

Ticks. Climate Change. Food allergies. What's the Connection and Why Should I Care?

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Those we have lost....

- David Susser DO, MACOI
- Ray Gadowski DO, FACOI
- Anthony Malcoun DO, MACOI
- Augustine Perotta DO, FACOI
- Paul Farmer MD

Disclaimer:

I have no conflicts of interest
and.....

I certainly am no expert on ticks

“Hey Blackburn - so what’s gonna kill us this
year?
A mutant flu virus?”

“I don’t know when, and I don’t know if it will be influenza, but it will most likely be an airborne virus”

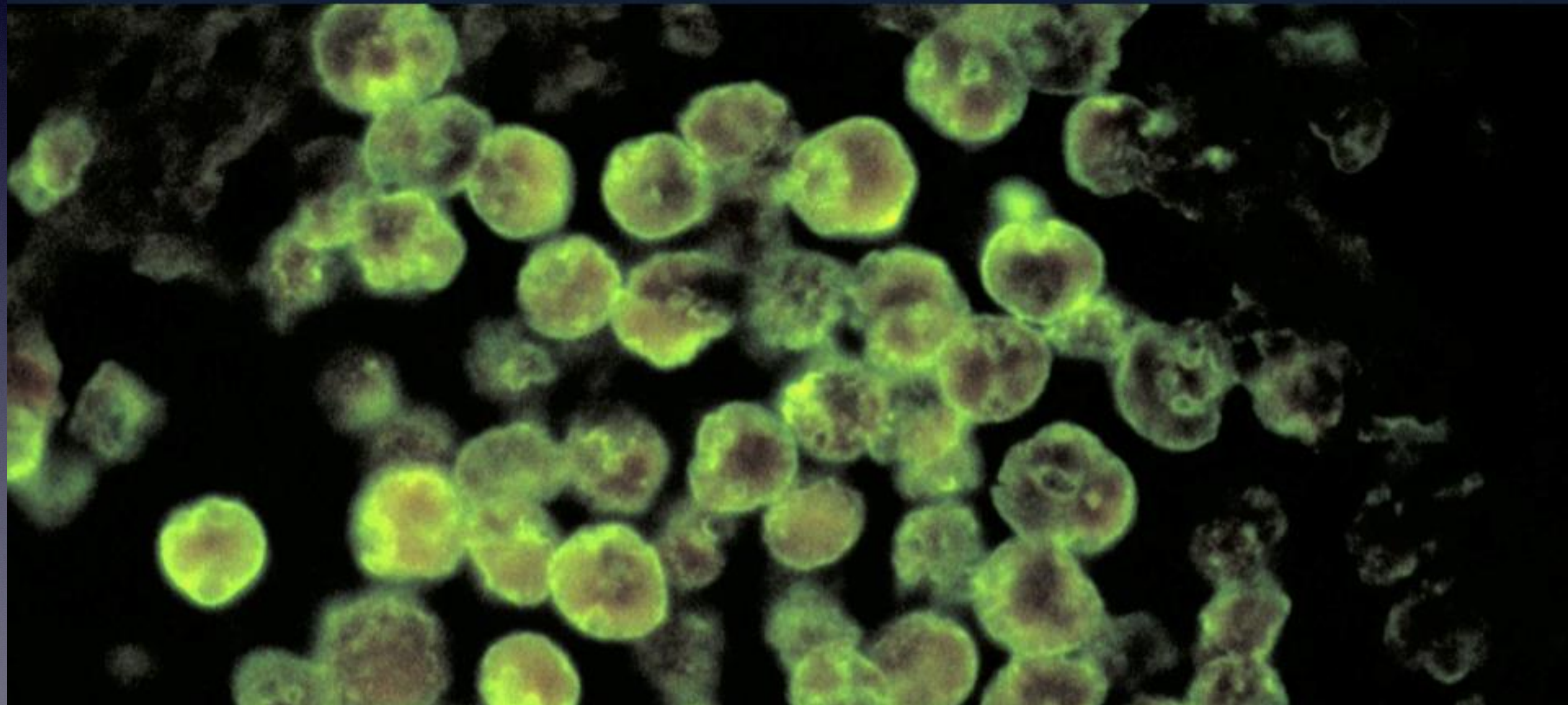
So what worries/depresses me even more?

