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

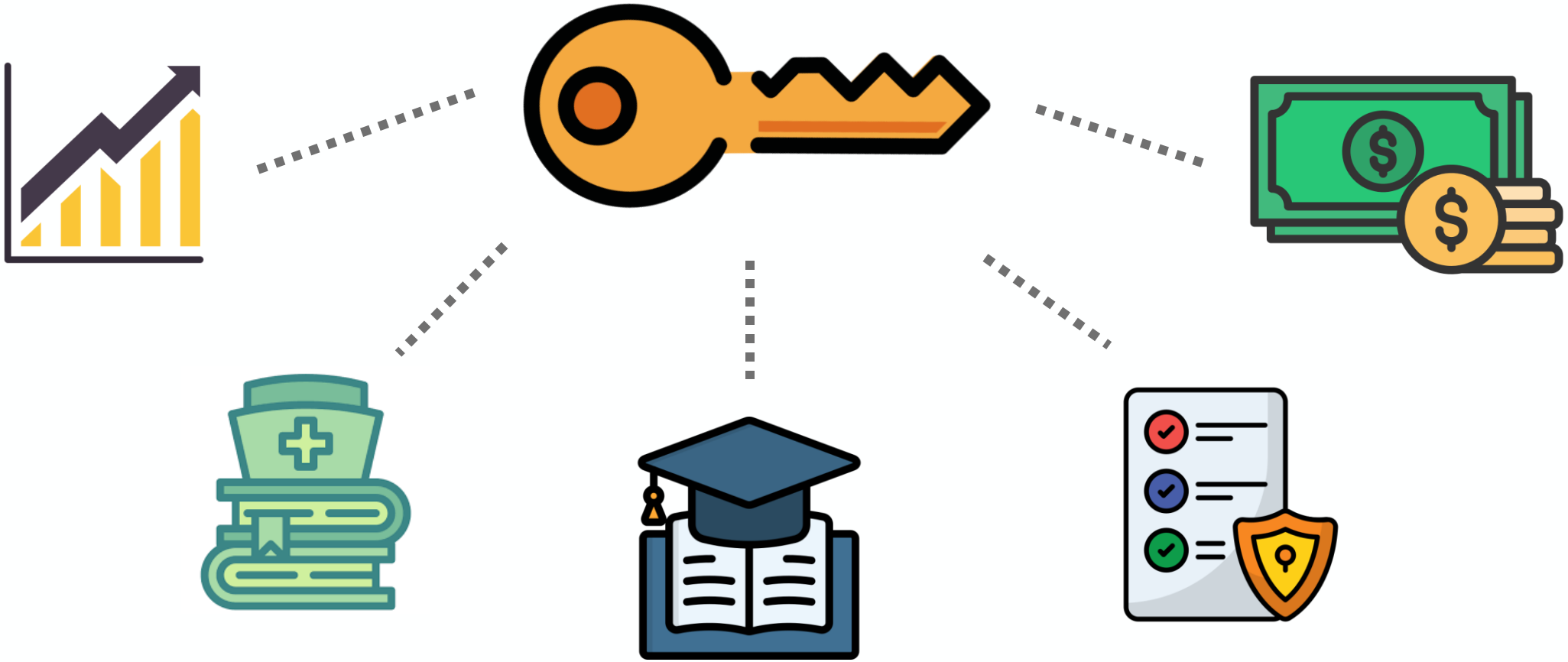
Lea Hamner, MPH

Epidemiologist

lhamner@oakbluffsma.gov

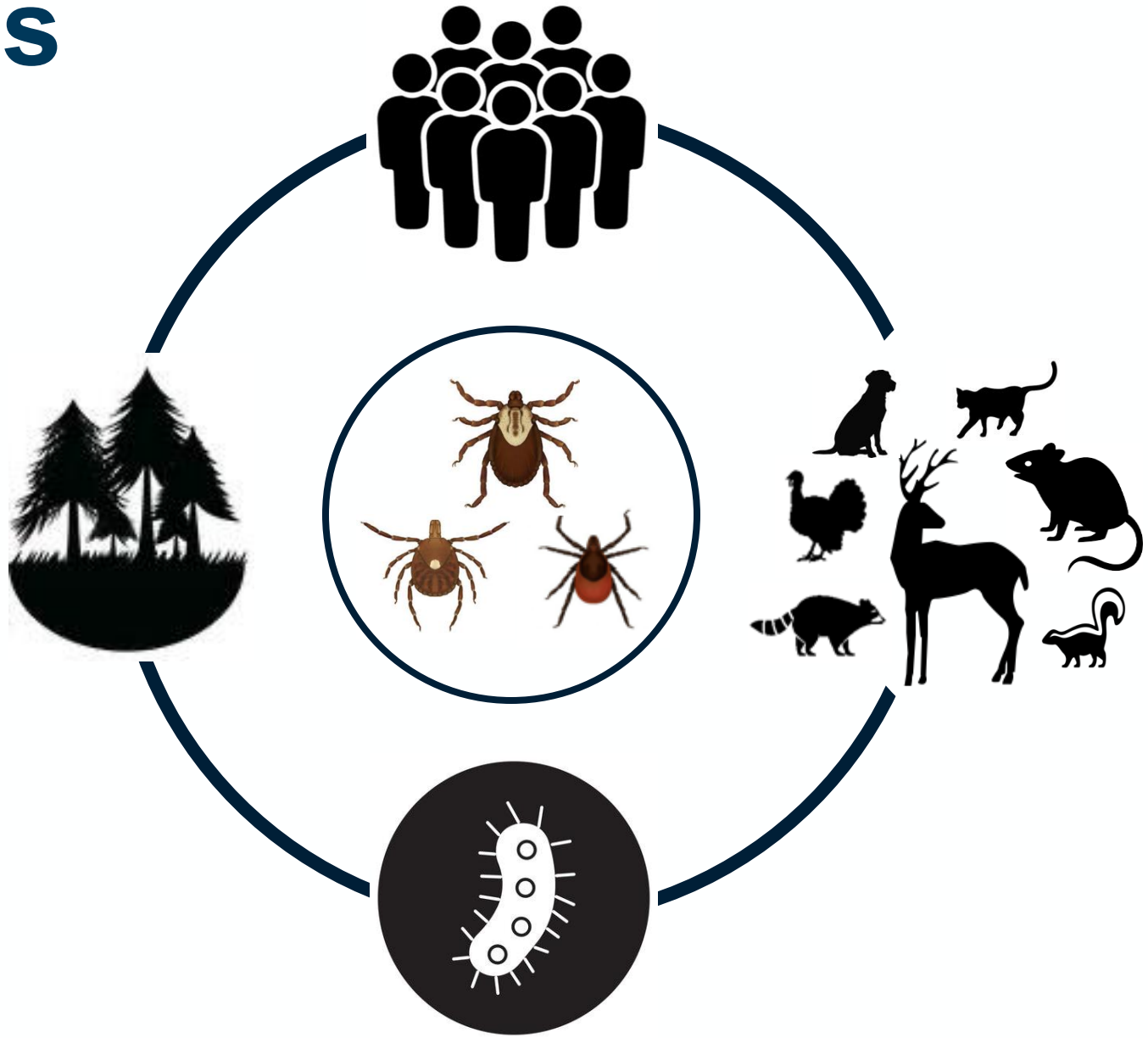
Information is valuable

Your local epidemiologist



My **Most Used** Epi Skills in LPH

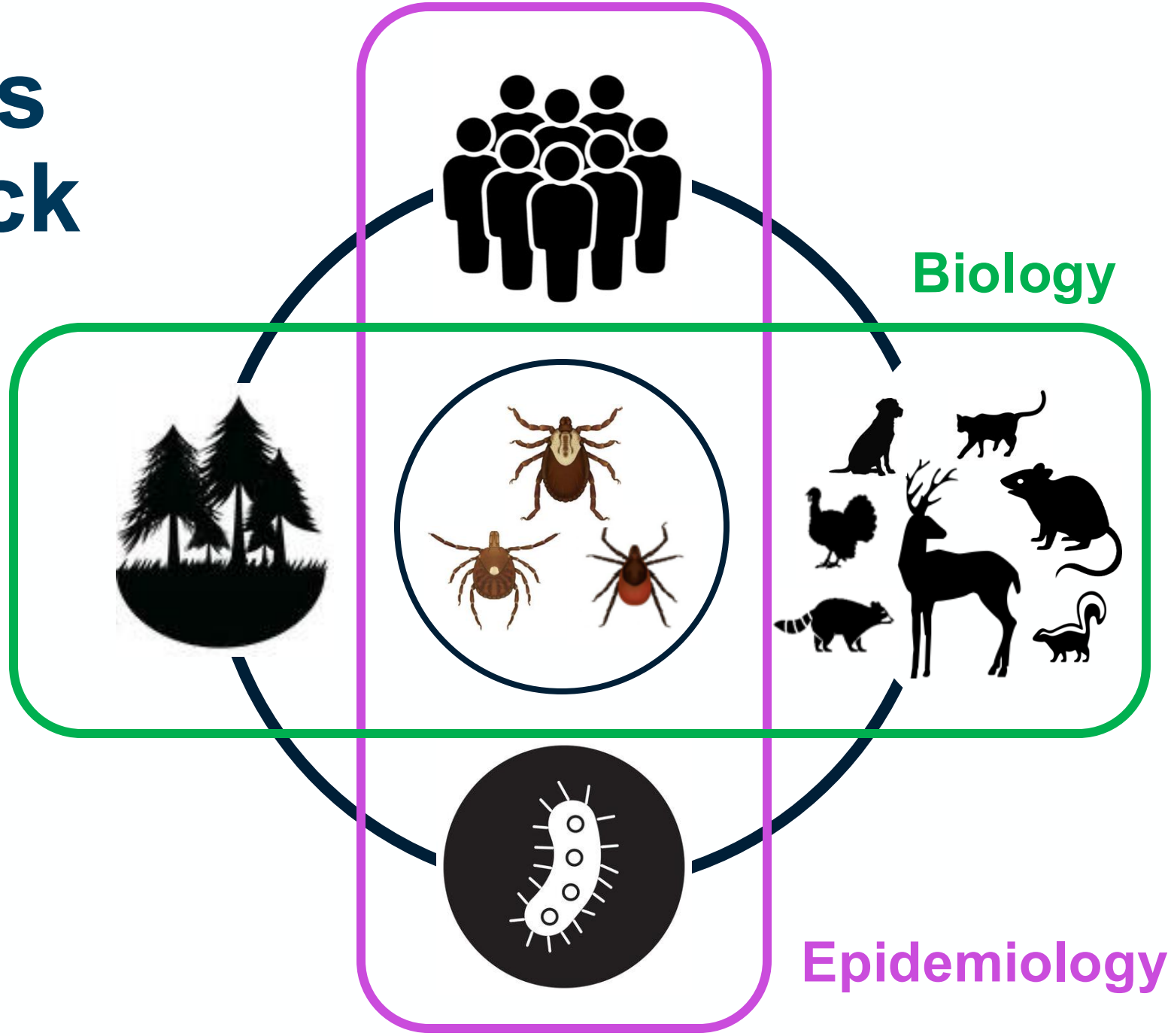
Ticks, diseases and allergy, are a *complex* public health problem.



