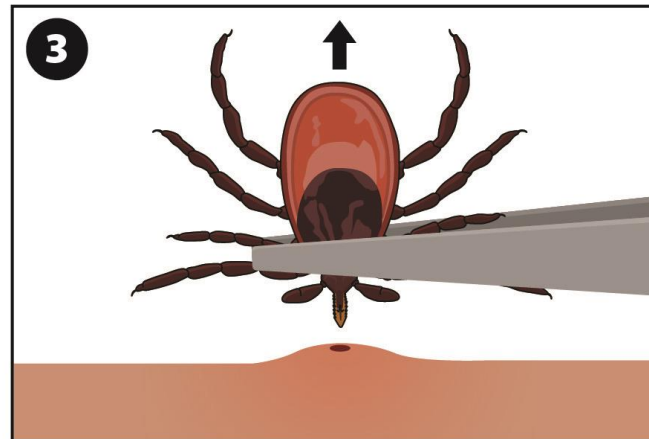
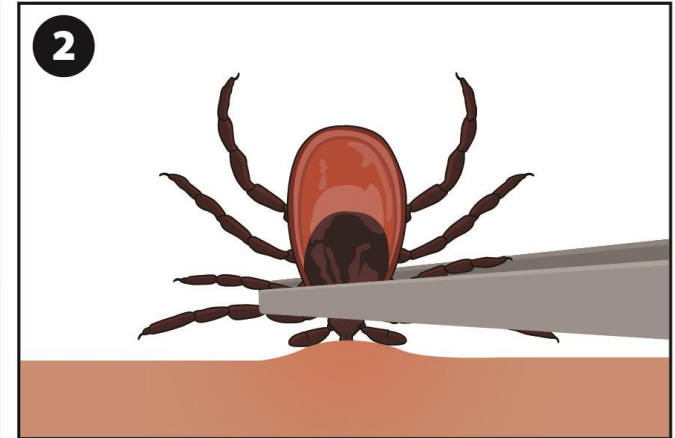
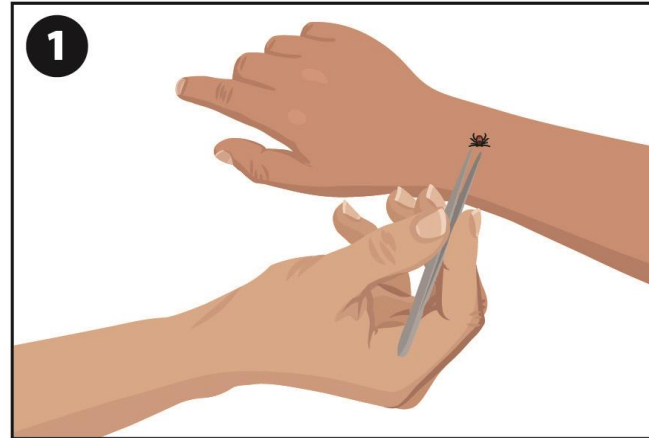
**BACK OF KNEES**

# CHECKING FOR TICKS

# REMOVING AN ATTACHED TICK

As soon as possible:

- Use fine-tipped tweezers
- Grasp the tick as close to the skin's surface as possible
- Pull upward with steady, even pressure
- Clean the bite area with rubbing alcohol and clean your hands with soap and water





# HOW TO DISPOSE OF THE TICK



Do NOT crush  
the tick with  
your fingers



Put in alcohol/  
hand sanitizer,



Place in sealed  
bag/container,



Wrap tightly in  
tape,



Or flush down  
the toilet



## Tick Bite Bot

A tool to assist people in removing attached ticks and seeking health care, if appropriate, after a tick bite.



**CDC TICK BITE BOT**

# TOOLS AND INFORMATION

# K-12 LEGISLATION AND TOOLKIT

- New Jersey statute ([Title 18A:35-5.1](#)) requires that Lyme disease prevention be included within the public-school health curriculum
- Additional legislation signed by Governor Murphy in 2023 ([P.L.2023, c.60](#))
- We have a toolkit to make this easy!
  - Includes: PowerPoint slides, script, activity sheets, quizzes, and letters for parents
  - [NJDOH Tickborne Diseases and Conditions webpage](#)

# TOOLKIT PREVIEW

Name: \_\_\_\_\_



## Tick Word Search

Find the words about ticks.

