



Massachusetts Department of Public Health

Public Health Council Meeting August 9, 2023

Robert Goldstein, Commissioner

Today's presentation is available on mass.gov/dph under "Upcoming Events" by clicking on the August 9 Public Health Council listing.



Massachusetts Department of Public Health

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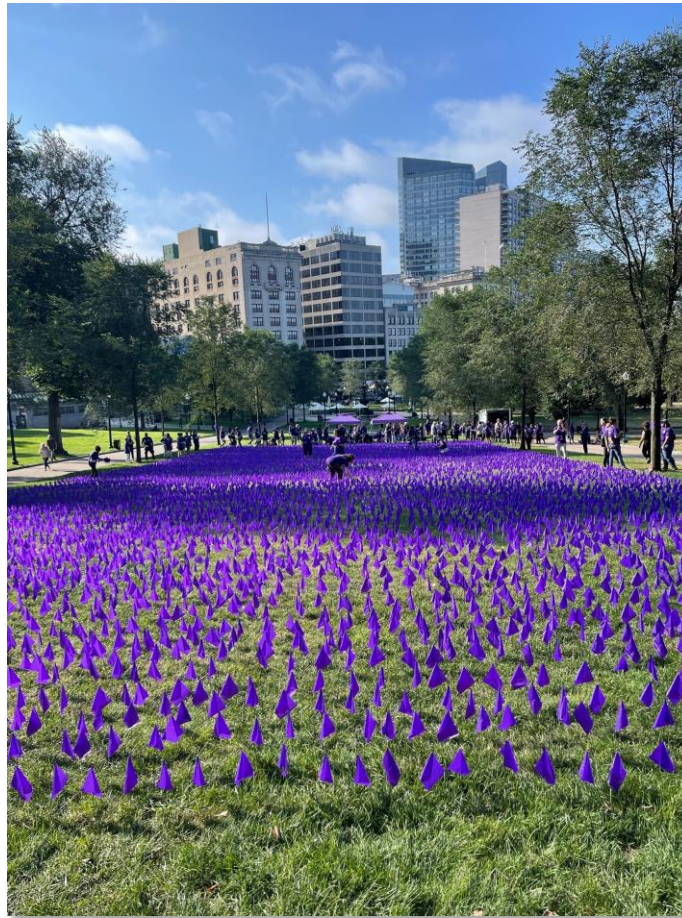
Robert Goldstein, Commissioner

Immunization Awareness Month



Image: Centers for Disease Control and Prevention

Overdose Awareness Month



[Mass.gov/Opioids](https://mass.gov/opioids)

[HelplineMA.org](https://helplineMA.org)
800-327-5050

Images from last year's remembrance event

Childhood Experiences Media Campaign



Mass. Public Health @MassDPH · Jul 31

Family support professionals can play an important role in helping kids to have positive childhood experiences – which can have lifelong positive impacts. Learn how: mass.gov/info-details/i...



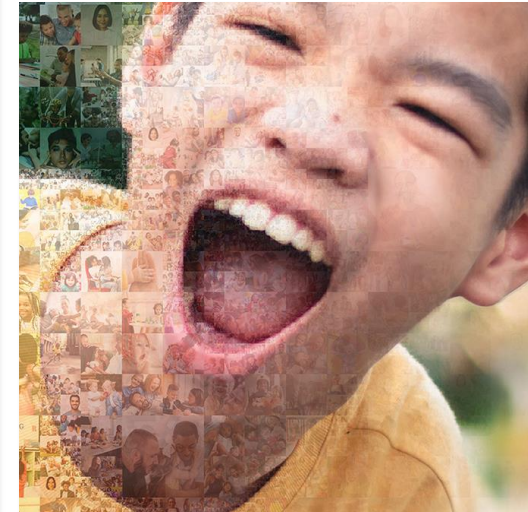
**What we experience
as children can help us
grow into healthy adults.**

Learn about ways you can create
positive childhood experiences
to help children thrive.