The Martha's Vineyard Tick Program

Our Local One Health Approach:

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



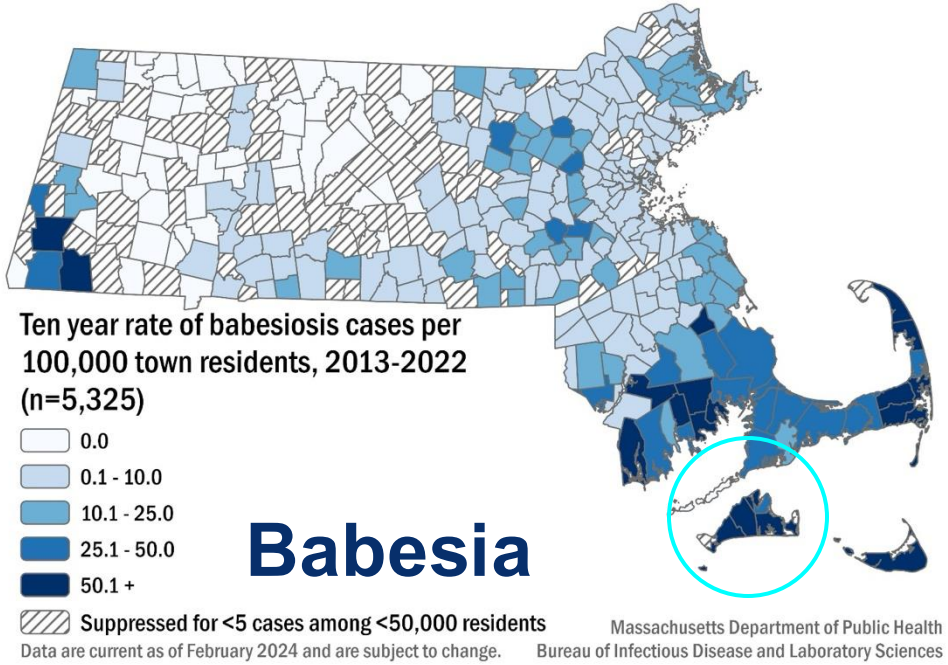
Evidence Informed, Community Driven

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

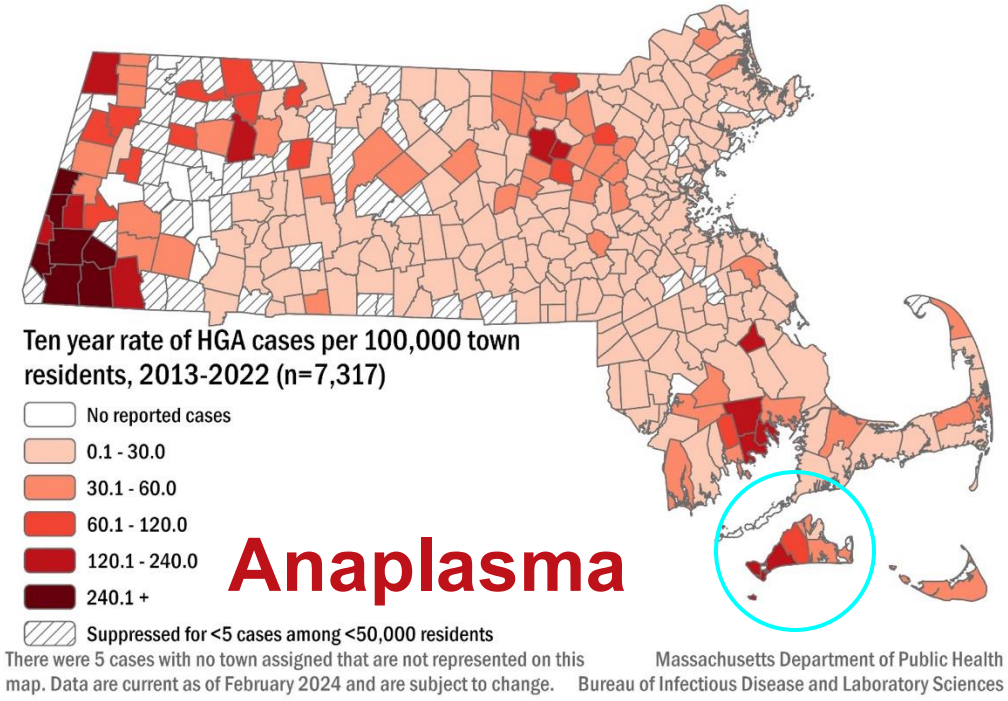
A Bit About Marthas Vineyard

A Bit About Marthas Vineyard

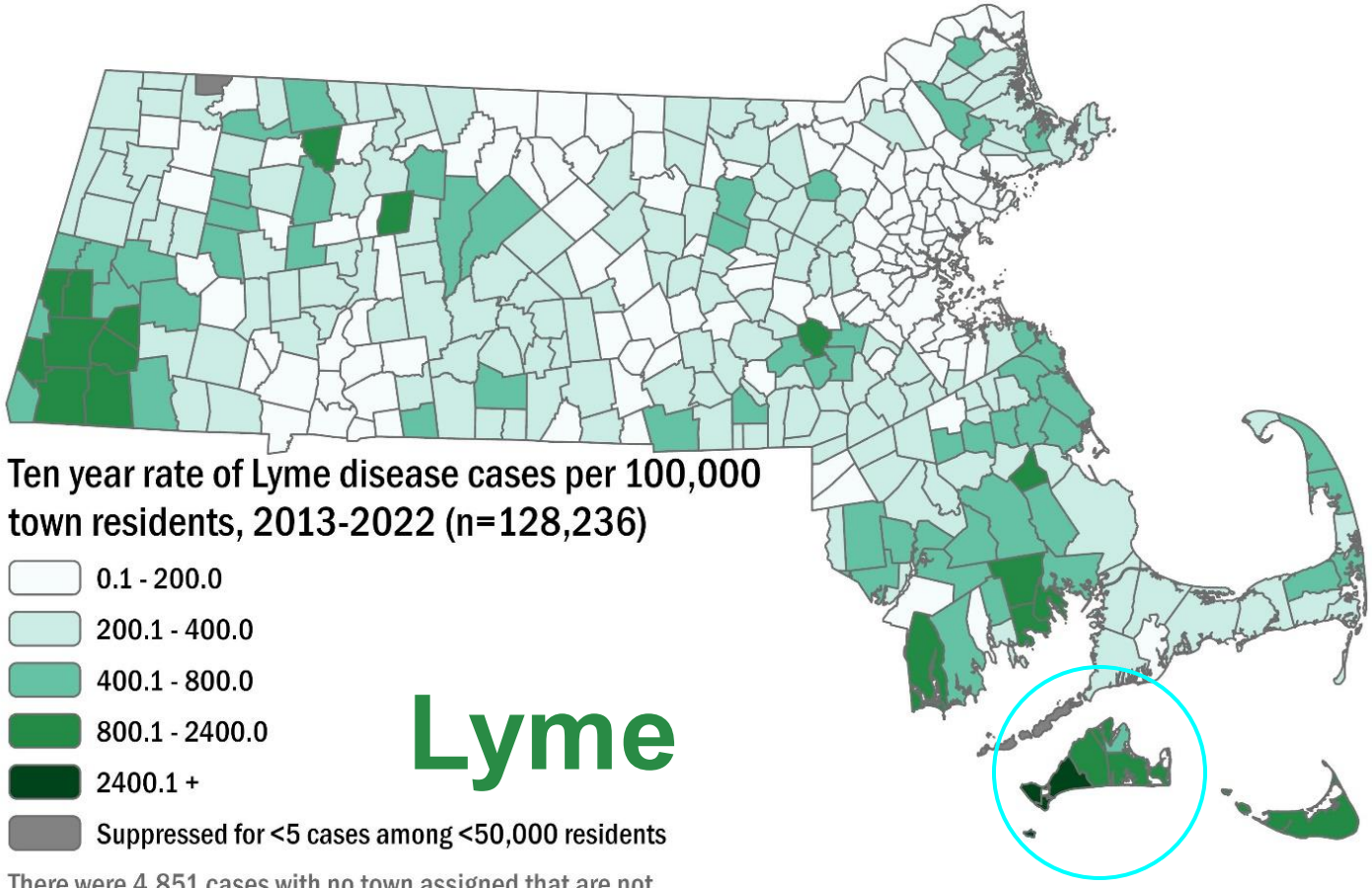
‘Houston, we have a problem”
- Epidemiologists