- Climate change -

- Fact: our planet is warming, seemingly at a rate far more quickly than many projected
- Fact: ticks love warm weather (and they are not all that have seemed to have expanded their territory)
- According to the CDC:
 - reports of tick-borne disease have more than doubled between 2004 and 2019
 - ticks are now the main source of pathogens in the continental U.S.

Brain-eating amoeba that infected a swimmer in Iowa is increasingly found in northern states

Higher air temperatures means warmer water, which could be the reason the *N. fowleri* bacteria has been found in northern states more in recent years.



Vibrio vulnificus →

Burkholderia pseudomallei (melioidosis) -
recently found in soil and water along the
Gulf Coast of Mississippi

- expanded territory of the Tiger Mosquito
- expanded territory of the Harlequin bug





*As the Great Salt Lake Dries Up, Utah Faces
An 'Environmental Nuclear Bomb'*

Climate change and rapid population growth are shrinking the lake, creating a bowl of toxic dust that could poison the air around Salt Lake City.

'There is no water': A climate alarm as lake in Chile turns to a desert

"We have to beg God to send us water – I've never seen it like this," a resident near the Penuelas reservoir said.



Another Step Toward Climate Apocalypse

July 4, 2022



Emillo Fraile/Europa Press

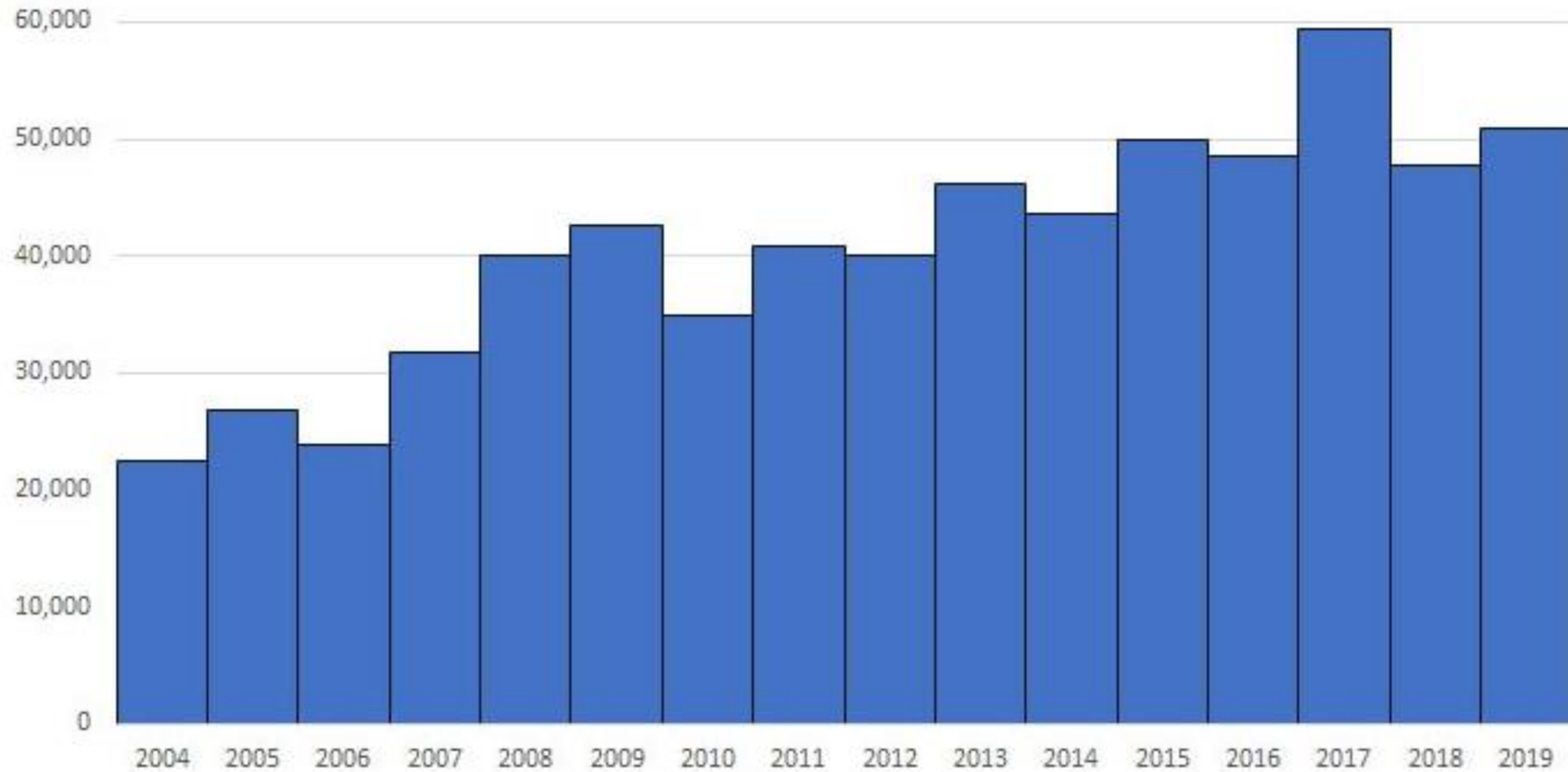
Tickborne Disease Surveillance Data Summary