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Sumner Tunnel Closure

Response, Scene, and Transport Times for all emergency runs occurring in East Boston and Seaport (control) during Sumner Tunnel Closure, July 2022 vs. July 2023

Area	Dates	Response Time (minutes)		Scene Time (minutes)		Transport Time (minutes)	
		2023 (Closure Period)	2022 (Comparison Period)	2023	2022	2023	2022
East Boston	July 5-11	8.74	8.55	13.42	13.29	14.17	10.87
	July 12-18	7.57	8.95	11.87	13.69	13.49	10.44
	July 19 - 25	8.21	8.35	11.49	12.68	13.99	10.43
Seaport (control)	July 5-11	6.38	7.83	15.77	9.78	9.96	6.44
	July 12-18	6.80	6.97	10.05	11.86	8.26	7.43
	July 19 - 25	7.65	6.52	9.63	13.14	6.42	7.14

Community Health Equity Survey

The 2023 Community Health Equity Survey is live!

Take the survey: mass.gov/HealthSurvey

For more information, or for resources to spread the word - draft email templates, social media language, posters, and more - please visit our website: mass.gov/CHEI

Questions? Want to partner with us? Contact the CHEI Team:
CHEI@mass.gov



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Massachusetts Department of Public Health

Update: Mosquito-borne Disease in Massachusetts

Catherine M. Brown, DVM, MSc, MPH

State Epidemiologist/State Public Health Veterinarian

Arbovirus Background: Overview

- There are several mosquito-borne viruses that present a threat to human health and to the health of domestic or wild animals
- Two insect-borne viruses (arboviruses) in particular have a history of causing disease outbreaks in the Commonwealth of Massachusetts
 - Eastern Equine Encephalitis (EEE) virus
 - West Nile virus (WNV)
- Since 2000, these arboviruses have resulted in over 280 cases of human disease in Massachusetts
 - EEE: 43 cases, resulting in at least 22 deaths
 - WNV: 240 cases, resulting in at least 14 deaths