Babesia



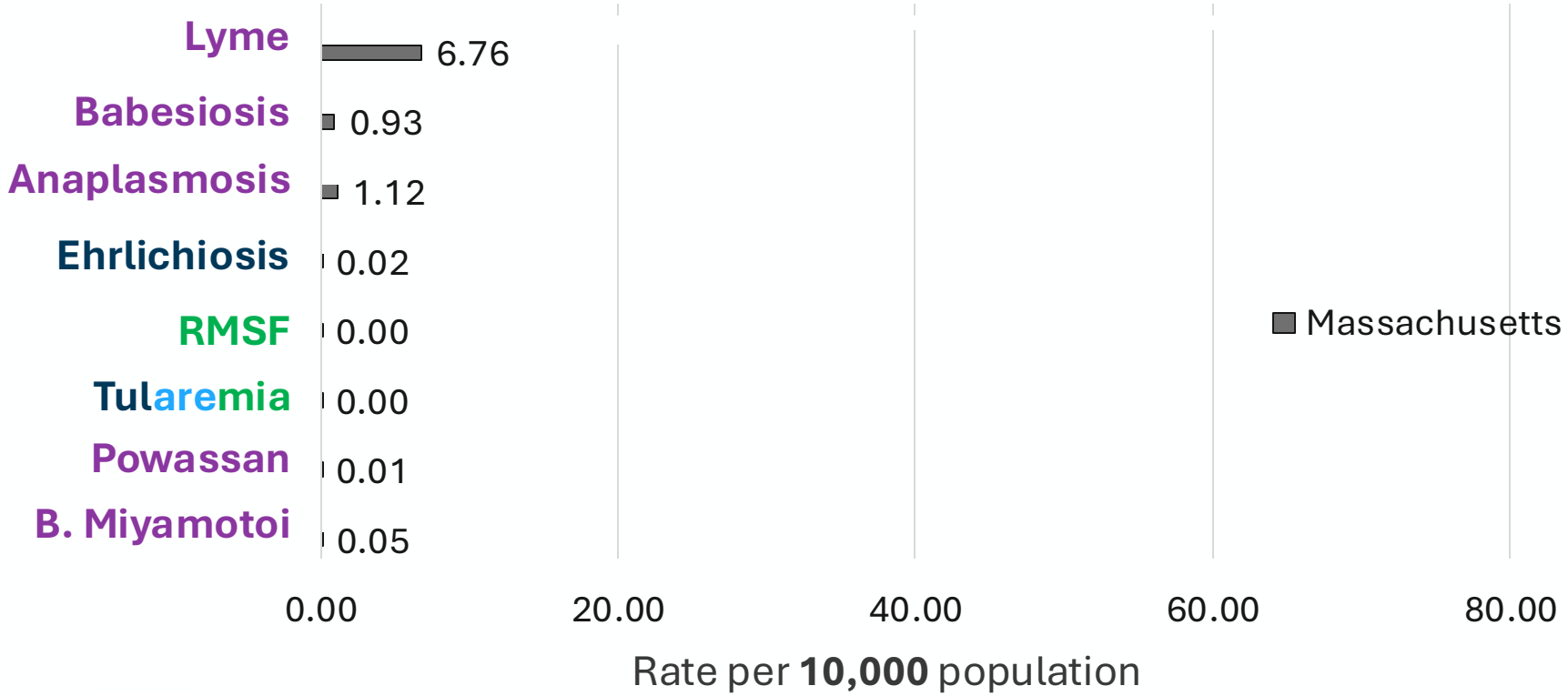
Anaplasma



Lyme

Deer Ticks cause the Most Infections

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



Deer tick-transmitted

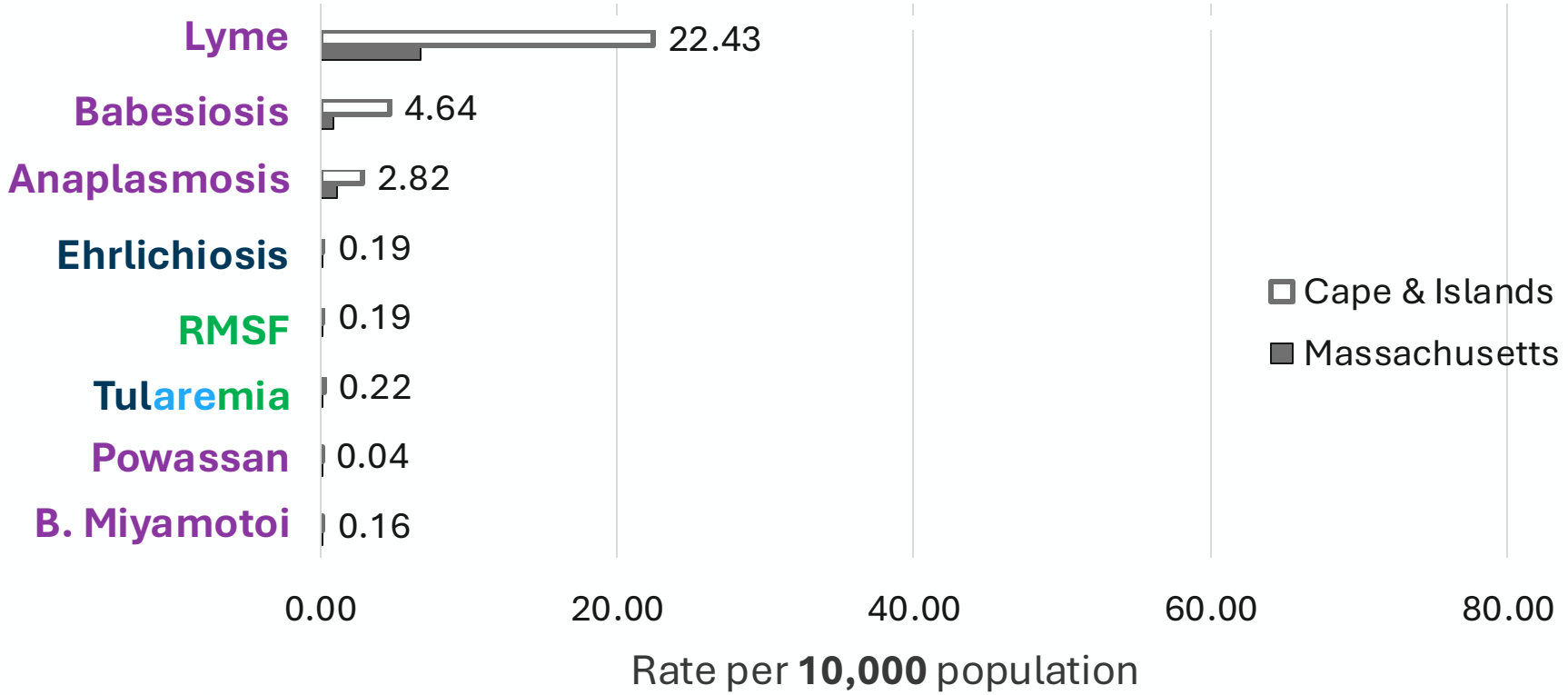
American Dog tick-transmitted

Lone Star 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

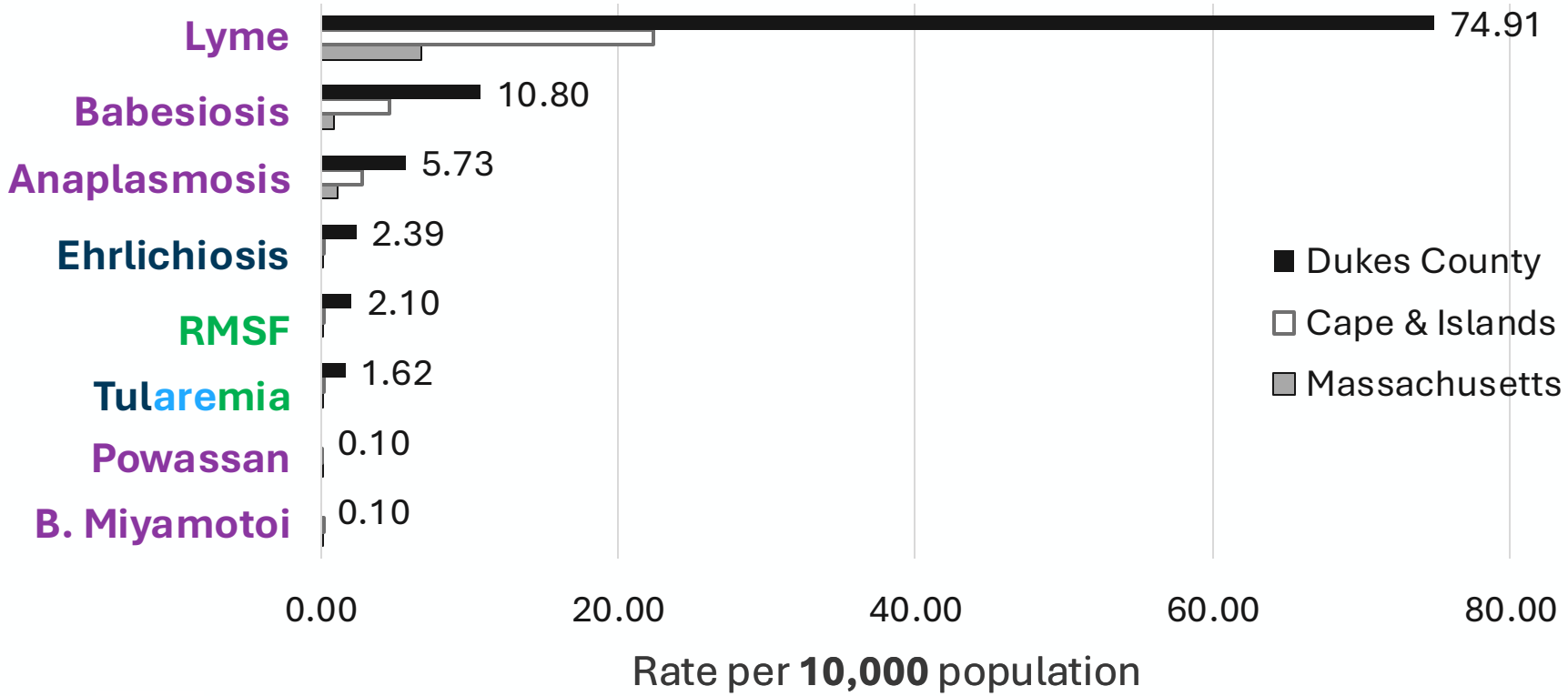
American Dog tick-transmitted

Lone Star 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

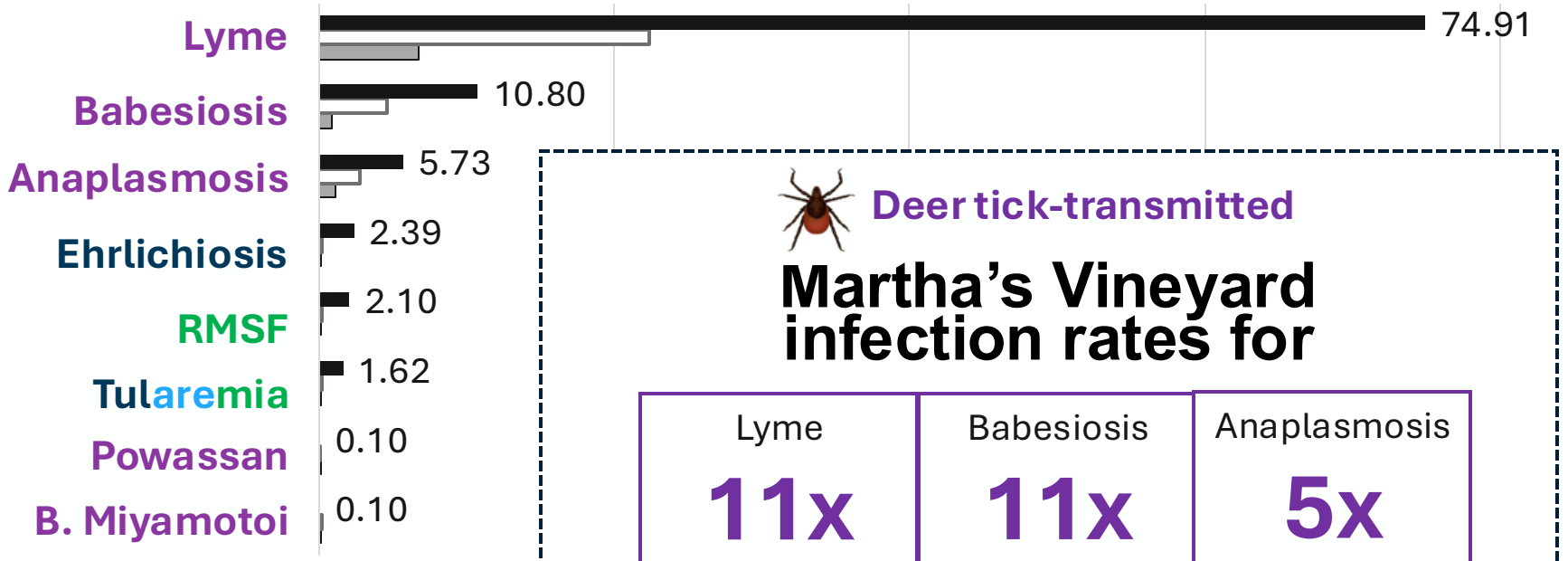
American Dog tick-transmitted

Lone Star 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

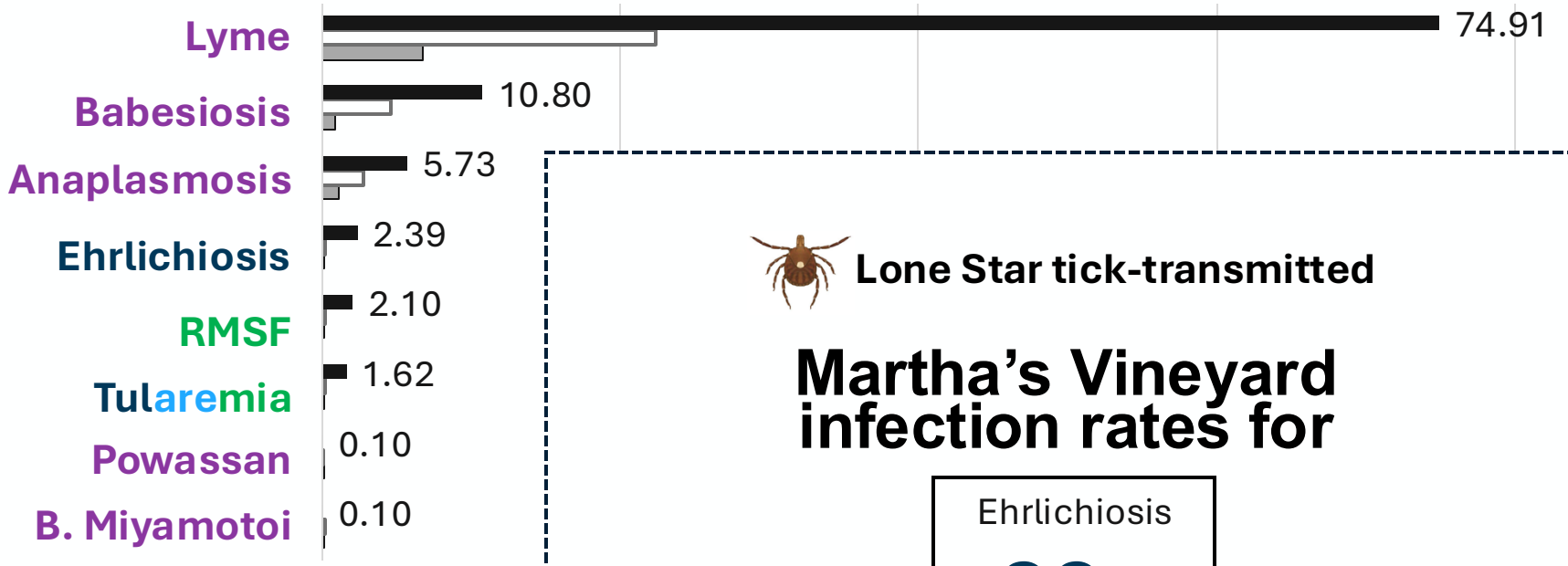
Lyme	Babesiosis	Anaplasmosis
11x	11x	5x

Powassan	B. Miyamotoi