In 2019, state and local health departments reported 50,865 cases of tickborne disease to CDC.

Reported Tickborne Diseases, U.S.	2016	2017	2018	2019
Lyme Disease (confirmed and probable)	36,429	42,743	33,666	34,945 *
Anaplasmosis/Ehrlichiosis [†]	5,750	7,718	6,123	7,976
Spotted Fever Rickettsiosis [§]	4,269	6,248	5,544	5,207
Babesiosis ^{§§}	1,910	2,368	2,160	2,420
Tularemia	230	239	229	274
Powassan virus	22	34	21	43
Total	48,610	59,349	47,743	50,865

*These numbers may actually be as high as 476,000 cases/yr

Total Reported Cases of Tickborne Disease, 2004–2019



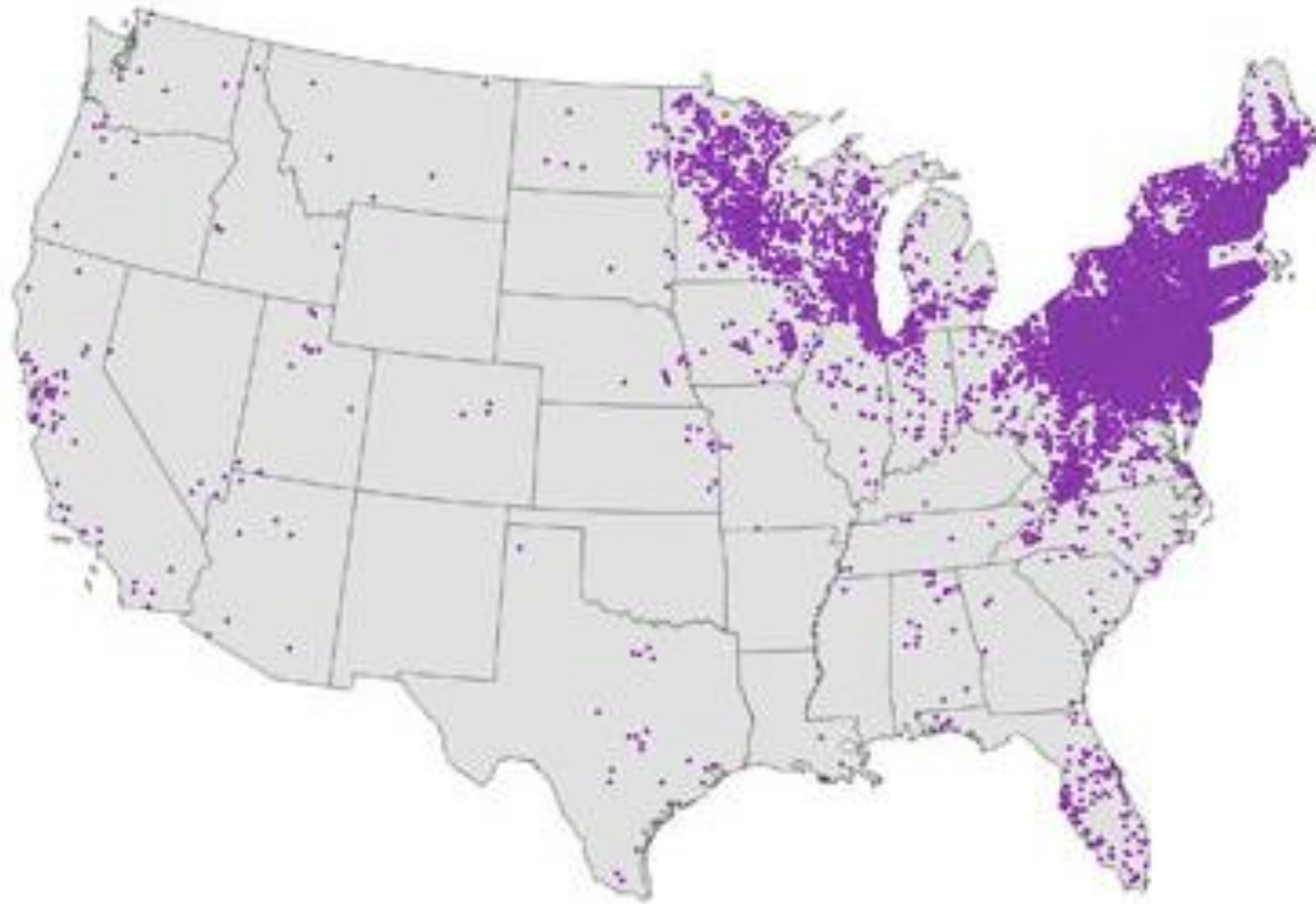
Ticks associated w/ human illness w/in the US:

(There's plenty more elsewhere)

- Blacklegged tick
- Lone Star tick
- American dog tick
- Brown dog tick
- Groundhog tick
- Gulf Coast tick
- Rocky Mountain wood tick
- Soft tick
- Western Blacklegged tick
- Asian longhorn tick?

Human illnesses associated w/ ticks:

- Anaplasmosis
- Babesiosis
- Borrelia Miyamotoi disease
- Bourbon virus
- Colorado Tick Fever (virus)
- Ehrlichiosis
- Heartland Virus disease
- Rocky Mountain Spotted Fever (RMSF)
- Rickettsia Parkeri Rickettsiosis
- Southern tick-associated rash illness (STARI)
- Tickborne Relapsing Fever
- Tularemia
- Powassan Virus disease
- Alpha-gal syndrome



LYME DISEASE

14 percent of world population may have had Lyme disease, research finds

In a new analysis, Central Europe had the highest share of residents with Lyme disease antibodies – 21 percent – compared to 9 percent in North America.



Lyme Disease

(*Borrelia burgdorferi*)



Erythema migrans

Blacklegged Tick (*Ixodes scapularis*)



adult
female



adult
male



nymph



larva



Lyme dx (400,000 + cases/yr!)

anaplasmosis

B. miyamotoi disease (a form of relapsing fever)

erlichiosis

babesiosis

Powassan virus disease

Post-Treatment (Chronic) Lyme Disease Syndrome (PTLDS)

- In some instances, patients describe vague, incapacitating, but non-specific symptoms lasting weeks to months to years following standard courses of antibiotics
- May be due to immune dysregulation (elevated IL-23 and/or other)
- there are no tests to confirm this presumptive dx (there are also no tests to confirm “seronegative Lyme dx”)
- multiple studies have failed to demonstrate any benefit from prolonged courses of antibiotics



- splenectomized individuals at risk for severe illness
- occasionally transmitted by blood transfusion

Babesiosis



Noskoviak K, Broome E. N Engl J Med 2008;358:e19.