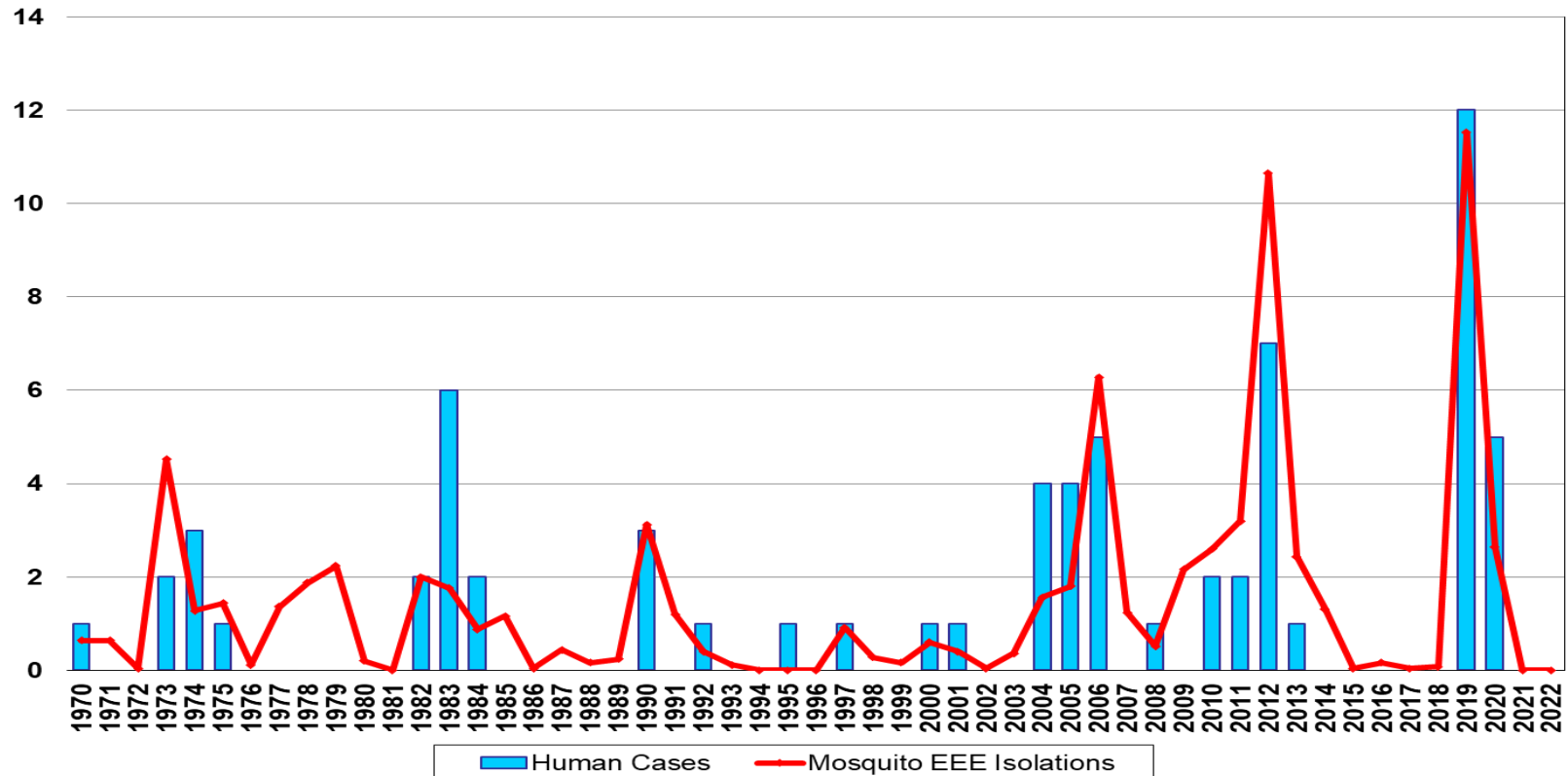
Arbovirus Background: Human Disease

	EEE	WNV
Incubation Period	3-10 days	3-14 days
Symptoms	Often abrupt onset of fever, chills, headache, muscle aches, nausea and vomiting, with progression to seizures, coma	80% Mild and sub-clinical infection 20% Headache, sore throat, fatigue, muscle and joint aches, fever
Severity	30-50% mortality rate for those with symptoms ~80% of those who recover have permanent neurological damage Children: 11/43 (25%) cases (33% mortality) Adults: 32/43 (75%) cases (50% mortality)	Age-related severity <1% Aseptic meningitis, encephalitis, meningoencephalitis

Arbovirus Background: Historical Activity

EEE

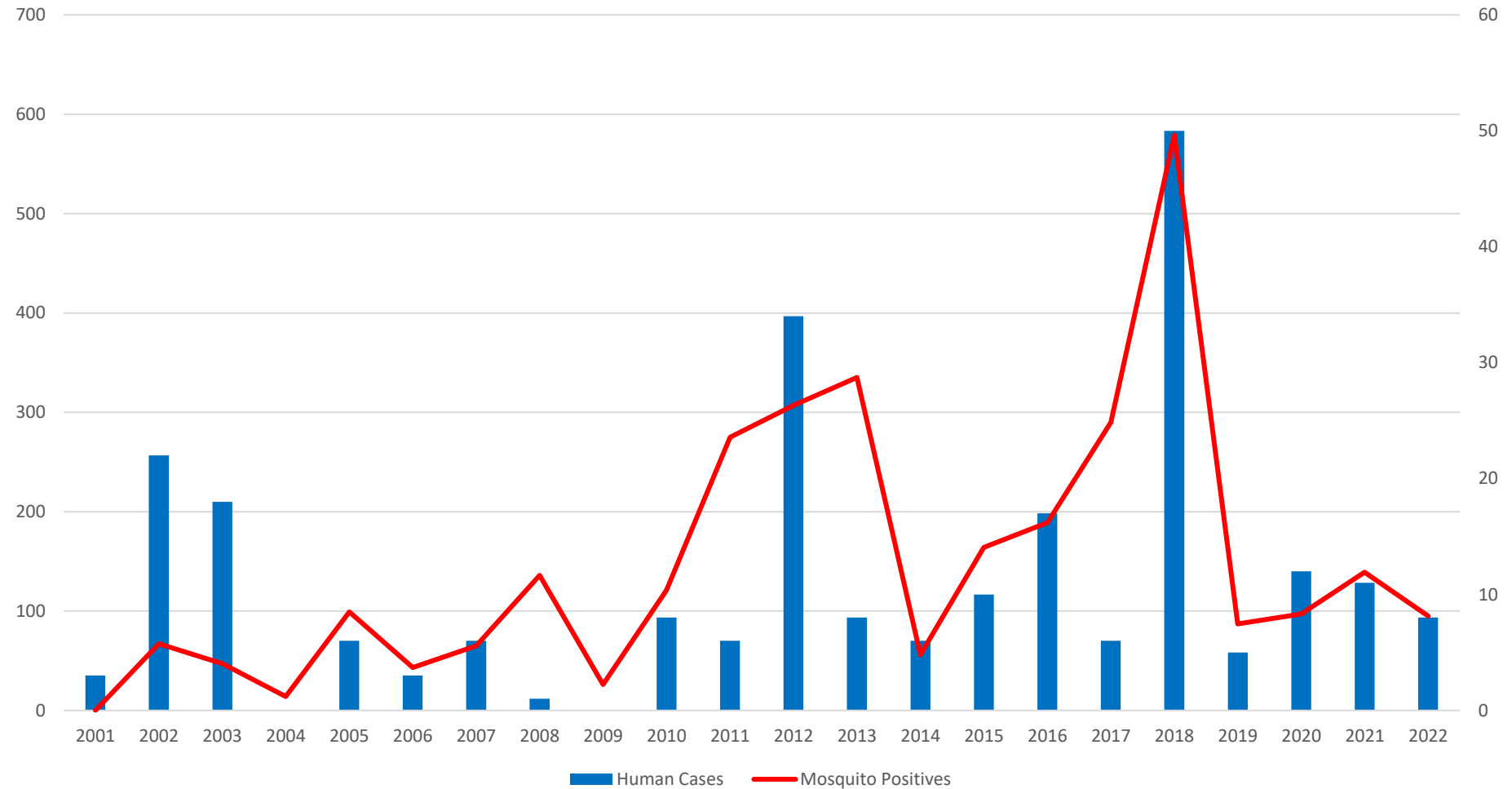
- Typically in 2-3 year outbreak cycles with limited activity during non-outbreak years, 2019-2020 was last outbreak cycle
- Outbreaks difficult to predict in advance



