

Ticked Off: The Role of an Epidemiologist in Fighting Tick-Borne Disease

**Massachusetts Health Office Association
Quarterly Meeting
December 18, 2025**



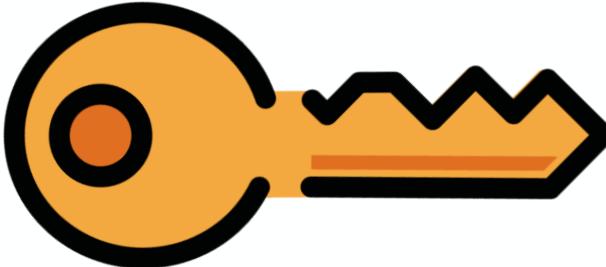
**Inter Island Public Health
Excellence Collaborative**



Lea Hamner, MPH
Epidemiologist
lhamner@oakbluffsma.gov

Information is valuable

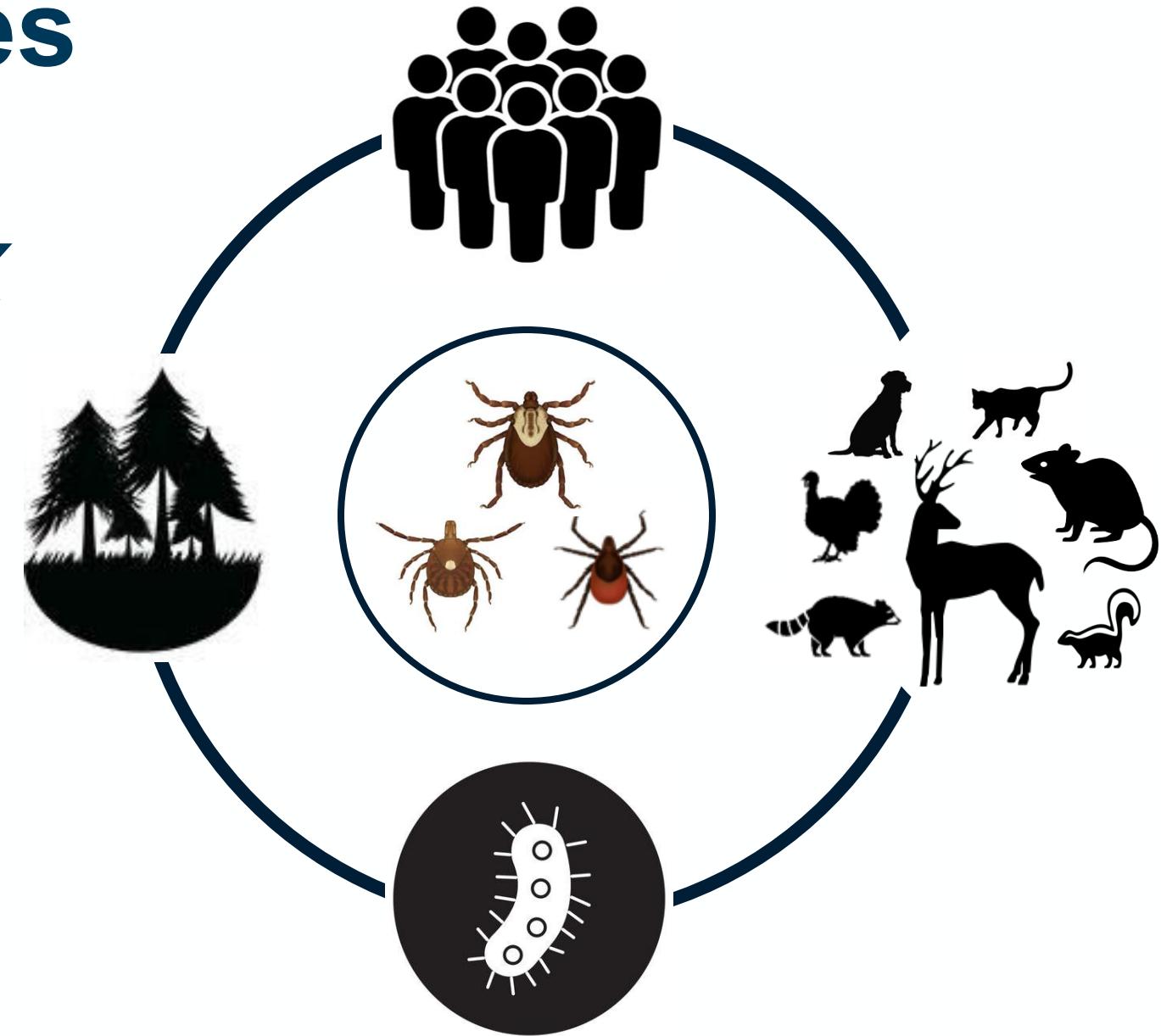
Your local epidemiologist



My Most Used Epi Skills in LPH



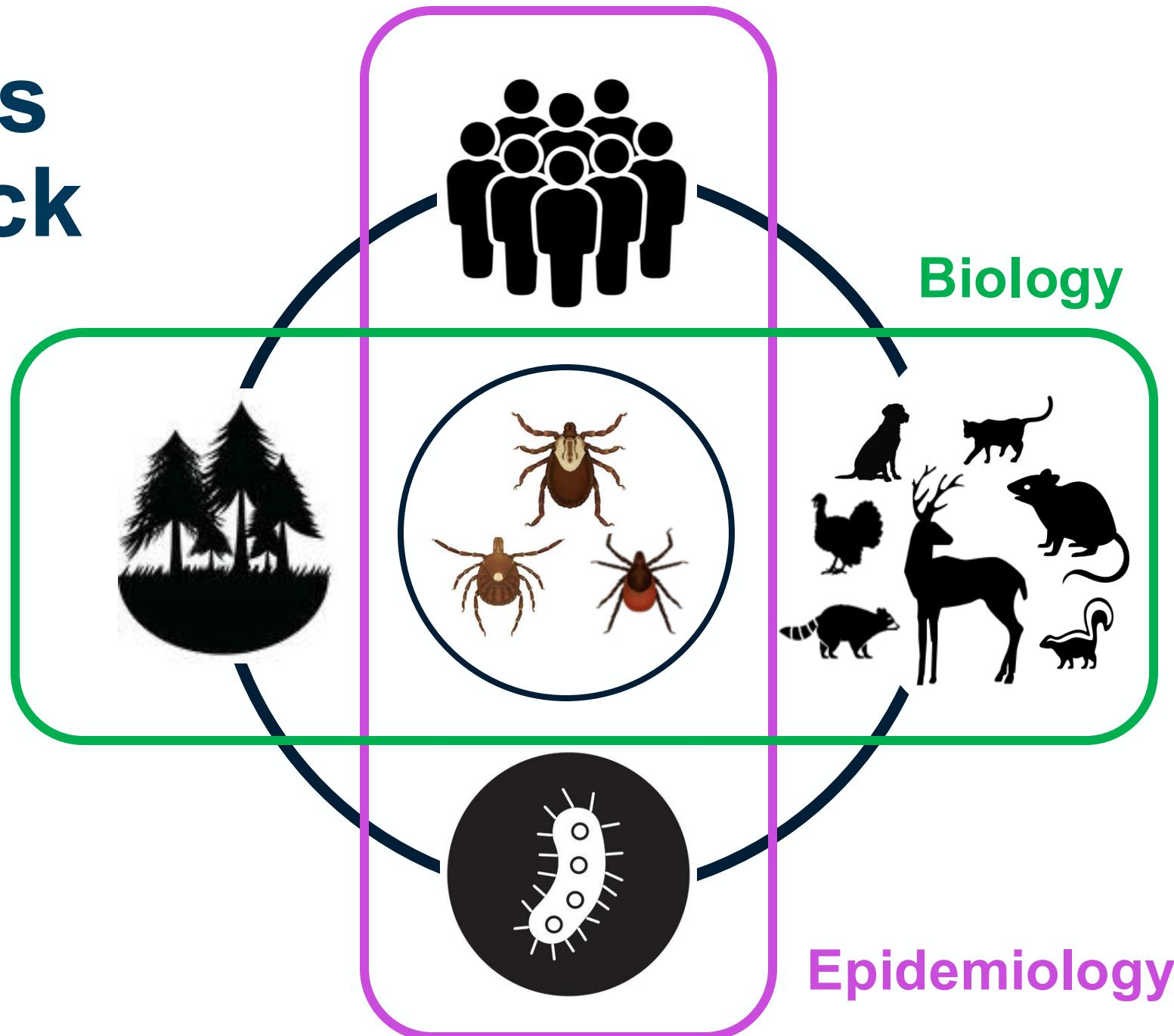
Ticks, diseases
and allergy,
are a *complex*
public health
problem.



The Martha's Vineyard Tick Program

Our Local One Health Approach:

- ✓ Grassroots
- ✓ Interdisciplinary
- ✓ Evidence-informed
- ✓ Community-driven



Evidence Informed, Community Driven

Goal 1:	Prevent tick bites
Goal 2:	Increase awareness and accurate information among public, providers, leaders, schools, etc.
Goal 3:	Support those currently suffering ; launched a public health-facilitated Alpha Gal Support Group
Goal 4:	Investigate & add to the science ; launch epidemiology research studies, field epidemiology and surveillance, and cultivate medical research studies
Goal 5:	Develop a community-endorsed strategic plan to reduce tickborne conditions in our community