8x	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

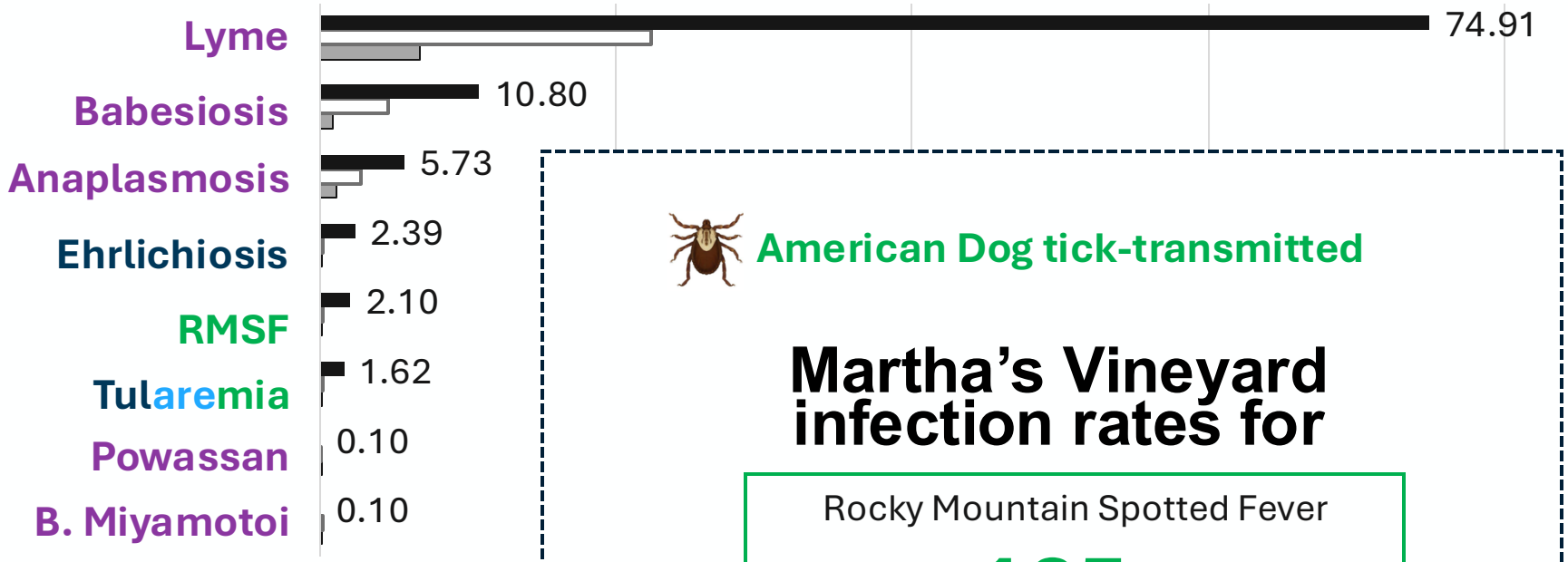
Ehrlichiosis

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



American Dog tick-transmitted

Martha's Vineyard infection rates for

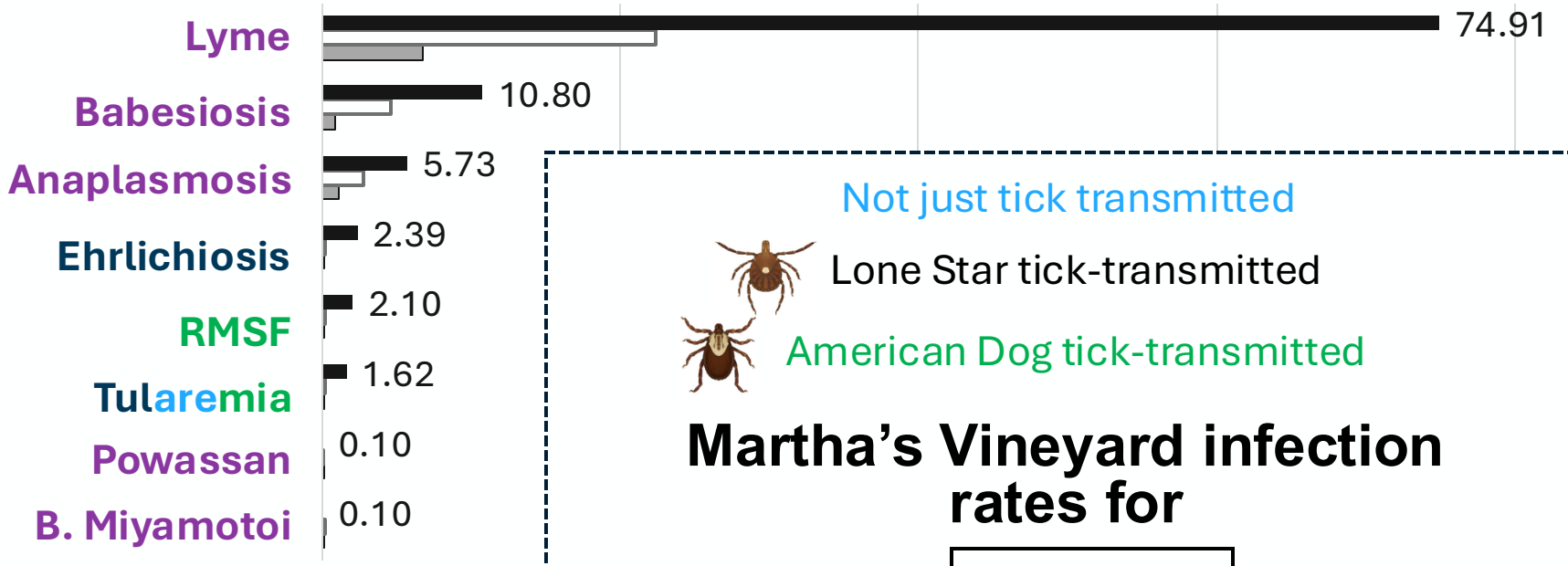
Rocky Mountain Spotted Fever

185x

Higher than the Massachusetts state rate

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

<u>Higher</u> than the Massachusetts state rate

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

Dukes County compared to Massachusetts State

	Massachusetts State			Dukes County			Dukes Co vs State Rate
Disease	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