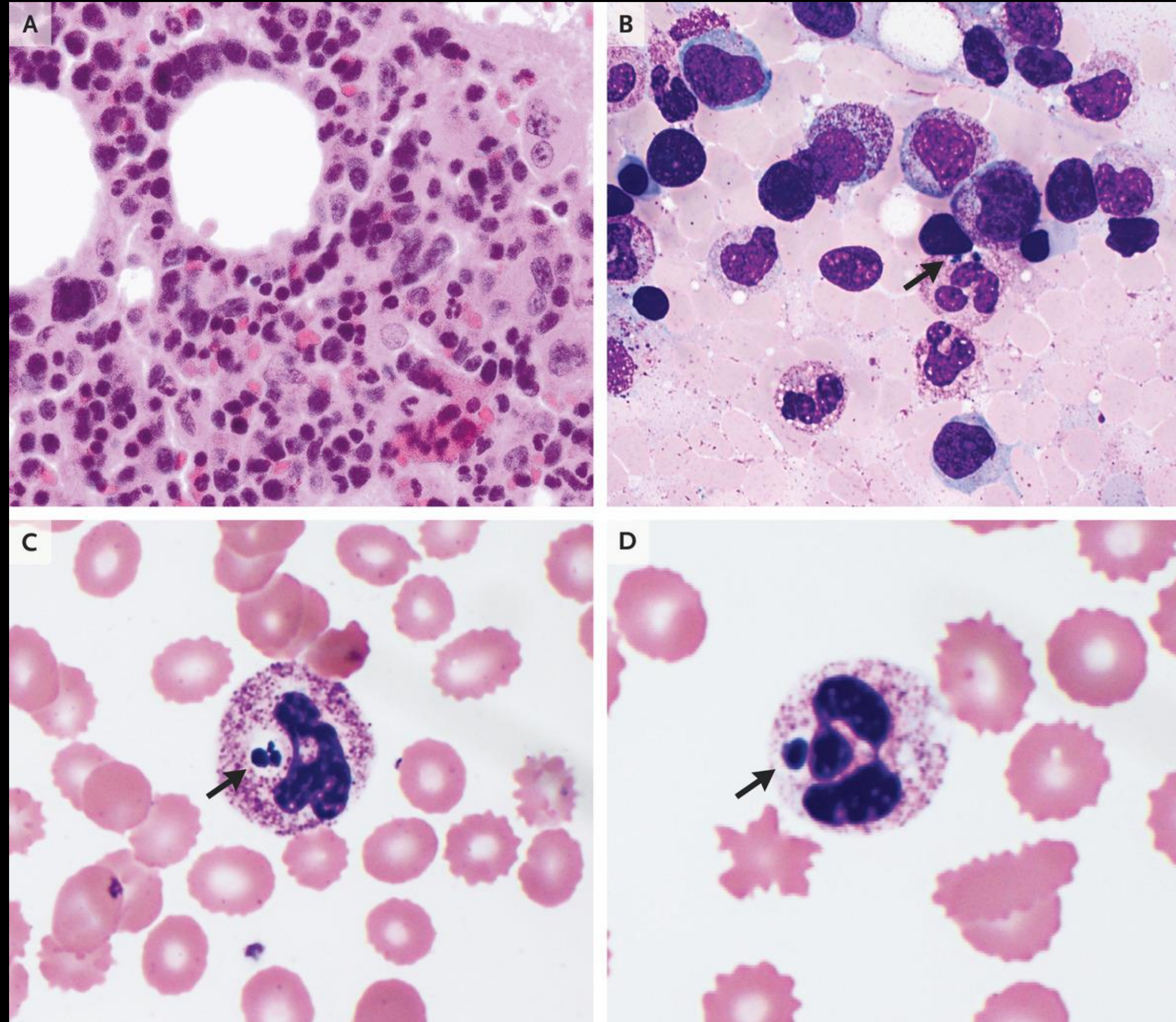
The NEW ENGLAND
JOURNAL of MEDICINE



EHRlichiosis



ANAPLASMOSIS





TULAREMIA



**SPOTTED FEVER RICKETTSIOSIS
(INCLUDING ROCKY MOUNTAIN SPOTTED FEVER)**


TICKBORNE DISEASES OF THE UNITED STATES

A Reference Manual for Healthcare Providers

Fifth Edition, 2018



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

[Tickborne Diseases of the US: A Reference Manual for Health Care Providers, Fifth Edition \(2018\) Print only version](#) 
[PDF – 52 pages]

Connecticut woman dies of tick-borne Powassan virus

Cases of Powassan virus, which spreads from deer ticks, have become more common in the last decade.



S/S, Dx of tickborne illness:

- S/S often non-specific; clinical suspicion
- Dx challenging; serologies may be delayed, unreliable and/or difficult to obtain

Rx of tickborne illness:

- no known effective antivirals
- prompt initiation of doxycycline when indicated or otherwise considered - do not wait for confirmatory testing
- unique rx for babesiosis, tularemia

Antimicrobial Prophylaxis of Tickborne Illness:

- Note: Unlike Lyme Dx, transmission of tick-borne viruses may occur w/in 15 minutes of attachment (no known effective prophylaxis)
- Unlike Lyme Dx, prophylaxis of tick borne illnesses not usually recommended, may not be available, and/or may not be effective
- For Lyme Dx, a single 200 mg dose of doxycycline may be offered (though CDC suggests this only under specific circumstances)

So.....what's this all got to do with climate
change?

What scientists are reporting:



Brian Leydet, a biologist at SUNY College of Environmental Science and Forestry, collects ticks by walking through wooded areas.

Kate Warren for The New York Times

Lone Star Tick (*Amblyomma americanum*)



Most commonly found in the southern U.S.; transmits:

erlichiosis

tularemia

Heartland virus

Bourbon virus

STARI

Alpha-gal syndrome

What scientists are reporting:

- anaplasmosis, babesiosis now seen in northern and central New York - previously almost unheard of (B. Leydet as reported by J. McKinley)
- Lyme disease, Powassan virus disease in Michigan. Huh?? (not to mention Hanta virus!!)
- Diseases transmitted by Lone Star tick now reported as far west as Nebraska, as far north as Maine - estimated 30 - 50% increase in spatial distribution of this tick* as well as increase in territory where they harbor various pathogens**

* R. Raghaven

** G. Vazquez-Prokopec, R. Tokarz

Why should I care?

- If you love the outdoors or live in “at-risk” areas of the country, you should care - health risks related to ticks (and other catastrophic events e.g. flooding, hurricanes, droughts, wildfires) predicted by many credible scientists to increase for the foreseeable future
- If you love your dog, you should care
- If you love to swim in fresh water lakes, going to water parks, you should care
- If you are not a vegan, you should care - and listen to Dr. Martin
- If you love your family (most of the time), you should care



Flooding Chaos in Yellowstone, a Sign of Crises to Come

Record rainfall and mudslides forced closures just as tourism season ramped up. Virtually none of America's national parks are untouched by extreme weather and climate change.



- If you care about your family, your children, your grandchildren, you should care



Summary:

- According to the CDC:
 - reports of tick-borne disease have more than doubled between 2004 and 2019
 - ticks are now the main source of (many) pathogens in the continental U.S.
- Climate change, with warmer temperatures, shortened winters, is contributing to the expanding territories, including at higher elevations, of ticks and other disease vectors
- We will be leaving our children and grandchildren to face catastrophic weather events, and the consequences of those, (see above) that many of us have never experienced

More on Alfa-gal Syndrome...

Bryan Martin DO, MACOI