A Bit About Marthas Vineyard



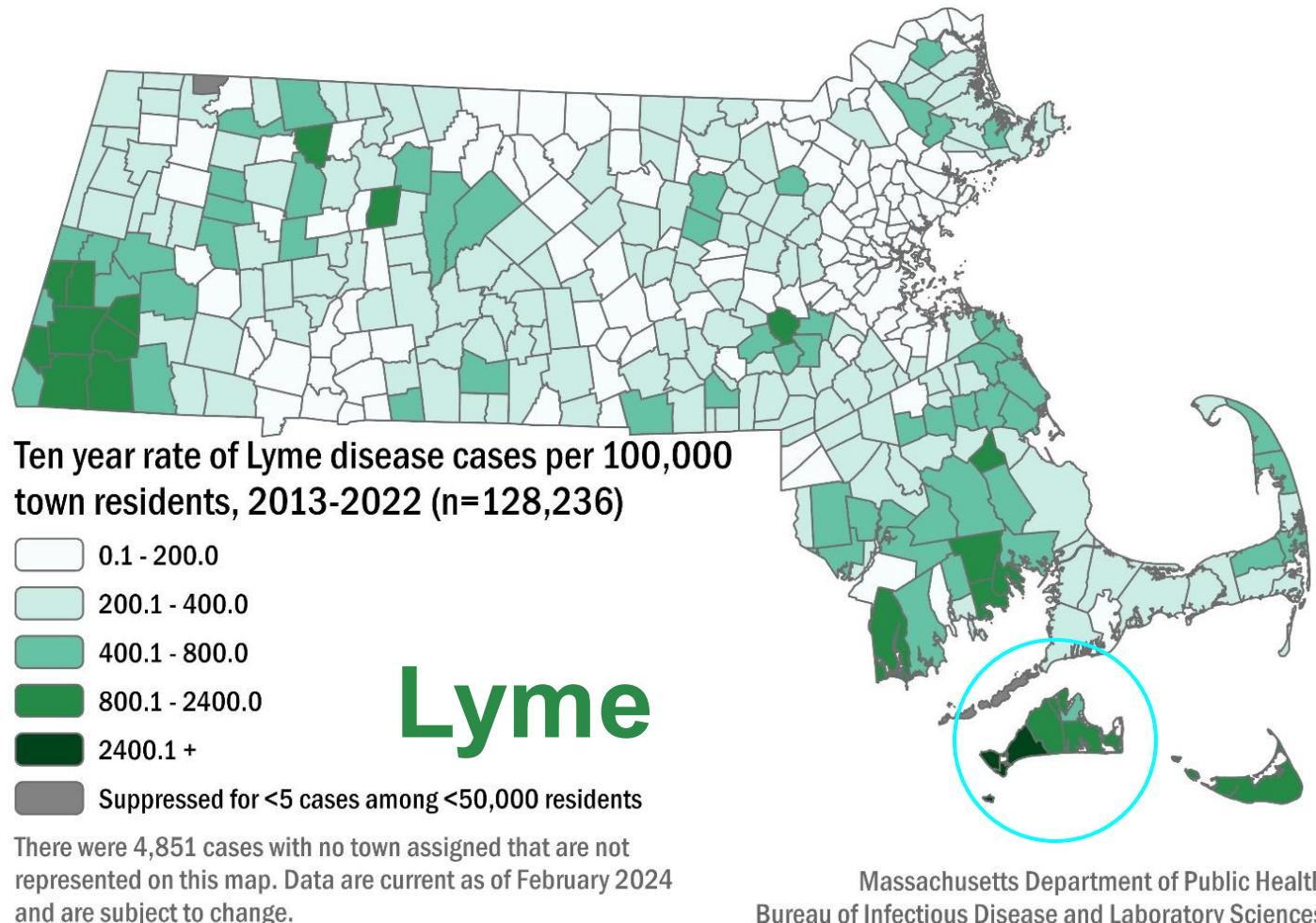
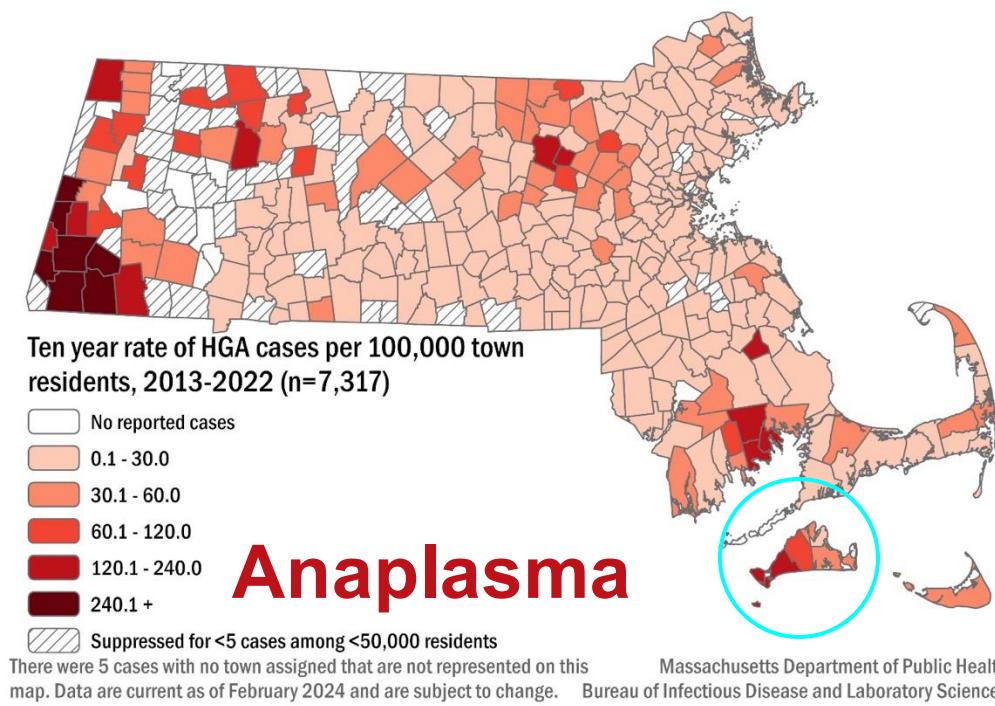
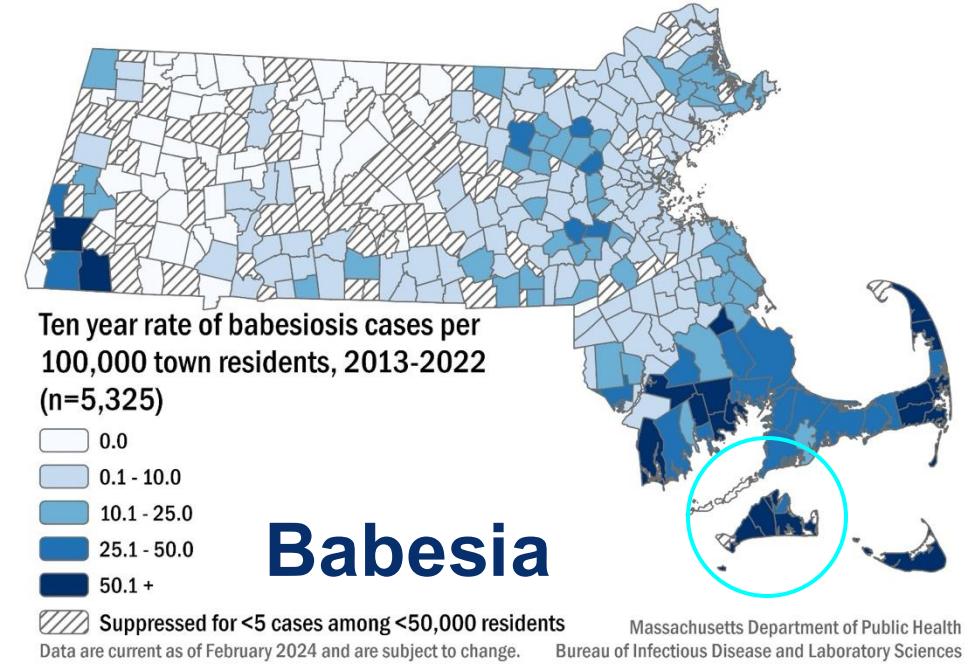
A Bit About Marthas Vineyard





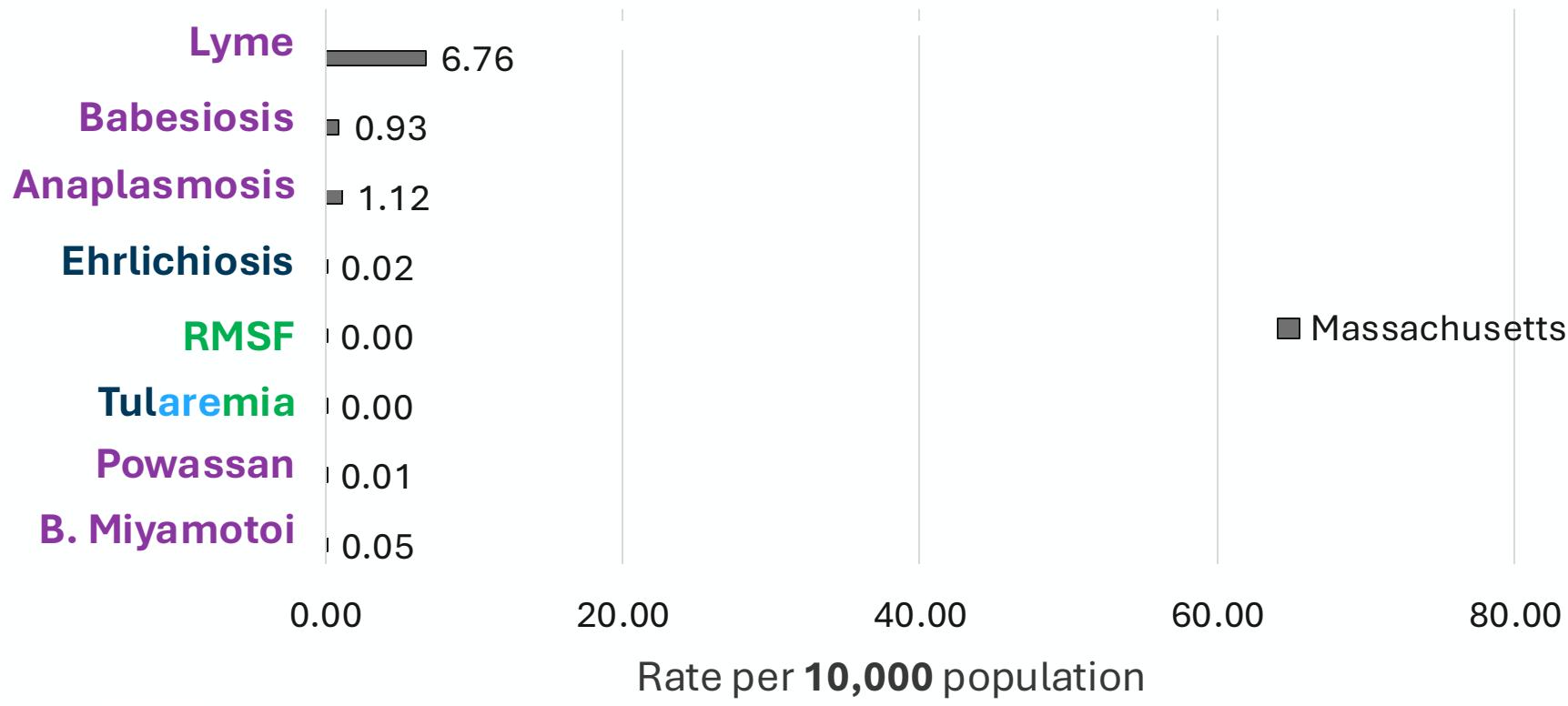
‘Houston, we have a problem’