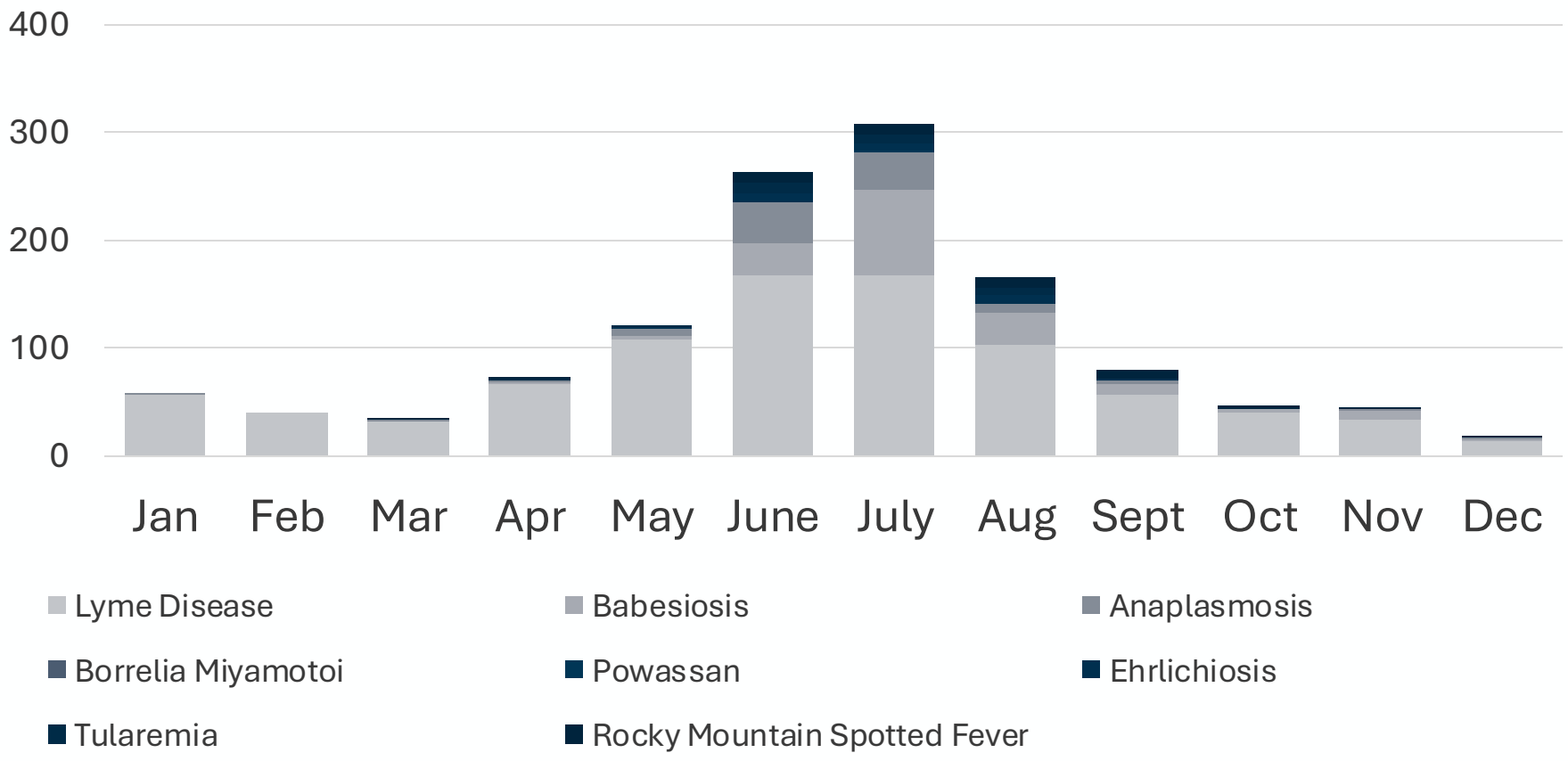
[3] American Dog tick-transmitted

[4] Not just tick transmitted

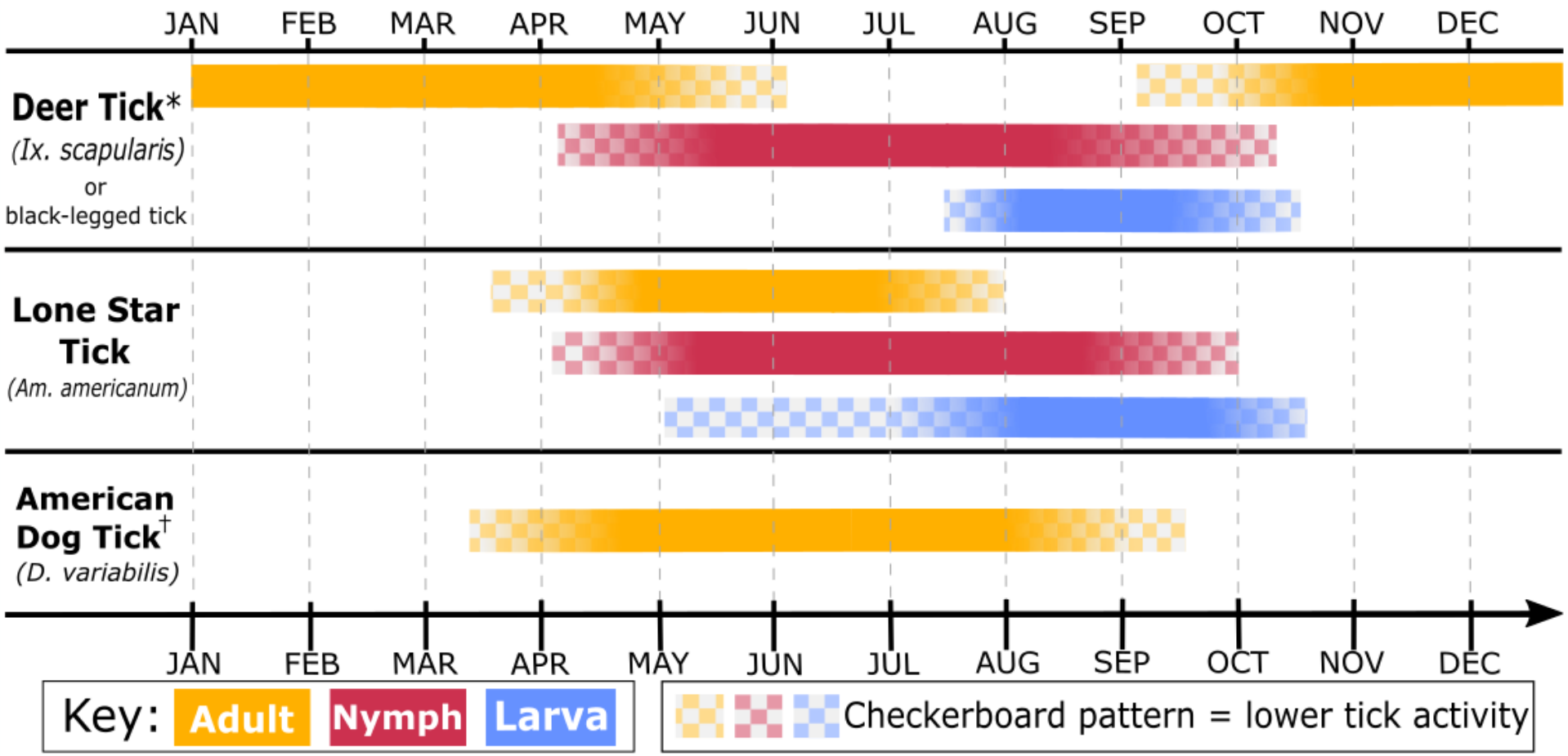
Rate per 10,000 calculation: Years included are 2020-2024. Calculation uses confirmed & probable cases from the Massachusetts Epidemiologic Virtual Network (MAVEN), Massachusetts Department of Public Health, and UMass Donahue Institute Population Estimates

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



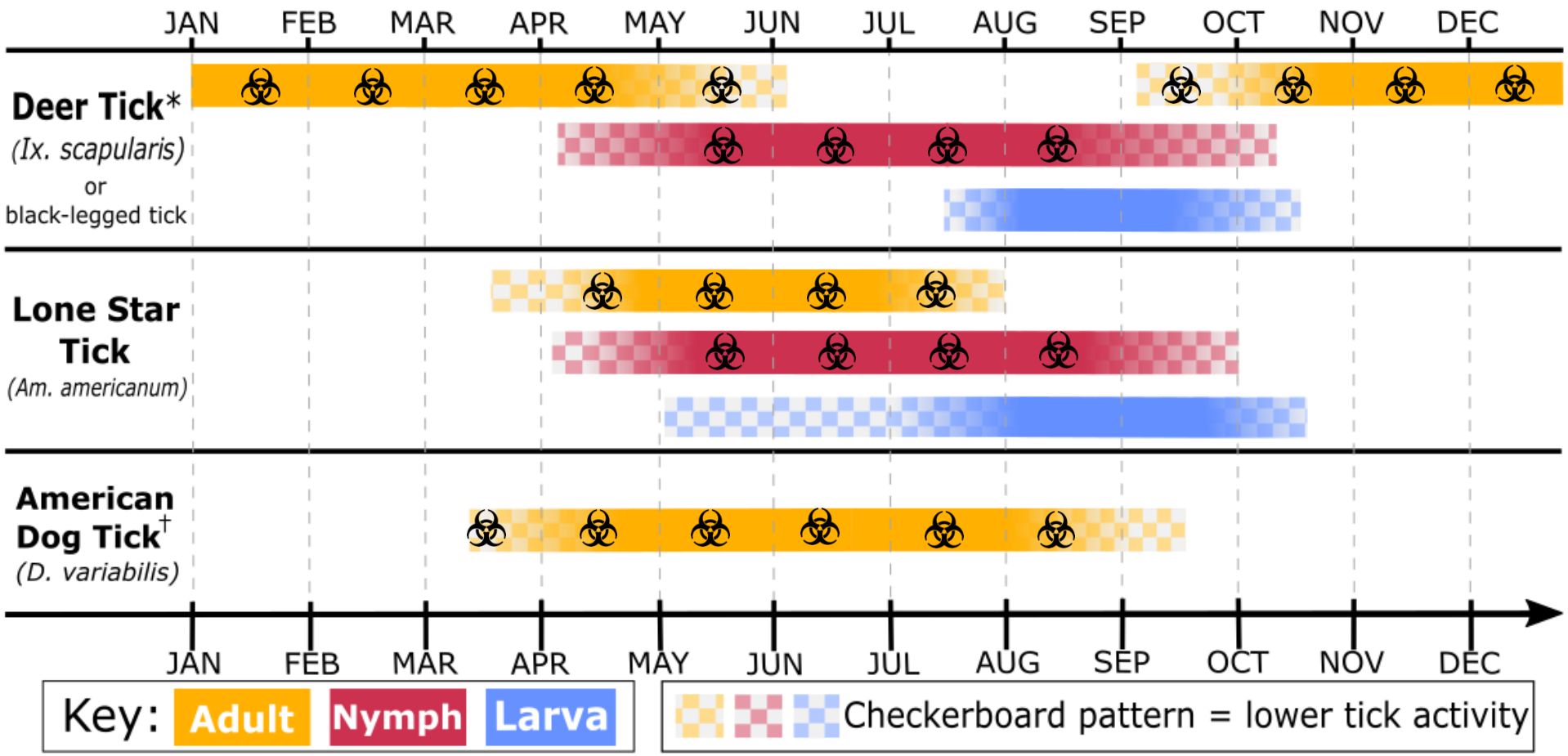
*Deer tick adults will be active when temperatures are above 40°F.
†Only the adult life stage of the American Dog Tick is known to bite humans.

MV TICK PROGRAM

Inter-Island Public Health • Martha's Vineyard & Nantucket •

Compiled by P. Roden-Reynolds for IIPHEC & MV Tick Program 02/2024
Adapted from "Ticks and Tick-borne Diseases of Virginia" flyer. Virginia Department of Health

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.

MV TICK PROGRAM

Inter-Island Public Health • Martha's Vineyard & Nantucket •

Compiled by P. Roden-Reynolds for IIPHEC & MV Tick Program 02/2024
Adapted from "Ticks and Tick-borne Diseases of Virginia" flyer. Virginia Department of Health

My Backyard
Chilmark, MA
May 2024

MV TICK PROGRAM

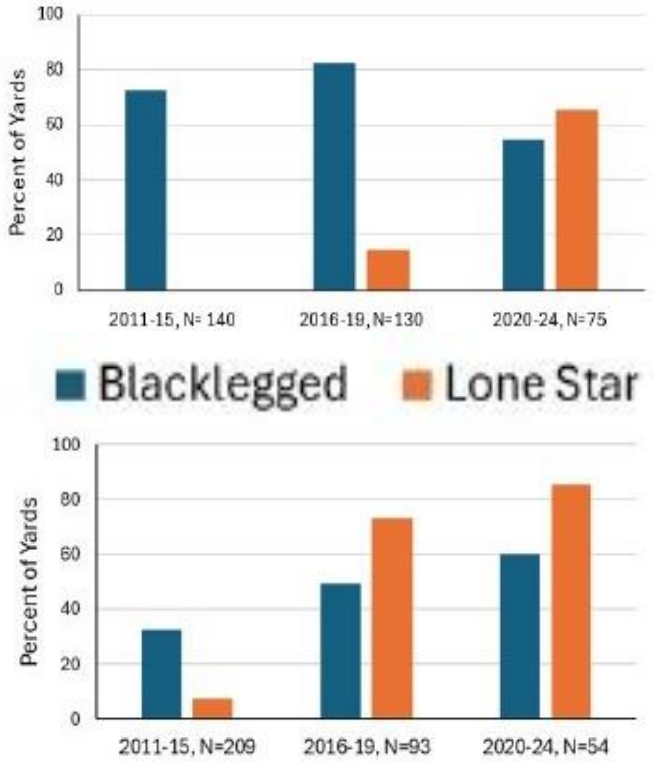
Ecological Surveys for Tick-Borne Illness Prevention

Ticks collected by
Patrick Roden-Reynolds

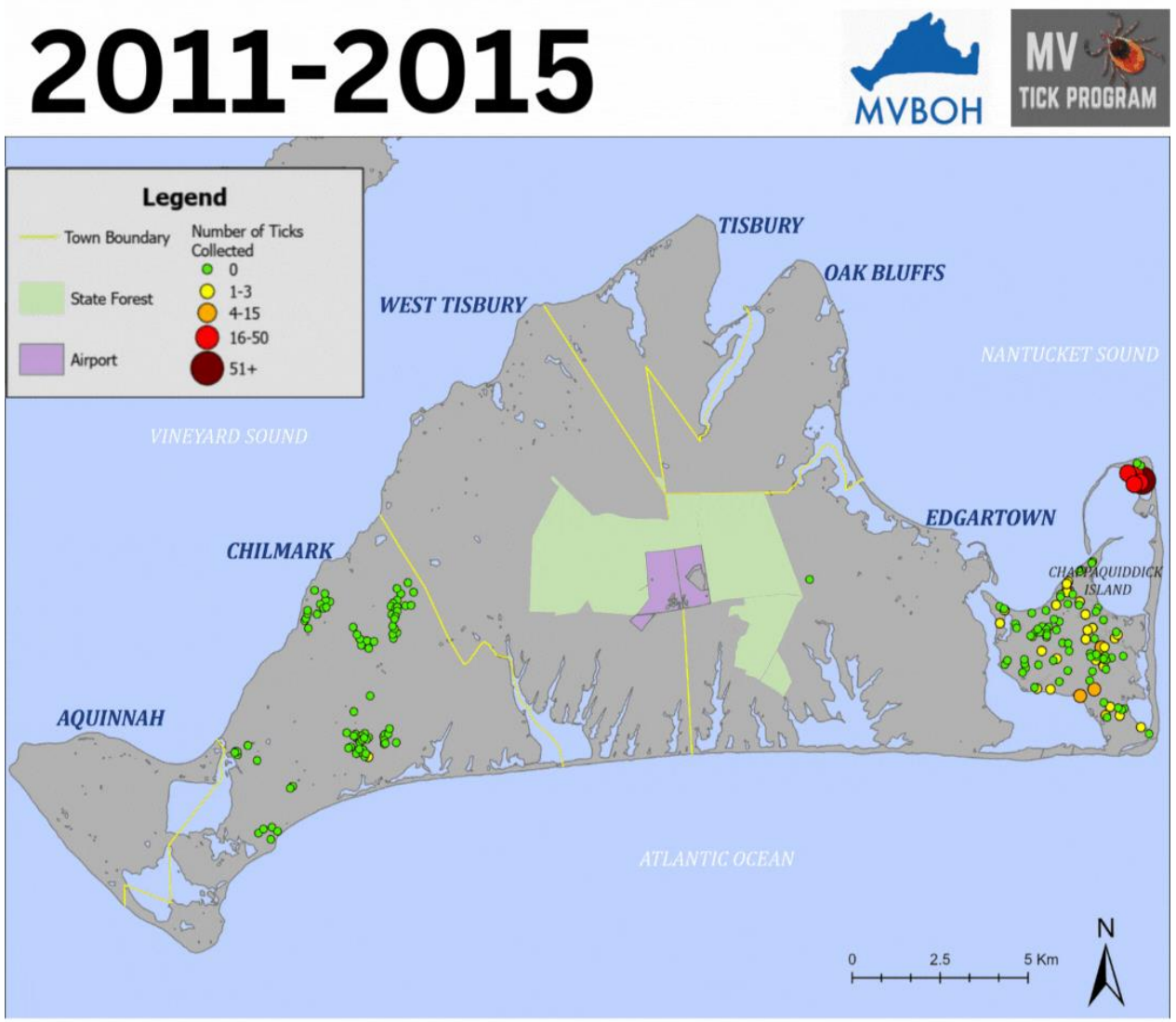
Lone Star Ticks: A tale of relentless expansion