Arbovirus Background: Historical Activity

WNV:

Annual occurrence



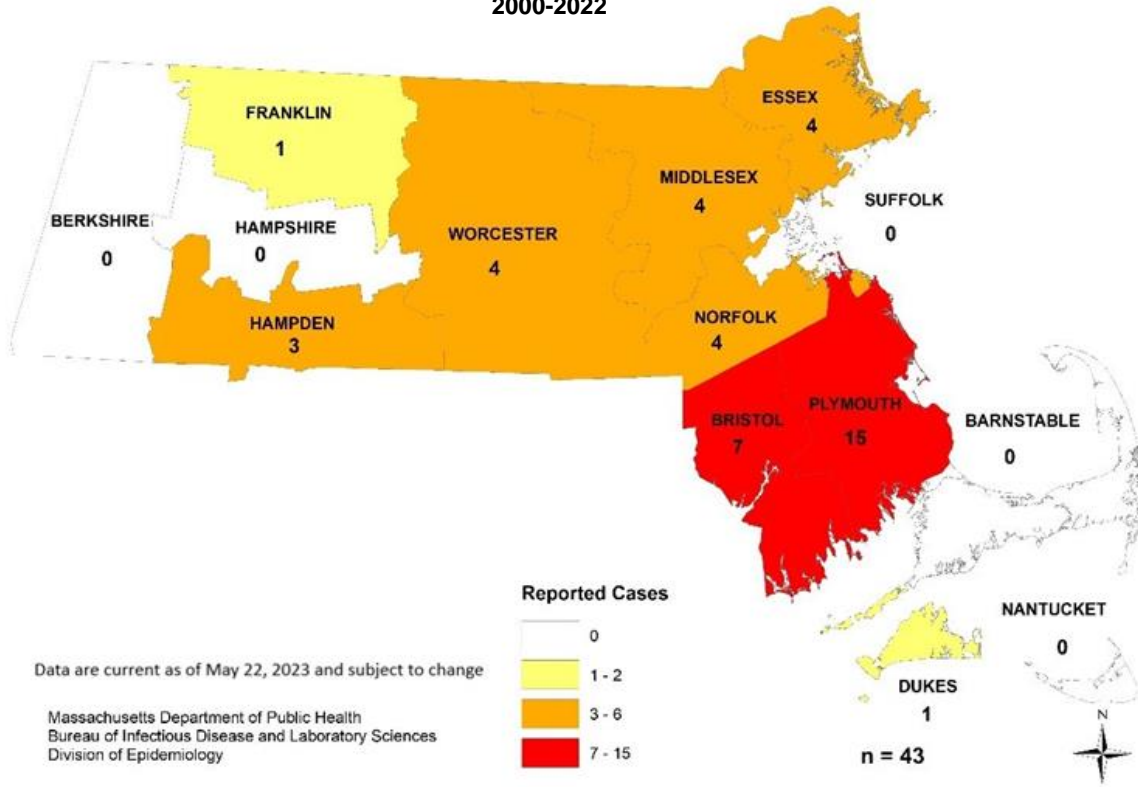
Arbovirus Background: Transmission Factors