- Epidemiologists



Deer Ticks cause the Most Infections

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



Deer tick-transmitted



Lone Star tick-transmitted

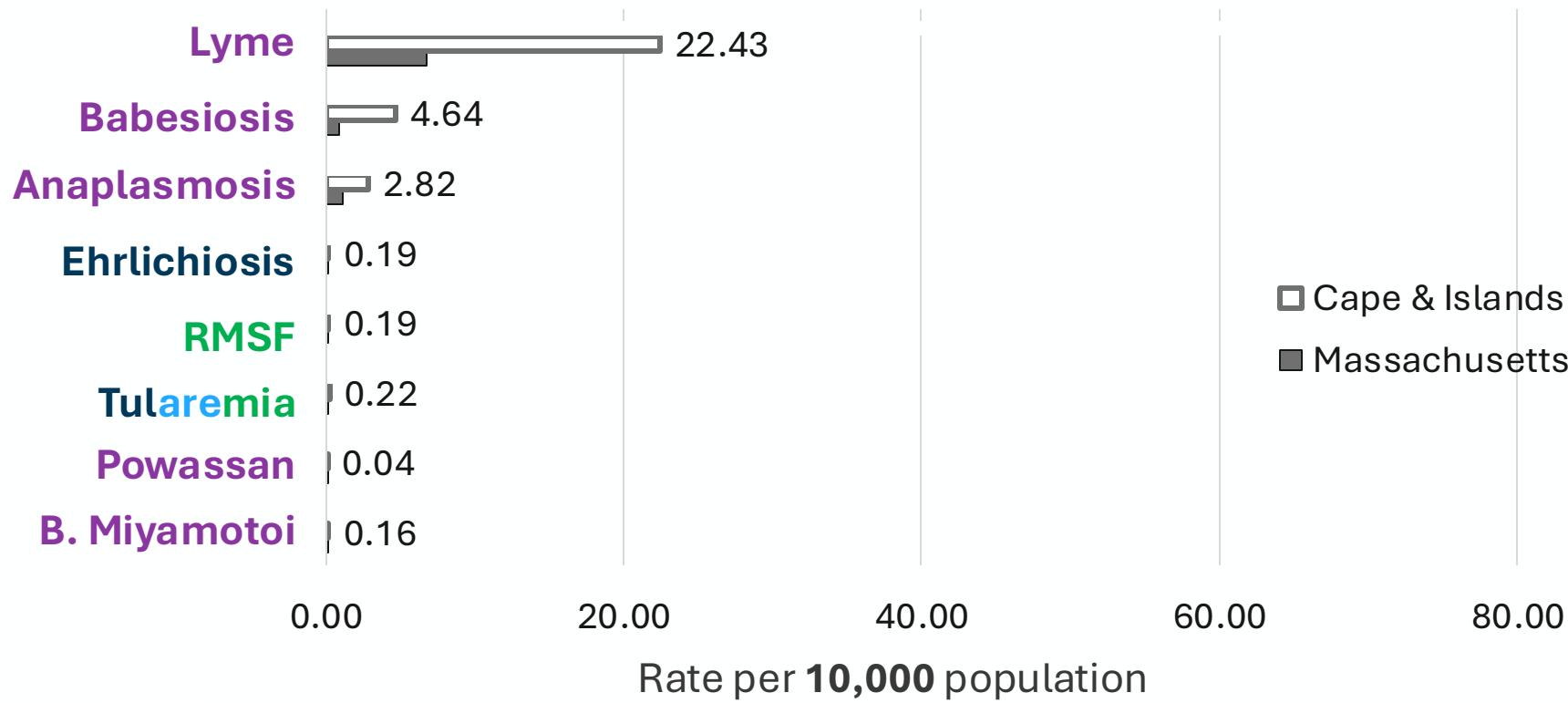


American Dog tick-transmitted

Not just tick transmitted

Deer Ticks cause the Most Infections

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



Deer tick-transmitted



Lone Star tick-transmitted

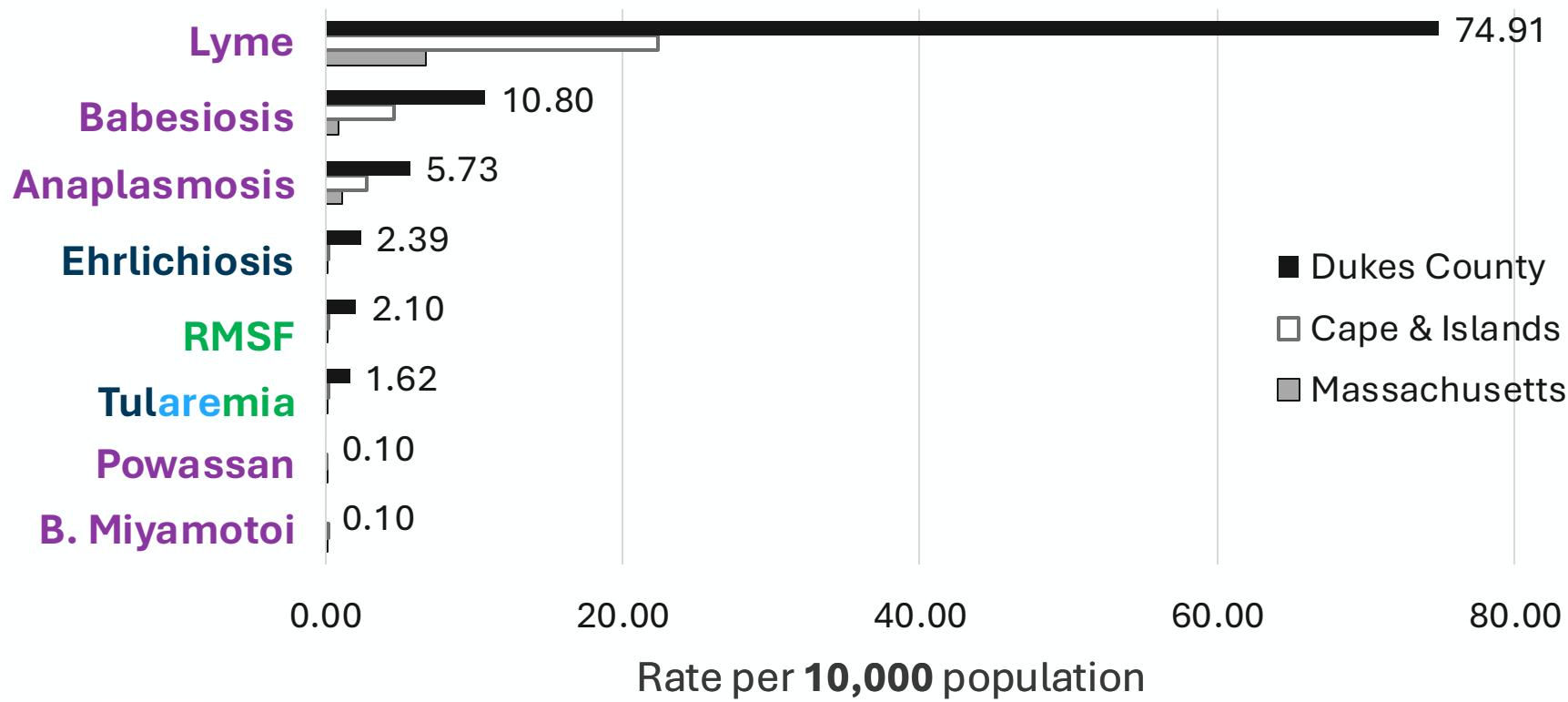


American Dog tick-transmitted

Not just tick transmitted

Deer Ticks cause the Most Infections

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



Deer tick-transmitted



Lone Star tick-transmitted

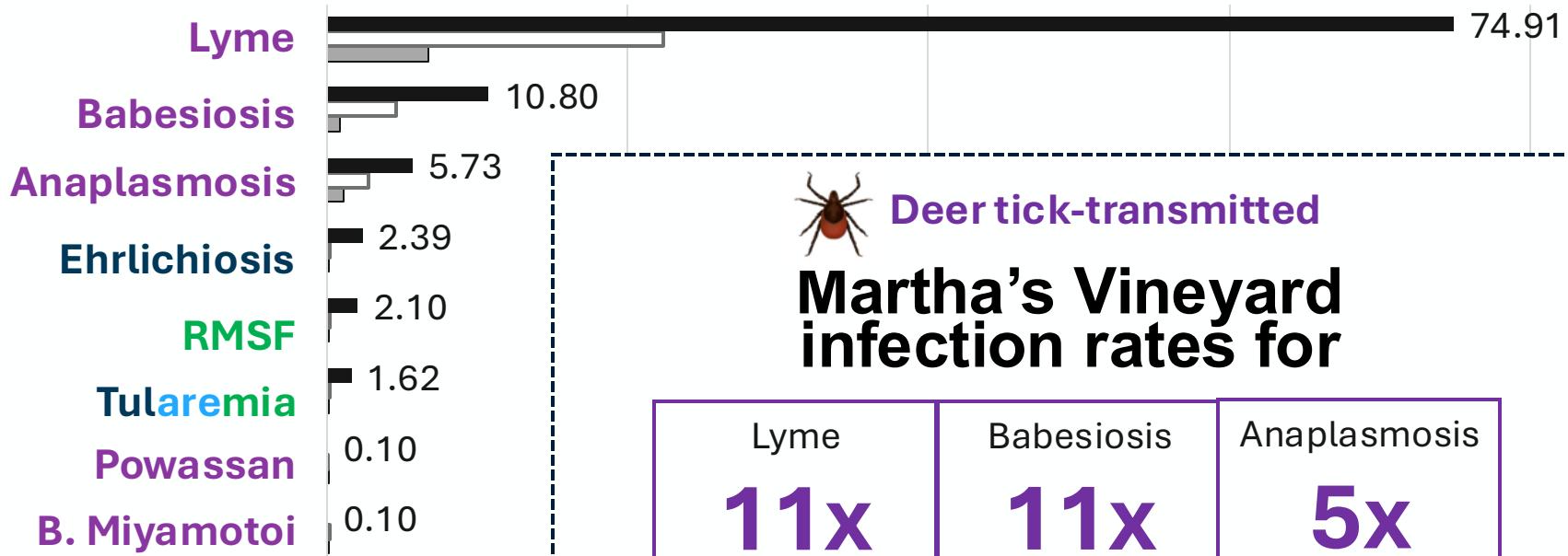


American Dog tick-transmitted

Not just tick transmitted

Deer Ticks cause the Most Infections

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



Deer tick-transmitted

**Martha's Vineyard
infection rates for**

Lyme
11x

Babesiosis
11x

Anaplasmosis
5x

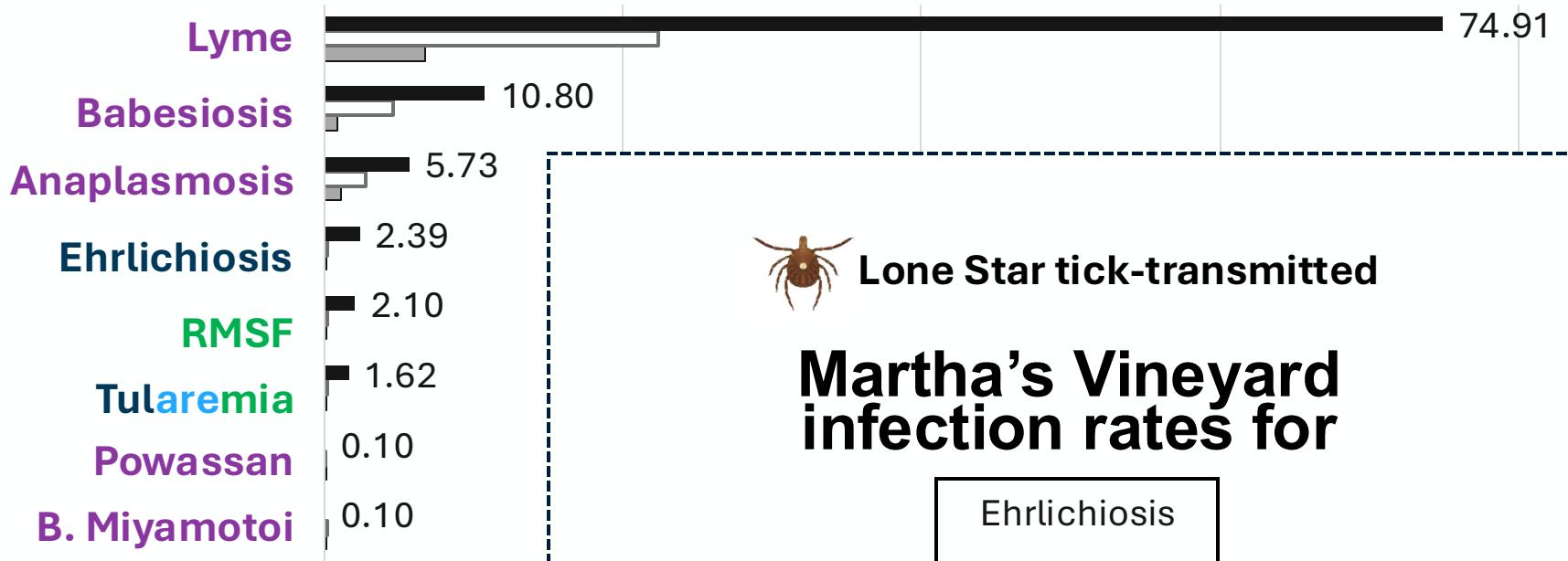
Powassan
8x

B. Miyamotoi
2x

Higher than the
Massachusetts state rate

Lone Star Tick Infections are on the Rise

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



Lone Star tick-transmitted

Martha's Vineyard
infection rates for

Ehrlichiosis
99x

Higher than the
Massachusetts state rate

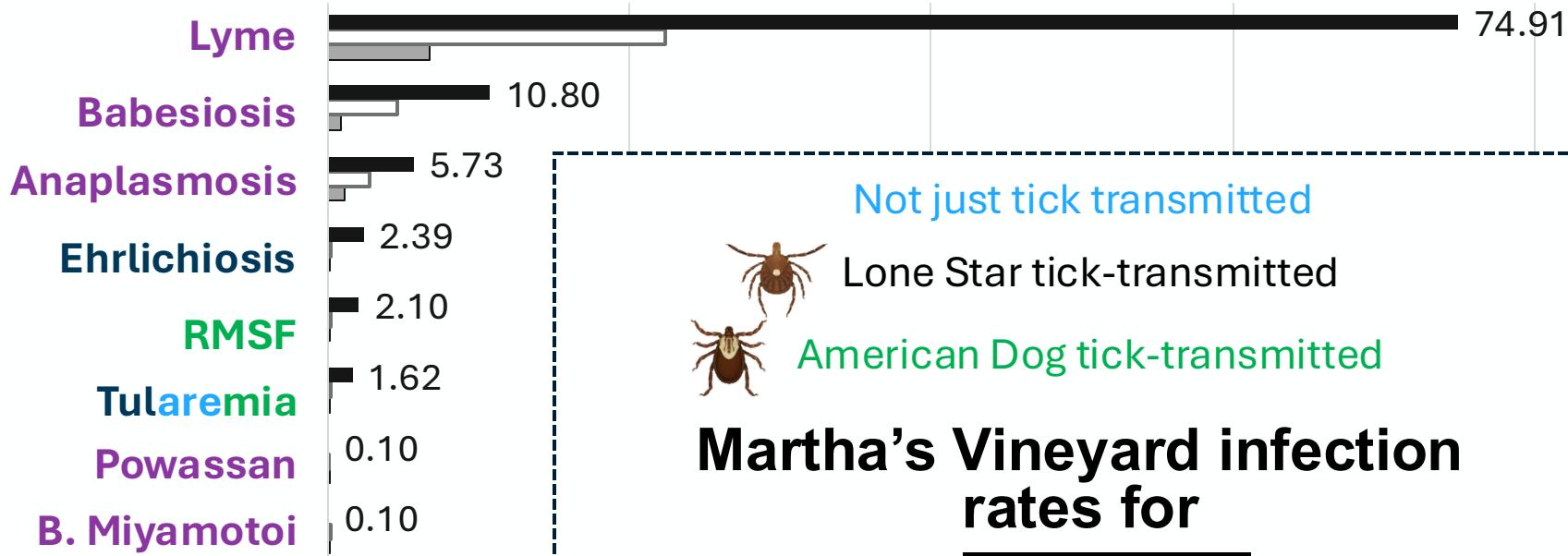
Dog Tick Infections are Unique to MV

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



As is Tularemia

5-Year Incidence Rate per 10,000 population, 2020-2024, confirmed & probable cases