Percent of backyards with 3+ of that tick species

West End:
Chilmark
Backyards



East End:
Chappaquiddick
backyards



Lone Star ticks found in Residential Yard Surveys

[Full article: Johnson, Roden-Reynolds, Snow, & Rich, 2024]

Lone Star Tick Larvae aka "Tick Bombs"

Photos courtesy of Dr. Sam Telford & MV Tick Program

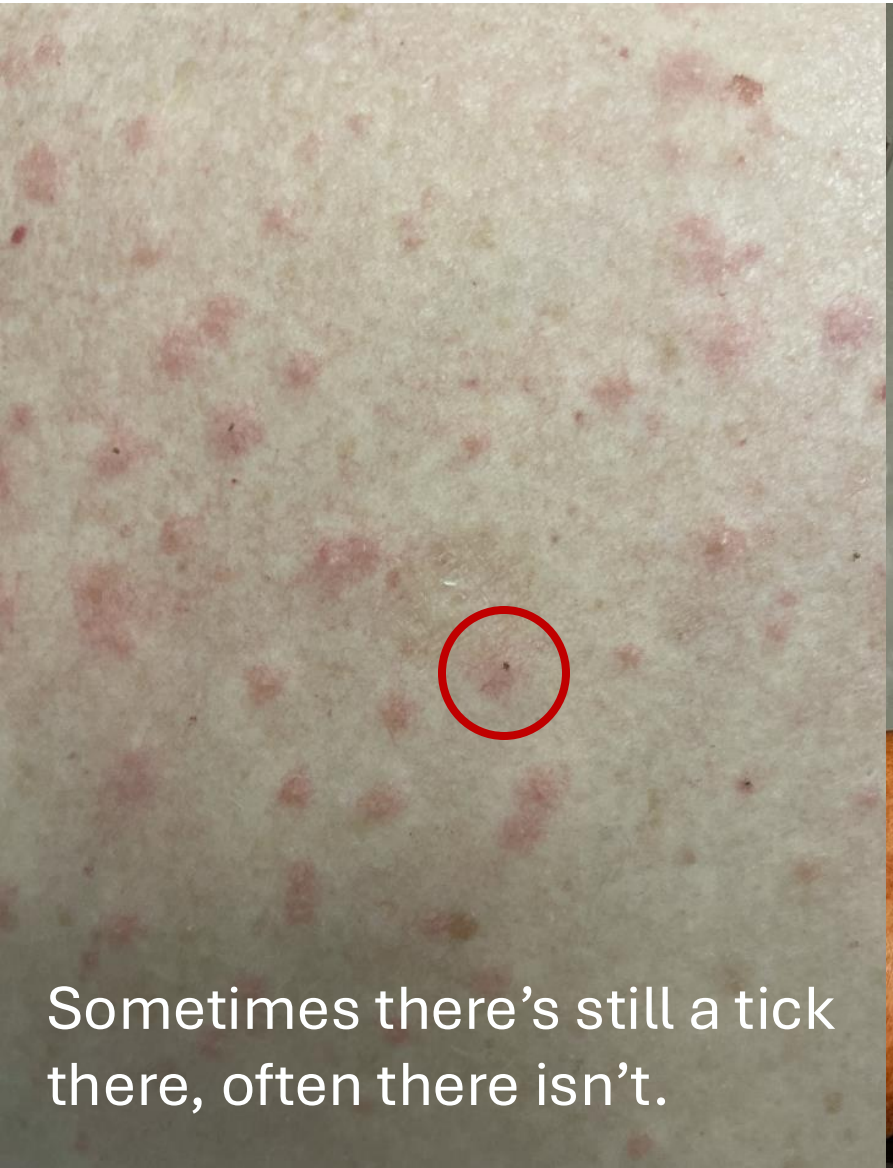
The best defense:

Permethrin-treated clothes > repellent > lint rollers

Goal #1: **Prevent the bite**.
Which sock was **permethrin-treated**?

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

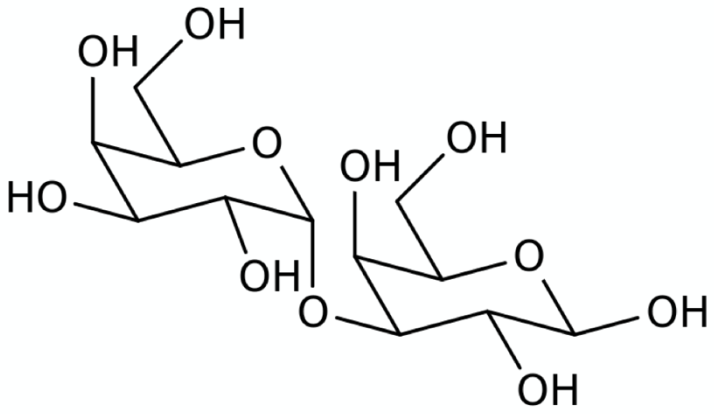
Lone Star bites ITCH, last weeks, miserable



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 <u>allergy</u> 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
• Hives • Rashes • Itching	Of the • Palms • Soles of feet • Lips, throat, or tongue • Eyelids	• Cough • Wheezing • Shortness of breath • Difficulty breathing	• Drop in blood pressure • Dizziness • Faintness	• Abdominal pain • Diarrhea • Nausea • Vomiting • Heartburn • Indigestion

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

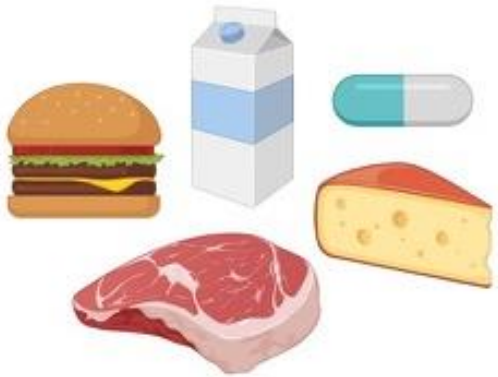
Alpha Gal Syndrome

(An allergy, not an infection)

Hives, itching, swelling, and/or anaphylaxis

Tick bite

Weeks to months



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

Hours

and/or

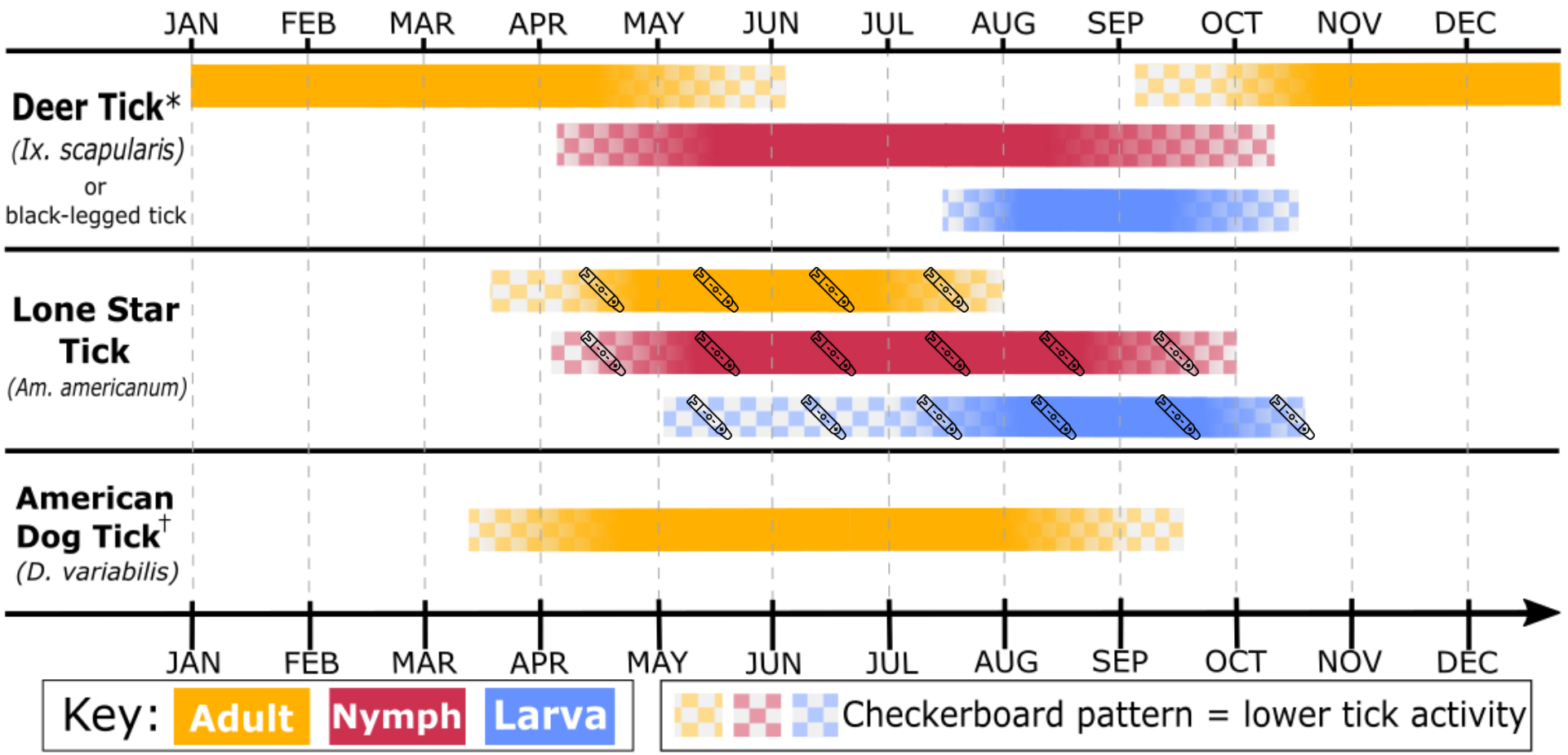
Abdominal pain, diarrhea, nausea, vomiting, and/or anaphylaxis

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

AGI
Alpha-gal Information™

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.

MV TICK PROGRAM

Inter-Island Public Health · Martha's Vineyard & Nantucket ·

Compiled by P. Roden-Reynolds for IIPHEC & MV Tick Program 02/2024
Adapted from "Ticks and Tick-borne Diseases of Virginia" flyer. Virginia Department of Health

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.