X	D	Y	O	Y	S	B	Q	T	Q	M	S	T	D	S
F	M	Y	U	Y	C	R	R	S	P	Y	B	I	T	E
H	K	M	R	I	L	Z	J	D	H	V	Z	U	R	I
S	V	G	P	M	S	M	Q	I	B	Q	D	A	C	O
Z	Q	Q	O	M	L	I	A	G	B	I	C	H	Q	Z
E	G	E	H	Q	T	V	M	Y	H	M	A	T	V	T
N	R	B	A	F	X	B	T	I	N	Y	J	Y	O	Z
W	A	Q	T	B	U	G	L	F	G	F	K	Z	A	M
D	S	K	E	A	O	G	V	N	D	T	I	C	K	K
L	S	Y	R	J	G	H	Z	K	J	D	E	K	R	A
S	R	C	U	G	C	B	J	R	A	D	N	O	S	Q
G	O	M	L	U	X	S	M	Z	X	N	Z	M	H	S
U	J	X	L	X	O	I	H	H	N	Z	Q	A	D	
I	R	A	K	N	K	C	Y	I	Z	H	E	X	Q	K
U	E	B	L	Q	C	K	V	X	H	L	W	I	C	R

TICK  
BITE

BUG  
TINY

GRASS  
SICK



## TICK CHECK CALENDAR

MONTH: \_\_\_\_\_ YEAR: \_\_\_\_\_

MONTH: \_\_\_\_\_ YEAR: \_\_\_\_\_

Sun Mon Tues Weds Thurs Fri Sat

Sun Mon Tues Weds Thurs Fri Sat

✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
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# VECTOR-BORNE DASHBOARD

Home > Diseases & Health Topics A-Z List > Fight the Bite, NJ!

## ATTENTION TRAVELERS

It's important to stay aware of circulating diseases while traveling, including vector-borne diseases. Some vector-borne diseases are more common during travel such as Zika, Malaria, and Yellow Fever. The Traveler's Health website will keep you up to date on travel-related alerts and provides resources for staying healthy before, during, and after your trip.

[Traveler's Health Website](#)

## Vector-borne Disease Data Dashboard

This dashboard uses interactive data visualizations to display vector-borne disease case data (counts and incidence rates), emergency department visits for tick-related illness, and vector-borne pathogen (germ) data in mosquitoes and ticks.

[Open Dashboard](#)

## Fight the Bite, NJ!

When infected blood-sucking insects (such as mosquitoes and ticks) bite a person, they can spread vector-borne illnesses such as West Nile Virus and Lyme disease. There are many types of vector-borne illness. The best defense against them is to take steps to avoid being bitten by infected insects.

The Communicable Disease Service has staff dedicated to the monitoring, control and prevention of vector-borne diseases.

Specific activities performed by vector-borne illness staff include:

- Surveillance of vector-borne diseases
- Identifying risk factors
- Monitoring geographic trends
- Providing technical assistance and training
- Educating the public and healthcare partners

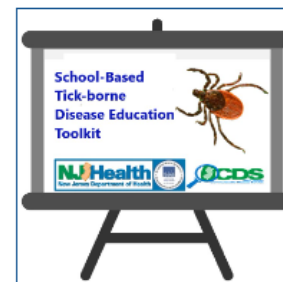
1. [Fight The Bite Campaign](#)
2. [Tick-borne Diseases/conditions in New Jersey](#)
3. [Mosquito-borne Diseases in New Jersey](#)
4. [Travel-related Tick and Mosquito-borne Diseases](#)
5. [Laboratory Testing and Guidance](#)
6. [NJDOH Trainings & Webinars](#)

## Fight The Bite Campaign

[Toolkit Creatives](#) (Facebook static ads, Facebook video ads, digital billboards & YouTube video) **NEW!**

[Top ^](#)

[Tick-borne Diseases/conditions in New Jersey](#)



## K-12 Tick Toolkit

[TOOLKIT WEBPAGE](#)

## Resources and References

[National Center for Zoonotic, Vector-borne and Enteric Diseases](#)

[Insect Repellent Essentials: A Brief Guide](#) [\[English\]](#) [\[Spanish\]](#)

# NEW AND UPCOMING MATERIALS

- Alpha-gal syndrome brochure
- Camp flyers and resources
- Toolkit revamp
- Toolkit evaluation
- May is Tickborne Disease Awareness Month!

NJDOH health alert messages: local health departments, healthcare providers

NJDOH CDS staff monitors, controls and prevents vectorborne diseases

Interagency vectorborne disease working group

Information posted to NJDOH website

WHAT IS NJ  
DOING ABOUT  
TICKBORNE  
DISEASES?



## WHERE CAN I LEARN MORE? CREDIBLE SOURCES

NJDOH

NJ Department of Health Communicable Disease Service: Fight the Bite!  
[bit.ly/FightTheBiteNJ](https://bit.ly/FightTheBiteNJ)

CDC

Centers for Disease Control and Prevention: Tick-Borne Disease  
<https://www.cdc.gov/ticks/prevention/index.html>

CDC

Centers for Disease Control and Prevention: Communication Tools  
<https://www.cdc.gov/ticks/communication-resources/index.html>

KAHOOT TIME!



THANK YOU