Not just tick transmitted



Lone Star tick-transmitted



American Dog tick-transmitted

**Martha's Vineyard infection
rates for**

Tularemia

143x

Higher than the Massachusetts
state rate

Public Health Data on Tick-borne Infections, 5-Year Rates from 2020-2024

Dukes County compared to Massachusetts State

Disease	Massachusetts State			Dukes County			Dukes Co vs State Rate
	Cases	Rate per 10,000	Rate per 100,000	Cases	Rate per 10,000	Rate per 100,000	
Lyme ¹	23801	6.76	67.6	784	74.91	749.09	11.1x
Babesiosis ¹	3269	0.93	9.3	113	10.80	107.96	11.6x
Anaplasmosis ¹	3945	1.12	11.2	60	5.73	57.33	5.1x
Ehrlichiosis ²	85	0.02	0.24	25	2.39	23.89	99.0x
RMSF ³	40	0.01	0.11	22	2.10	21.02	185.1x
Tularemia ^{2, 3, 4}	40	0.01	0.11	17	1.62	16.24	143.0x
Borrelia Miyamotoi ¹	162	0.05	0.46	1	0.10	0.96	2.1x
Powassan ¹	40	0.01	0.11	1	0.10	0.96	8.4x

Numbers on labels indicate which type of tick transmits the disease

¹ Deer tick-transmitted

² Lone Star tick-transmitted

³ American Dog tick-transmitted

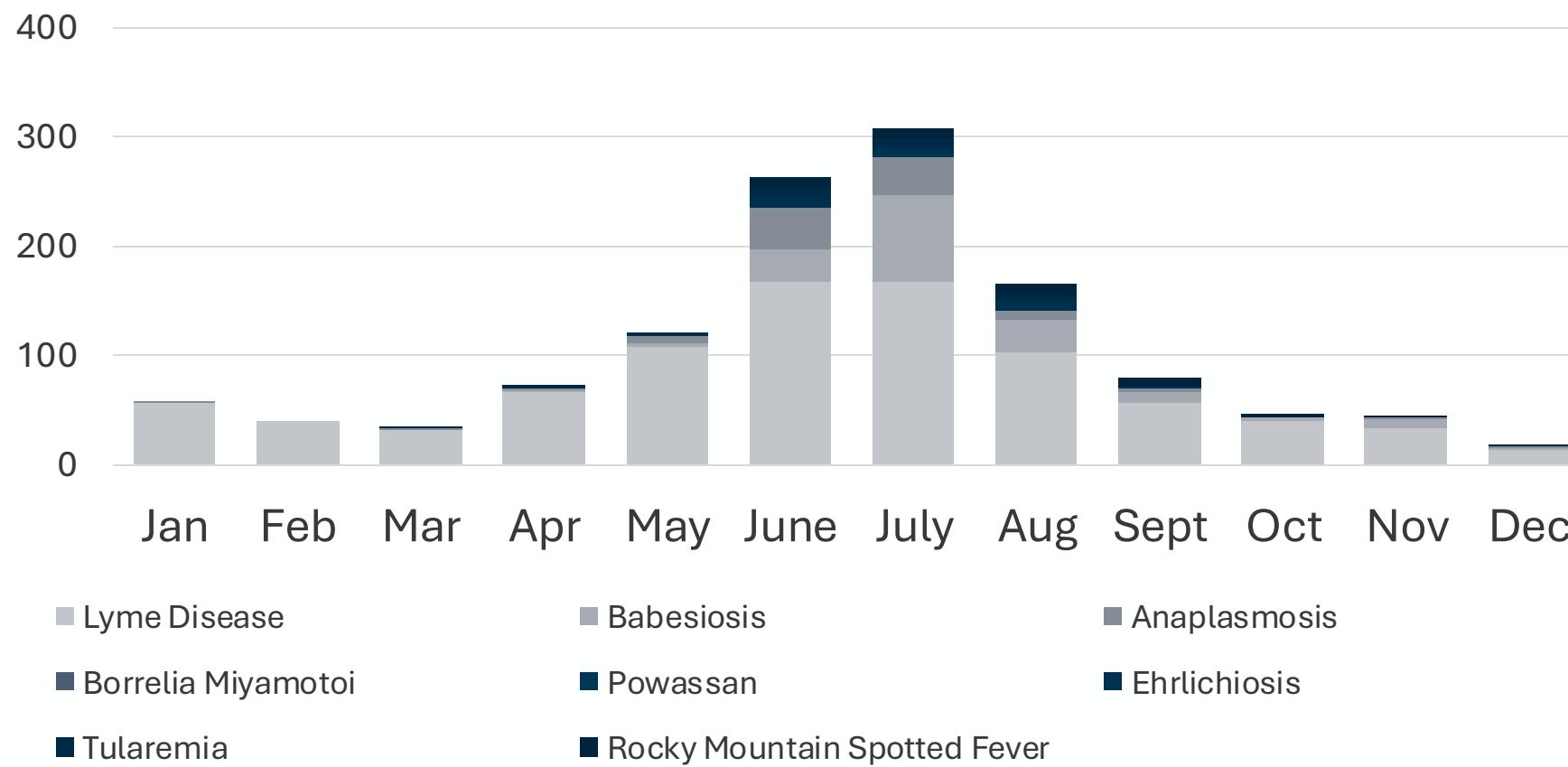
⁴ Not just tick transmitted

Rate per 10,000 calculation: Years included are 2020-2024.

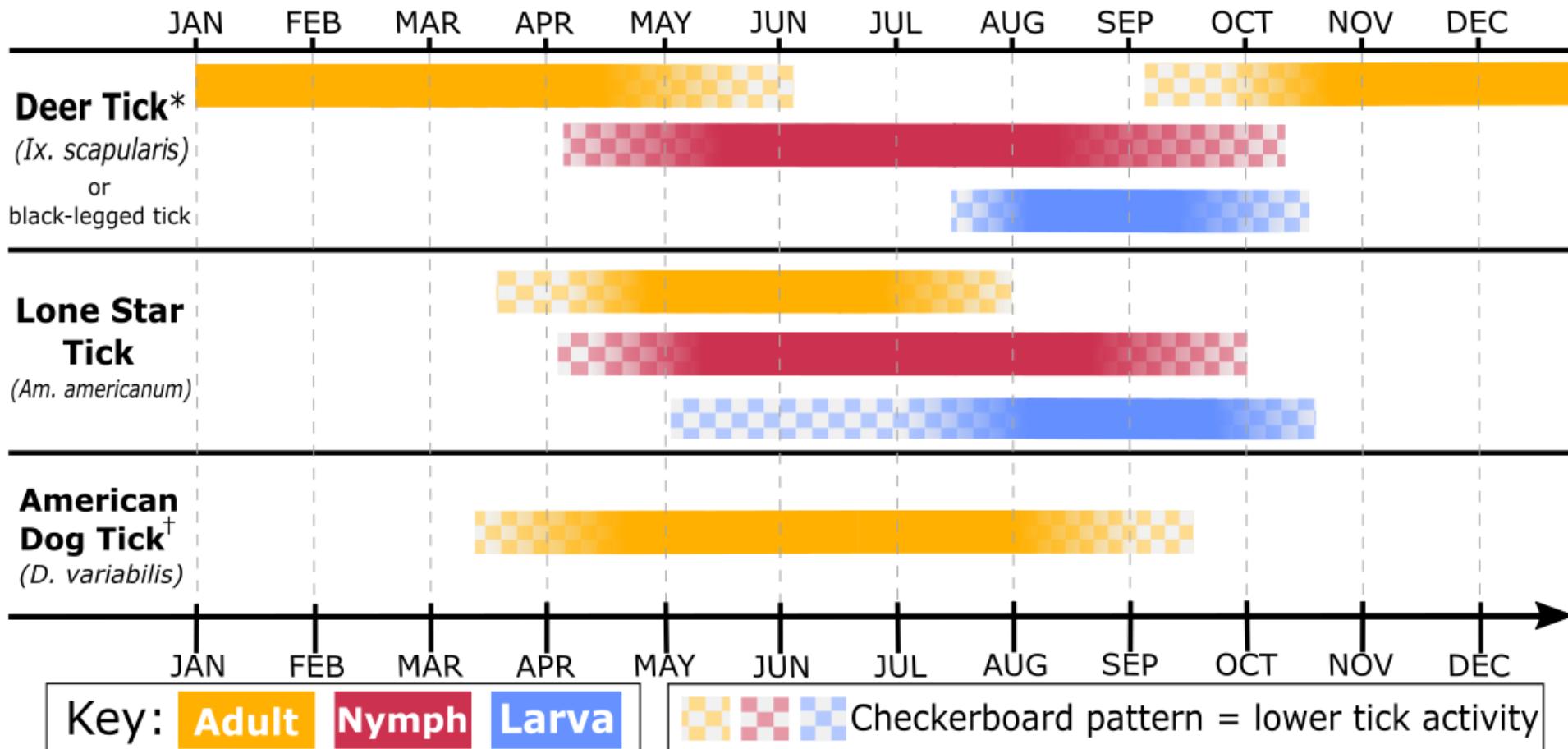
Calculation uses confirmed & probable cases from the Massachusetts Epidemiologic Virtual Network (MAVEN), Massachusetts Department of Public Health, and UMass Donahue Institute Population Estimates

Tick infections occur year-round, but peak in summer when ticks and humans are most active