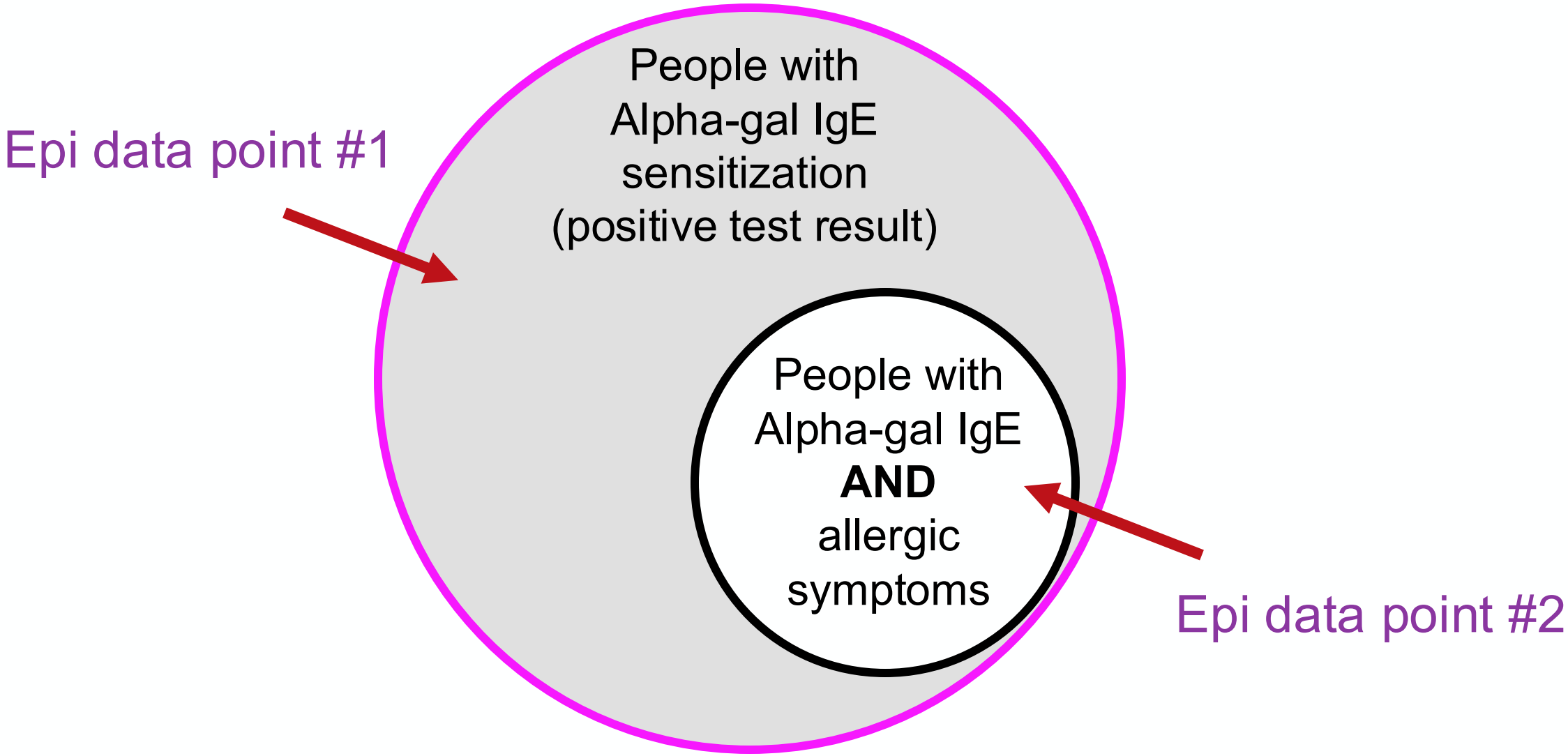
Lowest

Scale of **Effort & Resources** Needed From Local Public Health

Highest

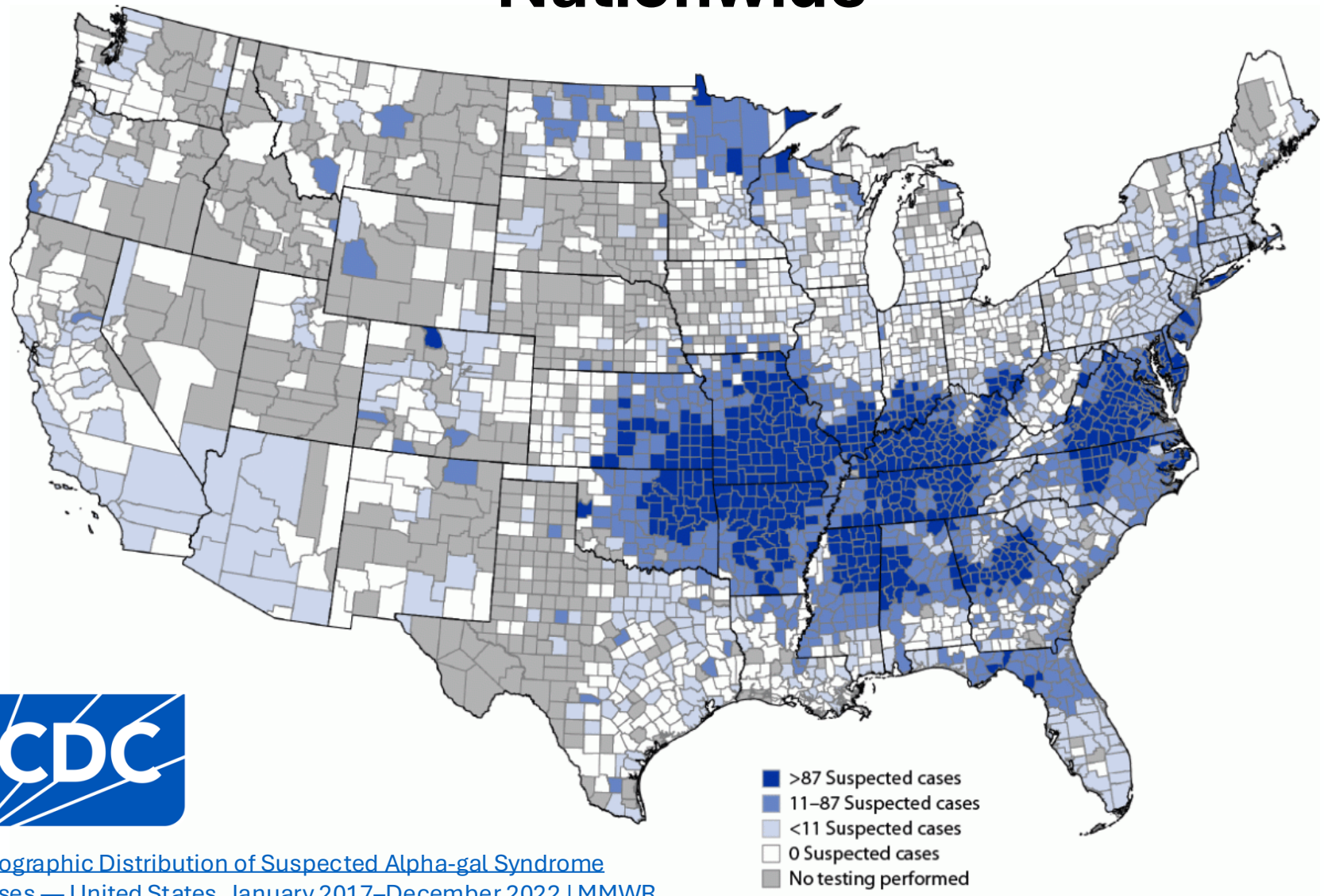
1. Self-report
2. **Aggregate laboratory data**
3. Aggregate healthcare provider data
4. **Line-level hospital data analysis**
5. Syndromic surveillance
6. **Healthcare facility MOU or DUA for local investigation**
7. Make legally reportable & investigate cases