10 Year (2015-2024) Dataset, Dukes County, all reportable tickborne infections, confirmed and probable cases



Tick Bite Risk is Year-Round; Highest in Spring to Fall

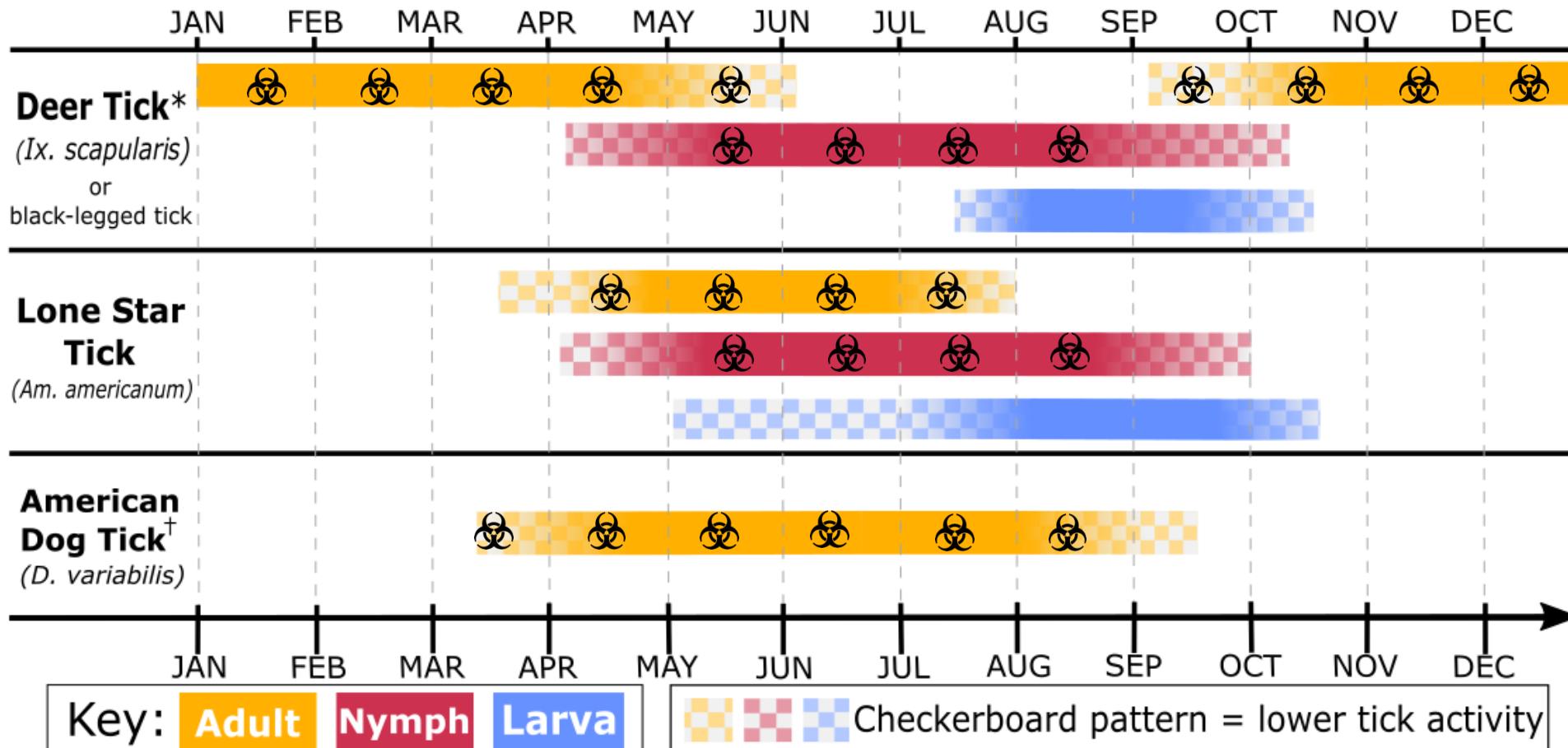


*Deer tick adults will be active when temperatures are above 40°F.

†Only the adult life stage of the American Dog Tick is known to bite humans.



Infectious Disease Risk is Year-Round; Highest in Spring to Fall



*Deer tick adults will be active when temperatures are above 40°F.

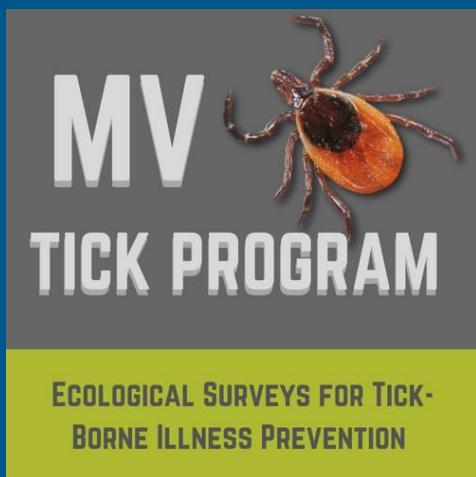
†Only the adult life stage of the American Dog Tick is known to bite humans.



My Backyard

Chilmark, MA

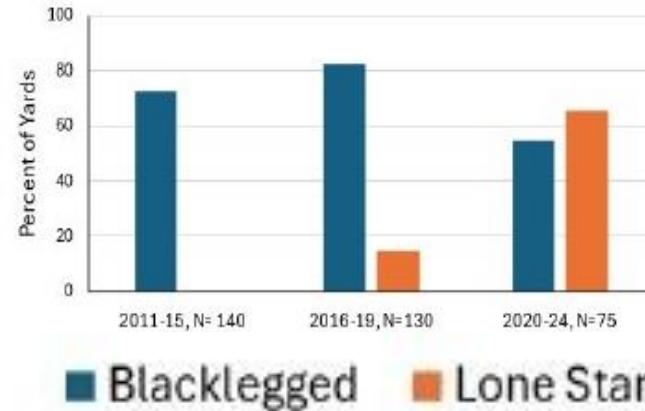
May 2024



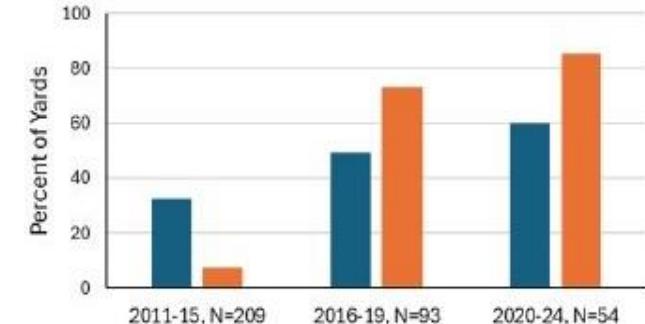
Lone Star Ticks: A tale of relentless expansion

Percent of backyards with 3+ of that tick species

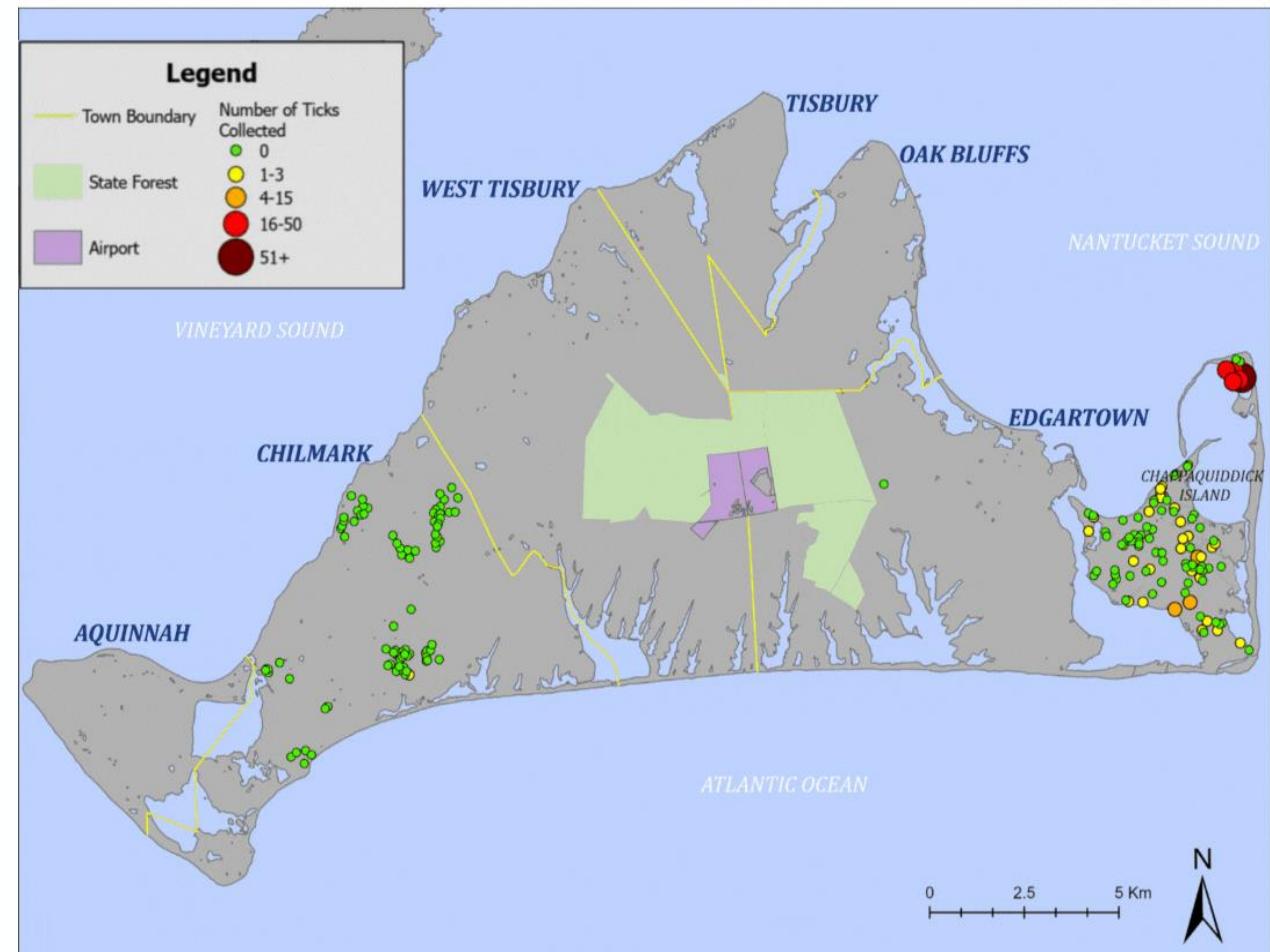
West End:
Chilmark
Backyards



East End:
Chappaquiddick
backyards



2011-2015



Lone Star ticks found in Residential Yard Surveys

Lone Star Tick Larvae aka "Tick Bombs"



The best defense:
Permethrin-treated clothes > repellent > lint rollers

Photos courtesy of Dr. Sam Telford
& MV Tick Program

Goal #1: Prevent the bite.

Which sock was permethrin-treated?



Self-experiment and photo
by Dr. Sam Telford III, Tufts

Lone Star bites ITCH, last weeks, miserable

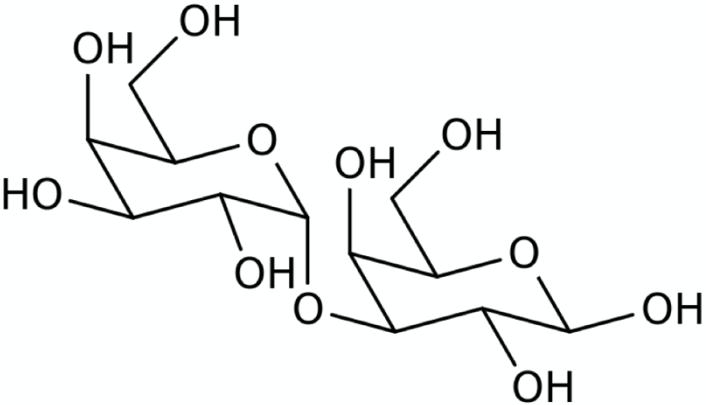


Sometimes there's still a tick there, often there isn't.



Larvae (babies) have no infectious pathogens, but can cause...

Galactose alpha-1,
3-galactose
(A carbohydrate)



Alpha Gal Syndrome

Present in
tissues & cells of
**ALL non-primate
mammals &**
some other
organisms too



- An allergy caused by a tick bite
- Wide range of symptoms
- Reactions can be mild to life-threatening
- Delayed symptoms (2-8 hours) after exposure

Classic Symptoms of Alpha Gal Syndrome

Timing: usually **delayed** 2-8 hours after eating/drinking exposures.
Can be quicker for inhaling or injected (medication) exposures.

Skin	Swelling	Breathing	Cardiac	Gastro-Intestinal
<ul style="list-style-type: none">• Hives• Rashes• Itching	<p>Of the</p> <ul style="list-style-type: none">• Palms• Soles of feet• Lips, throat, or tongue• Eyelids	<ul style="list-style-type: none">• Cough• Wheezing• Shortness of breath• Difficulty breathing	<ul style="list-style-type: none">• Drop in blood pressure• Dizziness• Faintness	<ul style="list-style-type: none">• Abdominal pain• Diarrhea• Nausea• Vomiting• Heartburn• Indigestion

Reactions can involve multiple systems at once, or change over time

Alpha Gal Syndrome

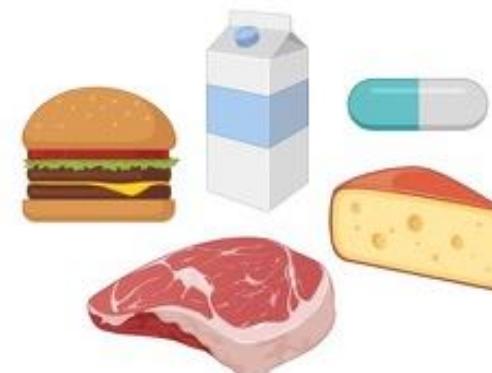
(An allergy, not an infection)



Tick bite



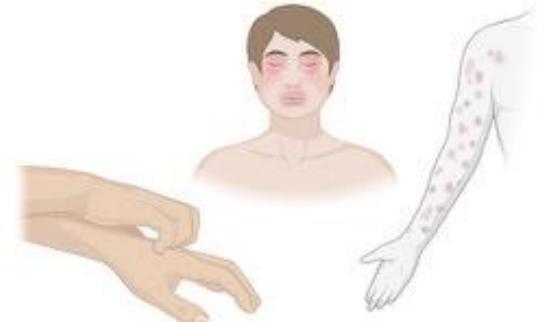
Weeks to months



Consume mammalian meat, dairy, gelatin, or other mammal-derived products



Hours



Hives, itching, swelling, and/or anaphylaxis

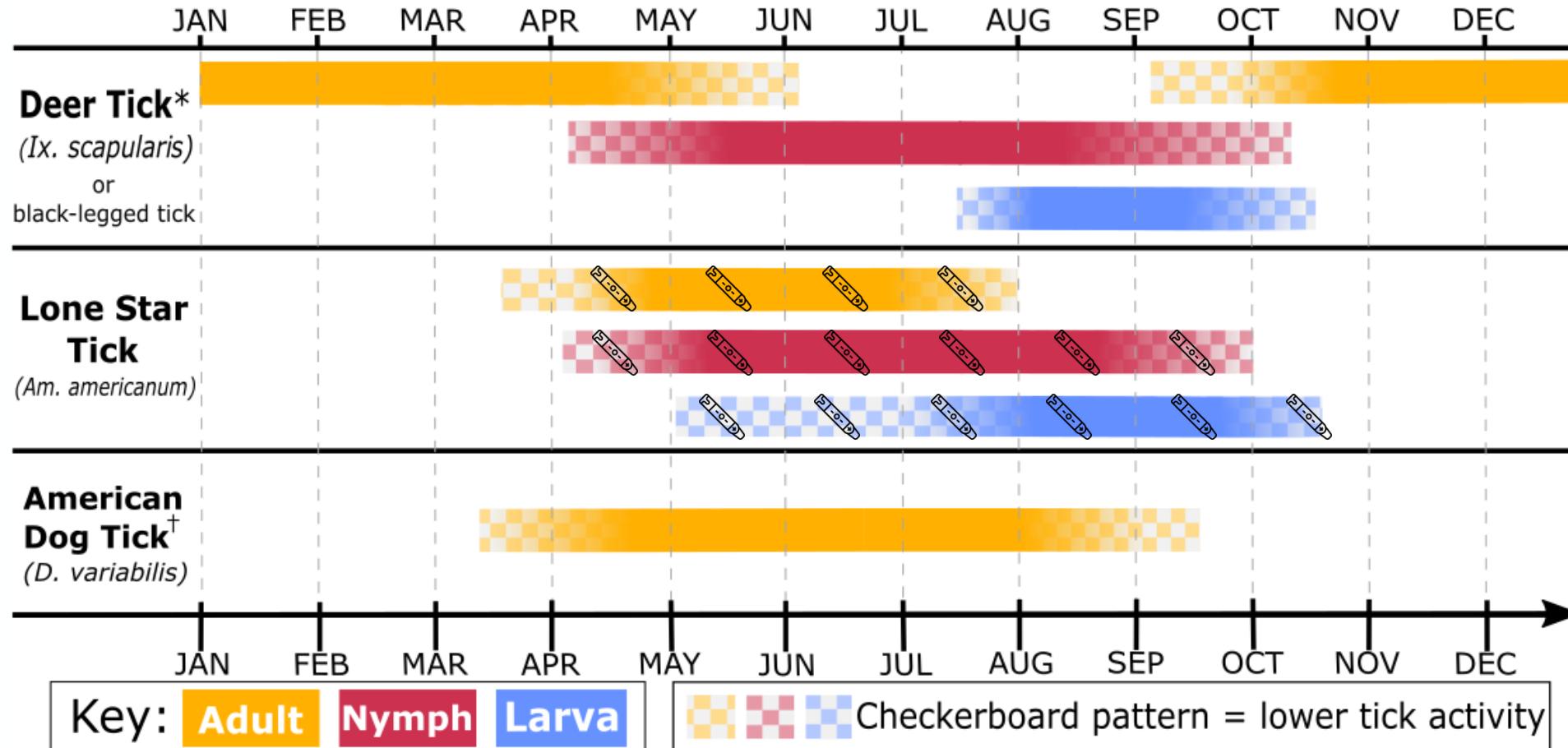


Abdominal pain, diarrhea, nausea, vomiting, and/or anaphylaxis

Adapted from McGill SK, Hashash JG, Platts-Mills TA. AGA Clinical Practice Update on Alpha-Gal Syndrome for the GI Clinician: Commentary. *Clin Gastroenterol Hepatol*.

Created with BioRender.com

Alpha Gal Syndrome Risk in Spring to Fall

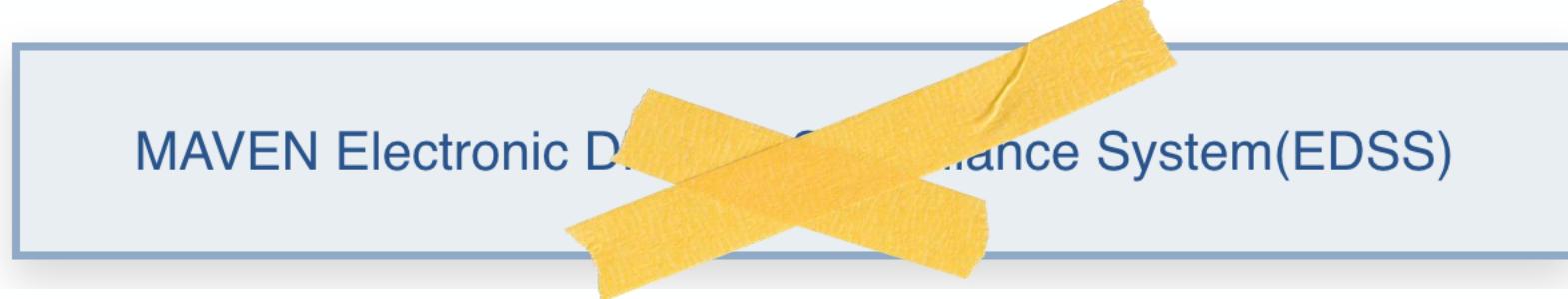


*Deer tick adults will be active when temperatures are above 40°F.

†Only the adult life stage of the American Dog Tick is known to bite humans.



Alpha Gal Syndrome is NOT a Reportable Disease in MA



Several Tickborne Conditions are NOT Reportable in MA State Law:

- Alpha Gal Syndrome (an allergy)
- Heartland Virus
- Bourbon Virus
- Southern tick-associated rash illness (STARI)
- Colorado tick fever
- Tickborne relapsing fever (Soft tick relapsing fever)

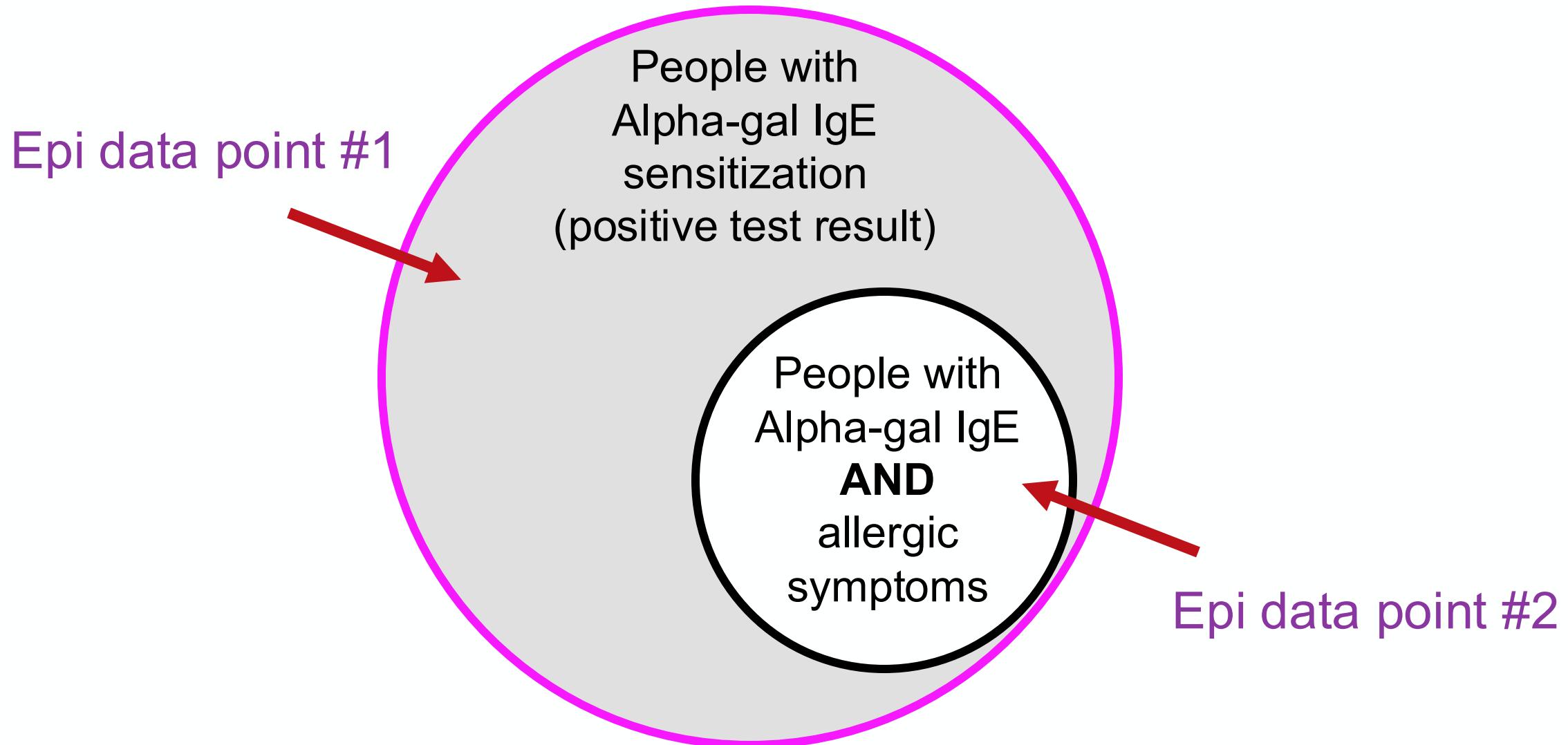


Getting the data...

Surveillance is a matter of what data we can get with the resources that we have.