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



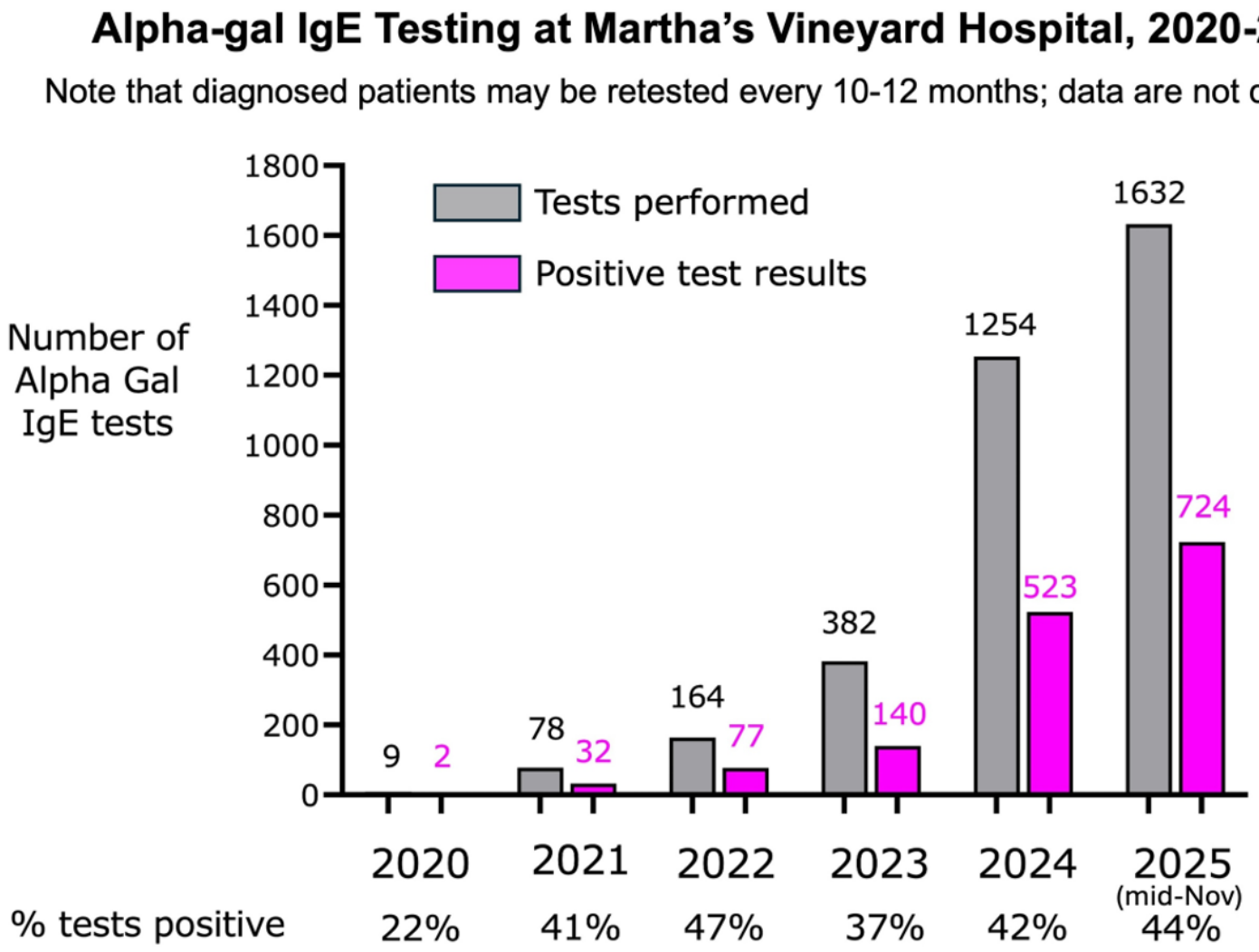
National Data Point #1

Alpha-Gal IgE Testing Nationwide



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

Local Data Point #1

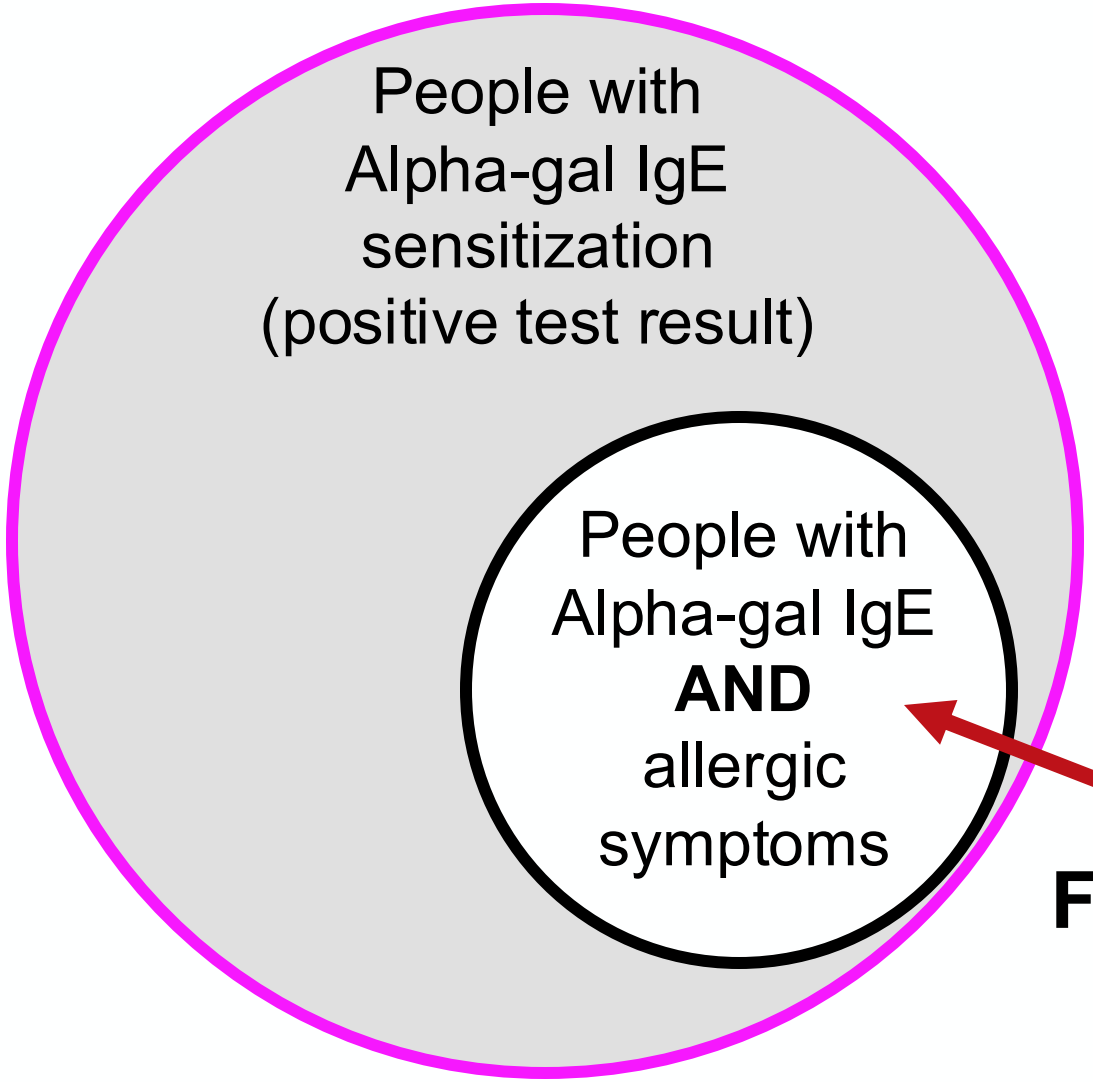


Local Data Point #2

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

	Massachusetts State			Dukes County			Dukes Co vs State Rate
Disease	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

	Ranked from **Most Common** to Least	Pathogen Type	Transmitted by: Deer tick	Lone Star Tick	American Dog Tick
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**			
	7. **Tularemia**	**Bacteria**			
Rare, but present	8. **Borrelia miyamotoi**	**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

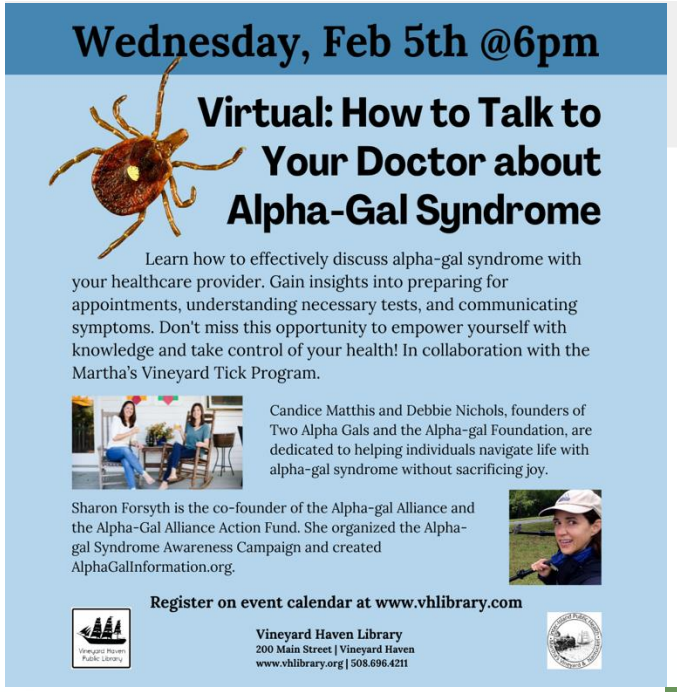
Aug 20 • By natalie o'neill

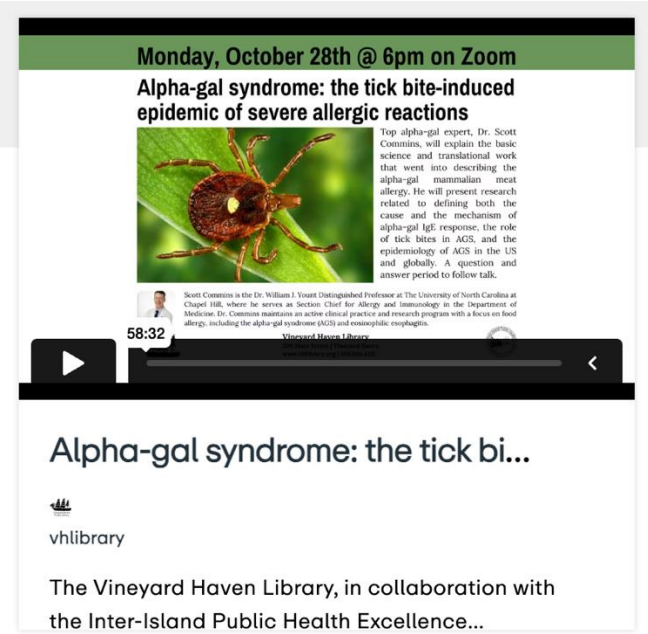
Virtual Programming

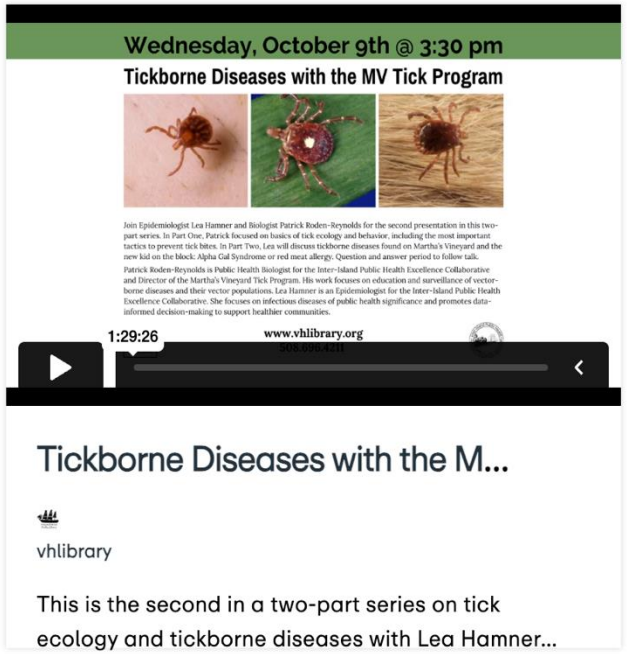
- Great for reducing repetitiveness and staffing costs of presentations
- Opportunities to feature more experts
- Recording presentations creates a resource library

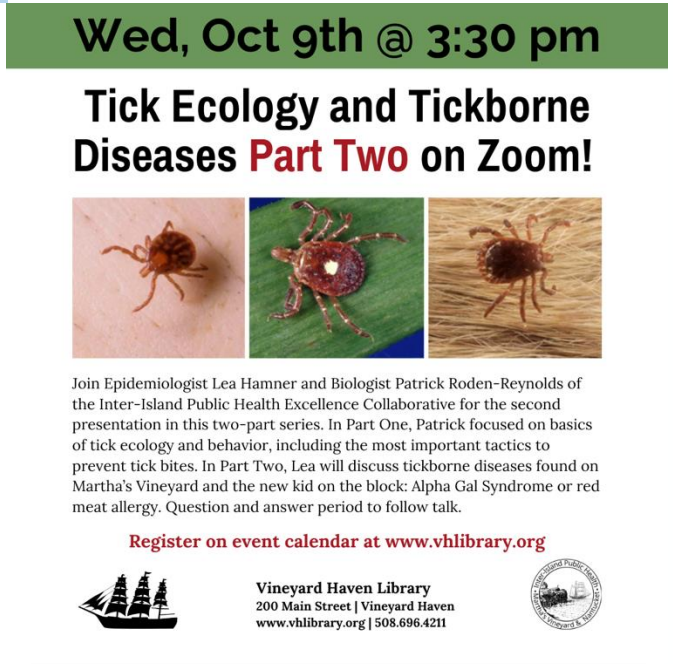
Vineyard Haven Public Library

Check out our [Video Showcase](#)!









Feedback from the Community:

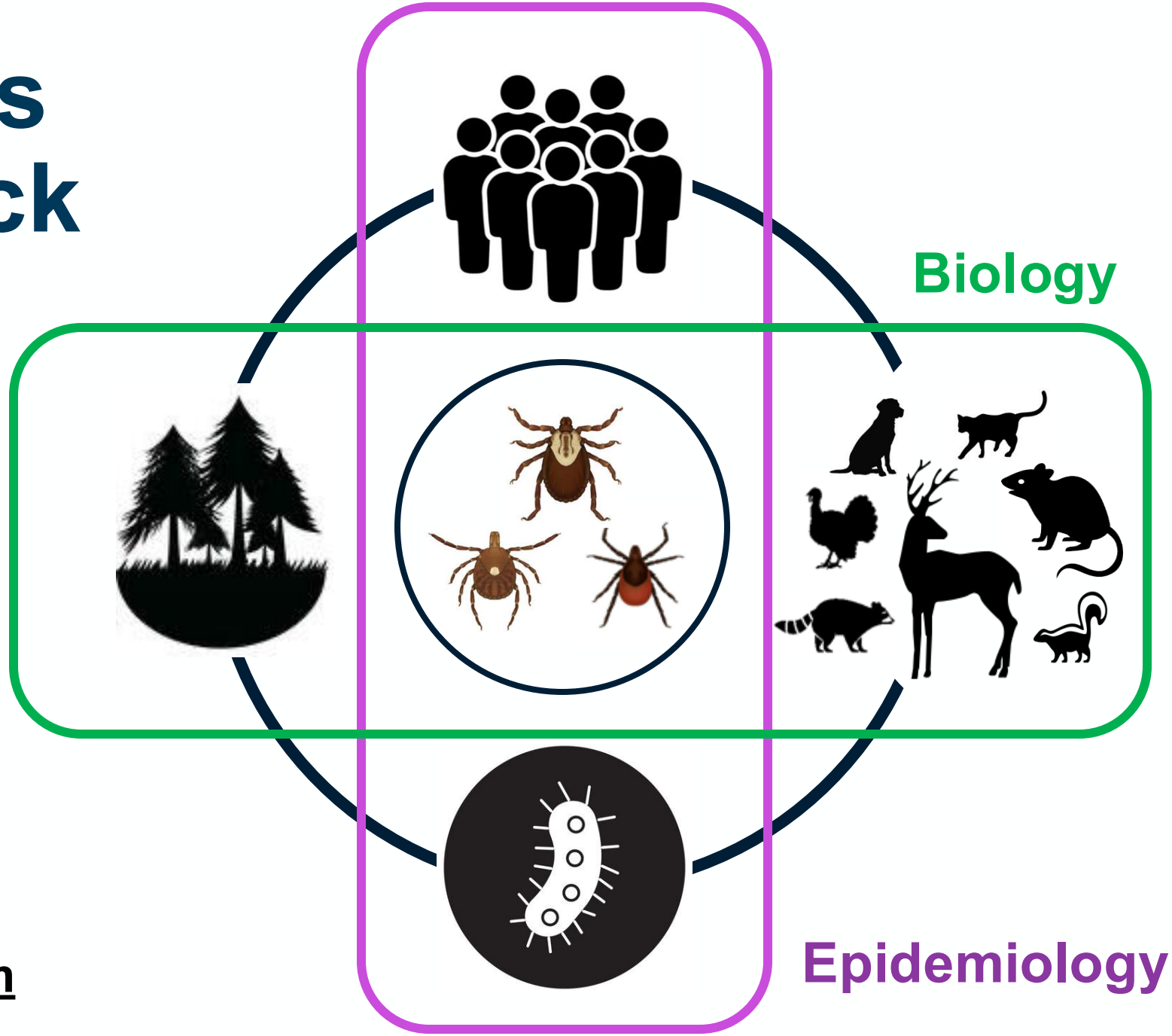
“Without the MV Tick Program the island would be awash in misinformation and rumors.”

"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!