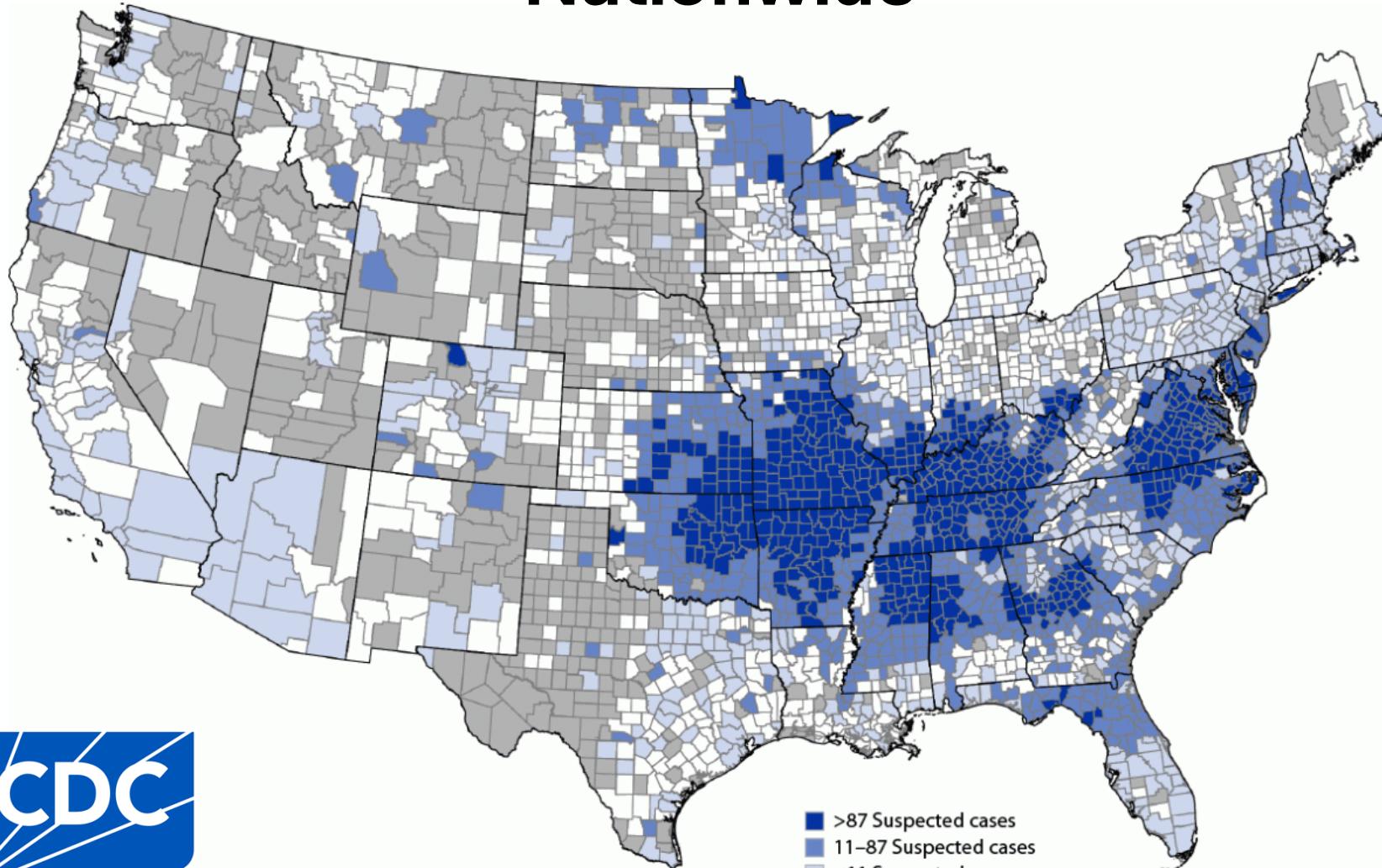


A positive test *alone* does not mean you have Alpha Gal Syndrome



National Data Point #1

Alpha-Gal IgE Testing Nationwide



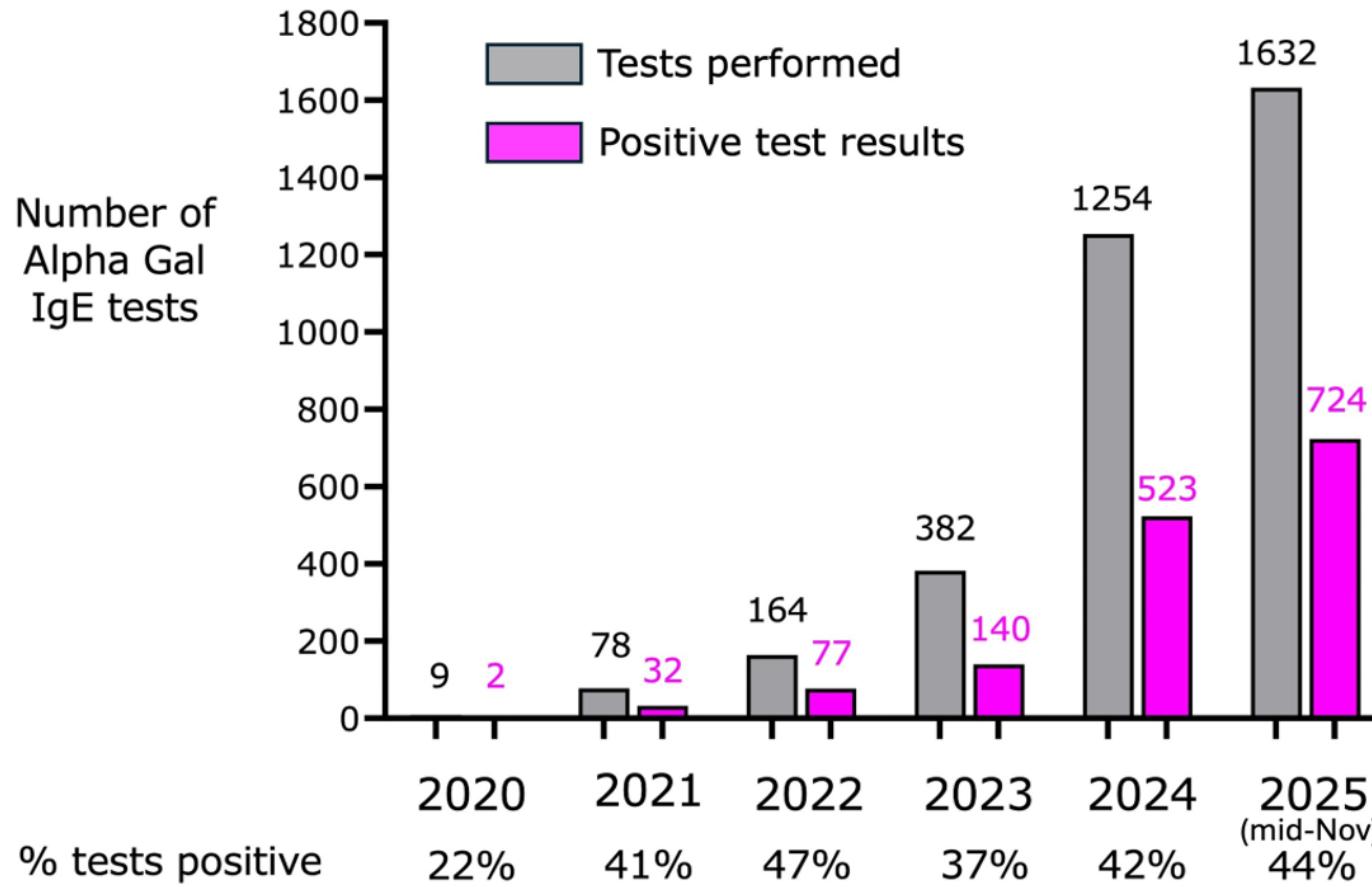
[Geographic Distribution of Suspected Alpha-gal Syndrome Cases — United States, January 2017–December 2022 | MMWR](#)

>87 Suspected cases
11–87 Suspected cases
<11 Suspected cases
0 Suspected cases
No testing performed

Local Data Point #1

Alpha-gal IgE Testing at Martha's Vineyard Hospital, 2020-2025

Note that diagnosed patients may be retested every 10-12 months; data are not de-duplicated.

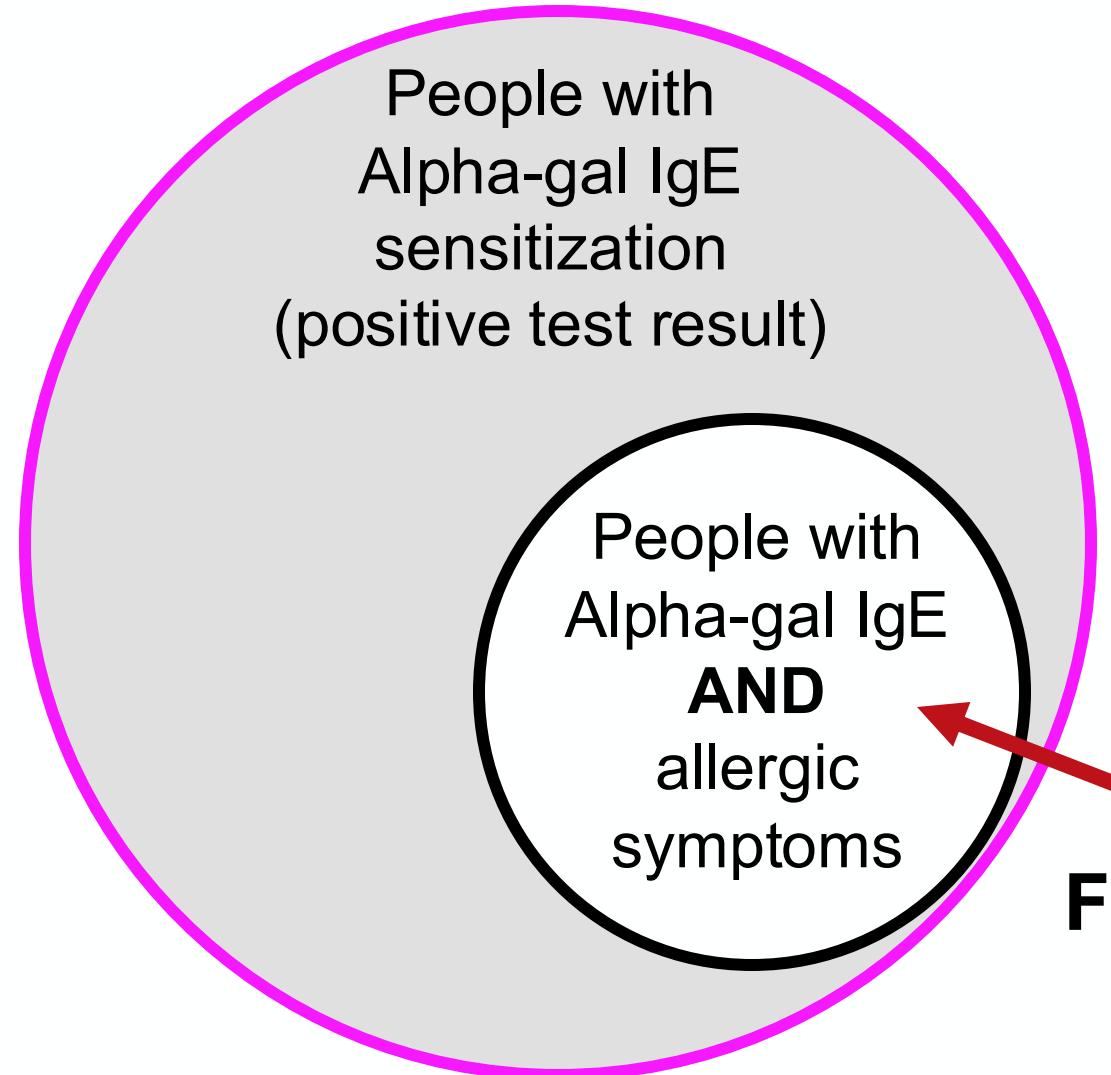


Local Data Point #2

In 2025, 1 island allergist had over 400 AGS patients.

(Prevalent cases who fought through referrals)

A positive test *alone* does not mean you have Alpha Gal Syndrome



Allergist data is a start, but many patients don't seek/get through the referrals.

My 2026 epi project:
Figure out this number!
(AGS Cases)

Public Health Data on Tick-borne Infections from 2020-2024

Dukes County compared to Cape & Islands region and Massachusetts State

Disease	Massachusetts State			Dukes County			Dukes Co vs State Rate
	Cases	Rate per 10,000	Rate per 100,000	Cases	Rate per 10,000	Rate per 100,000	
Lyme ¹	23801	6.76	67.6	784	74.91	749.09	11.1x
Alpha Gal Syndrome	?	?	?	~ 400	38 – 189?	380-1890?	???
Babesiosis ¹	3269	0.93	9.3	113	10.80	107.96	11.6x
Anaplasmosis ¹	3945	1.12	11.2	60	5.73	57.33	5.1x
Ehrlichiosis ²	85	0.02	0.24	25	2.39	23.89	99.0x
RMSF ³	40	0.01	0.11	22	2.10	21.02	185.1x
Tularemia ^{2, 3, 4}	40	0.01	0.11	17	1.62	16.24	143.0x
Borrelia Miyamotoi ¹	162	0.05	0.46	1	0.10	0.96	2.1x
Powassan ¹	40	0.01	0.11	1	0.10	0.96	8.4x

Numbers on labels indicate which type of tick transmits the disease

¹ Deer tick-transmitted

² Lone Star tick-transmitted

³ American Dog tick-transmitted

⁴ Not just tick transmitted

Rate per 10,000 calculation: Years included are 2020-2024.

Calculation uses confirmed & probable cases from the Massachusetts Epidemiologic Virtual Network (MAVEN), Massachusetts Department of Public Health, and UMass Donahue Institute Population Estimates

Tickborne Conditions in Dukes County

Dukes County, 2020-2024

		Transmitted by:			
		Pathogen Type	Deer tick	Lone Star Tick	American Dog Tick
Ranked from Most Common to Least					
Very common	1. Lyme Disease	Bacteria			
	2. Alpha Gal Syndrome	Not a pathogen			
Common	3. Babesiosis	Protozoa			
	4. Anaplasmosis	Bacteria			
Uncommon	5. Ehrlichiosis	Bacteria	*		
	6. Rocky Mountain Spotted Fever (RMSF)	Bacteria			
Rare, but present	7. Tularemia	Bacteria			
	8. <i>Borrelia miyamotoi</i>	Bacteria			
	9. Powassan Virus	Virus			

Data from Massachusetts Epidemiologic Virtual Network (MAVEN) & Martha's Vineyard Hospital (Alpha Gal Syndrome, total positive tests per year). Analysis & graphic by Lea Hamner, July 10, 2025

Information → Communication

 The New York Times

Why Is Martha's Vineyard Going Vegan? It's All About Tick Bites.

Aug 12 • By Pete Wells



 CBS News

Meat, dairy allergies from tick bites "skyrocketing" on Martha's Vineyard, expert says

Aug 15 • By Kristina Rex



 Martha's Vineyard Magazine

An Island Epidemic

Jun 6 • By Ethan Genter



 Barnstable County (.gov)

Cape Cod Healthcare: Alpha-gal is Spreading Fast on Cape Cod and the Islands

May 5 • By Laurie Higgins

 the-scientist.com

The Alpha-Gal Syndrome Story: How Researchers Traced a Red-Meat Allergy to Ticks

May 26 • By Danielle M Gerhard

 Psychology Today

Alpha-gal syndrome is increasing as Lone Star ticks spread across the United States.

Sep 16

 The Times

'We can no longer eat burgers or ice cream — all because of a tick bite'

Aug 20 • By Samuel Lovett

 New York Post

Tick bites on Martha's Vineyard are forcing residents to go vegan because of alpha-gal syndrome

Aug 20 • By natalie o'neill



Virtual Programming

- Great for reducing repetitiveness and staffing costs of presentations
- Opportunities to feature more experts
- Recording presentations creates a resource library



Vineyard Haven Public Library



Check out our
[Video Showcase!](#)

Wednesday, Feb 5th @6pm

Virtual: How to Talk to Your Doctor about Alpha-Gal Syndrome



Learn how to effectively discuss alpha-gal syndrome with your healthcare provider. Gain insights into preparing for appointments, understanding necessary tests, and communicating symptoms. Don't miss this opportunity to empower yourself with knowledge and take control of your health! In collaboration with the Martha's Vineyard Tick Program.

Candice Matthis and Debbie Nichols, founders of Two Alpha Gals and the Alpha-gal Foundation, are dedicated to helping individuals navigate life with alpha-gal syndrome without sacrificing joy.

Sharon Forsyth is the co-founder of the Alpha-gal Alliance and the Alpha-Gal Alliance Action Fund. She organized the Alpha-gal Syndrome Awareness Campaign and created AlphaGallInformation.org.

Register on event calendar at www.vhlibrary.com

Vineyard Haven Library
200 Main Street | Vineyard Haven
www.vhlibrary.org | 508.696.4211

Monday, October 28th @ 6pm on Zoom

Alpha-gal syndrome: the tick bite-induced epidemic of severe allergic reactions



Top alpha-gal expert, Dr. Scott Commins, will explain the basic science and translational work that went into describing the alpha-gal mammalian meat allergy, and the work which related to defining both the cause and the mechanism of alpha-gal IgE response, the role of tick bites in AGS, and the epidemiology of AGS in the US and globally. A question and answer period to follow talk.

Scott Commins is the Dr. William J. Youst Distinguished Professor at The University of North Carolina at Chapel Hill, where he serves as Section Head of Allergy and Immunology in the Department of Medicine. Dr. Commins is also the Director of a private clinical practice and research program with a focus on food allergy, including the alpha-gal syndrome (AGS) and eosinophilic esophagitis.

Vineyard Haven Library

58:32

Alpha-gal syndrome: the tick bi...

 vhlibrary

The Vineyard Haven Library, in collaboration with the Inter-Island Public Health Excellence...

Wednesday, October 9th @ 3:30 pm

Tickborne Diseases with the MV Tick Program



Join Epidemiologist Lea Hammer and Biologist Patrick Roden-Reynolds for the second presentation in this two-part series. In Part One, Patrick focused on basics of tick ecology and behavior, including the most important tactics to prevent tick bites. In Part Two, Lea will discuss tickborne diseases found on Martha's Vineyard and the new kid on the block: Alpha Gal Syndrome or red meat allergy. Question and answer period to follow talk.

Patrick Roden-Reynolds is Public Health Biologist for the Inter-Island Public Health Excellence Collaborative and Director of the Martha's Vineyard Tick Program. His work focuses on education and surveillance of vector-borne diseases and their vector populations. Lea Hammer is an Epidemiologist for the Inter-Island Public Health Excellence Collaborative. She focuses on infectious diseases of public health significance and promotes data-informed decision-making to support healthy communities.

1:29:26 www.vhlibrary.org 508.696.4211

Tickborne Diseases with the M...

 vhlibrary

This is the second in a two-part series on tick ecology and tickborne diseases with Lea Hamner...

Wed, Oct 9th @ 3:30 pm

Tick Ecology and Tickborne Diseases Part Two on Zoom!



Join Epidemiologist Lea Hammer and Biologist Patrick Roden-Reynolds of the Inter-Island Public Health Excellence Collaborative for the second presentation in this two-part series. In Part One, Patrick focused on basics of tick ecology and behavior, including the most important tactics to prevent tick bites. In Part Two, Lea will discuss tickborne diseases found on Martha's Vineyard and the new kid on the block: Alpha Gal Syndrome or red meat allergy. Question and answer period to follow talk.

Register on event calendar at www.vhlibrary.org

Vineyard Haven Library
200 Main Street | Vineyard Haven
www.vhlibrary.org | 508.696.4211



Feedback from the Community:

“Without the MV Tick Program the island would be awash in misinformation and rumors.”

“As a clinician and patient affected by AGS, I wholeheartedly support your team’s effort and leadership in responding to this crisis.”

“The more education on Alpha-Gal Syndrome, the better. There are still so many who don’t even know about it.”

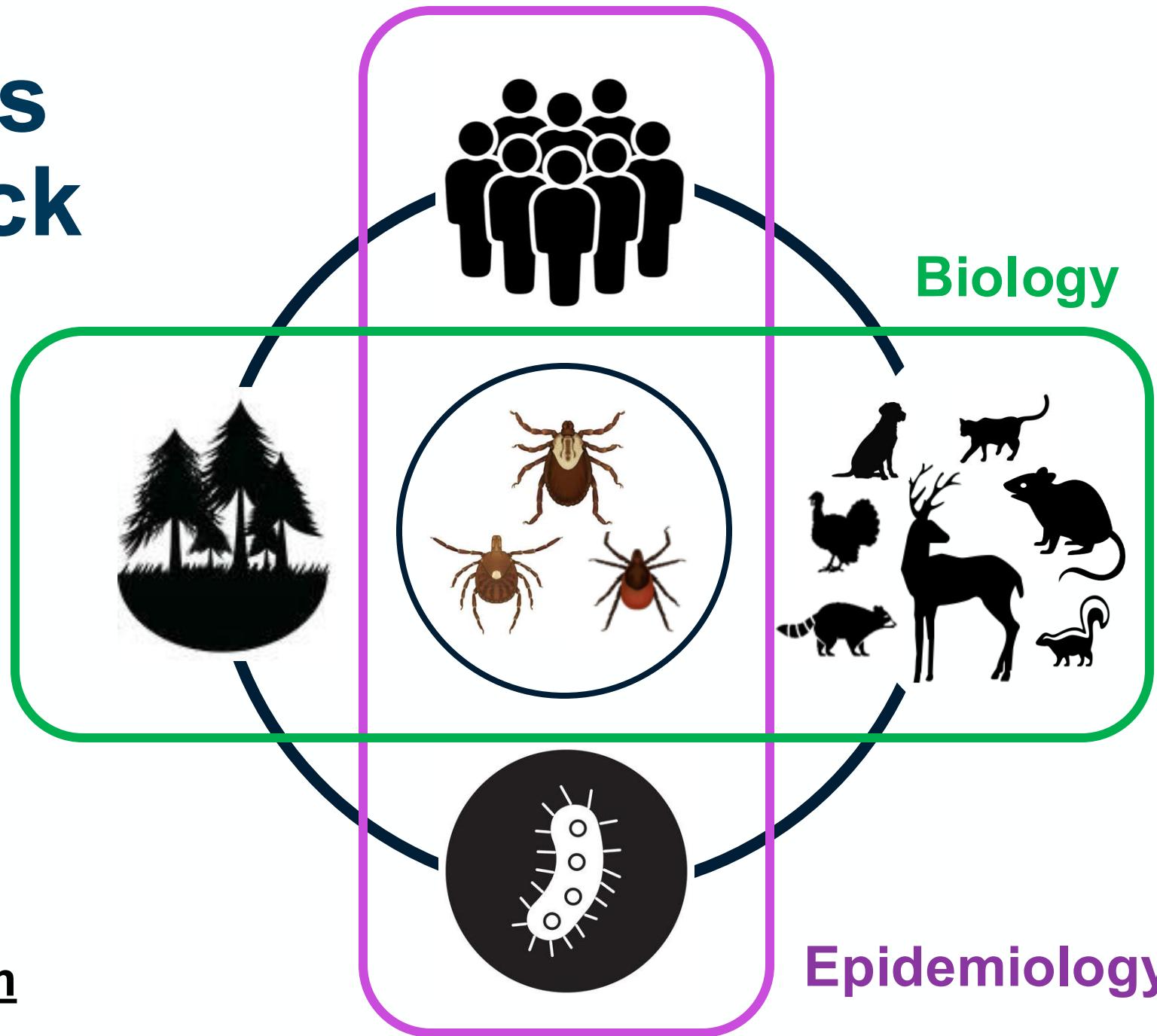
“Because of the MV Tick Program’s education efforts, I knew what was happening when I had my first Alpha-Gal reaction. I knew what to do, when to call 911, and didn’t panic. That knowledge kept me safe.”

The Martha's Vineyard Tick Program



Check out our other presentations and visit our website!

IslandsPublicHealth.com



Thank you!