- **Arboviruses arise from different habitats**
 - EEE
 - Red maple/white cedar swamps are source habitat for birds and mosquitoes
 - Type of habitat most common in Southeastern MA
 - WNV
 - Urban habitats that accumulate small collections of stagnant water
- **During season factors that influence risk**
 - Mosquito Populations
 - Precipitation
 - Temperature
- **Climate change effects likely**

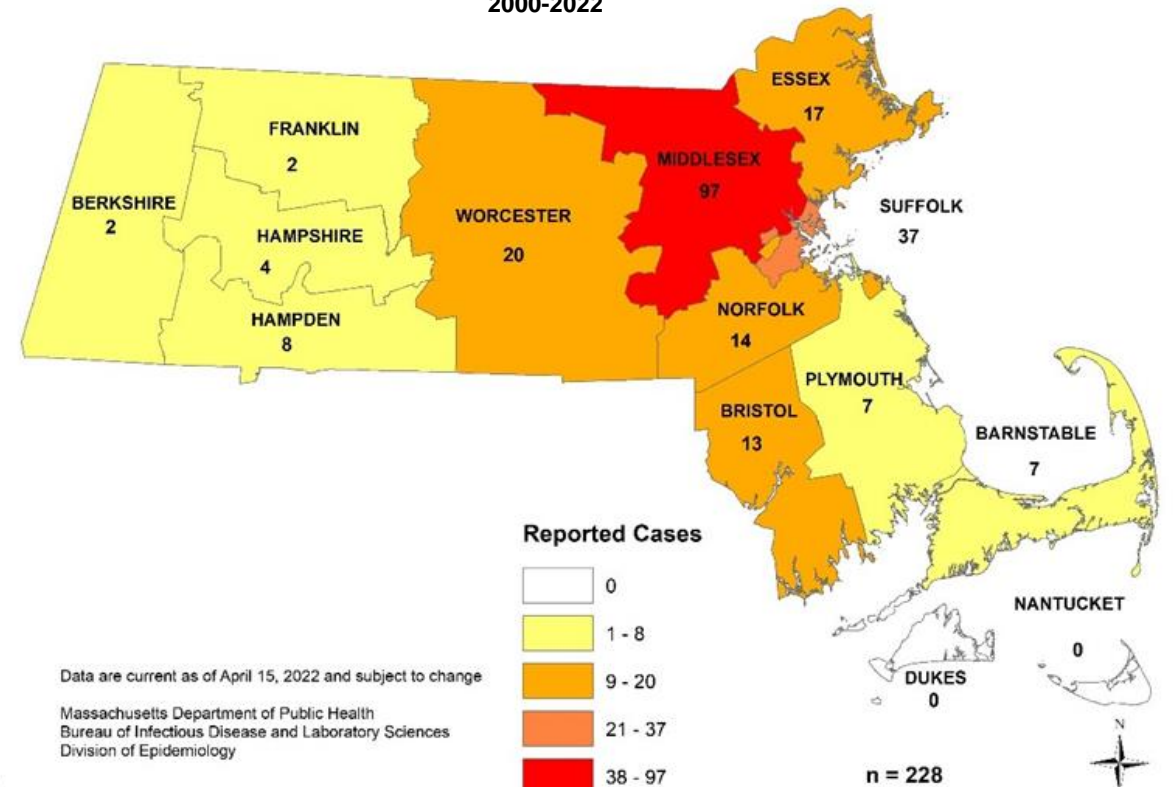


County of Residence of Cases

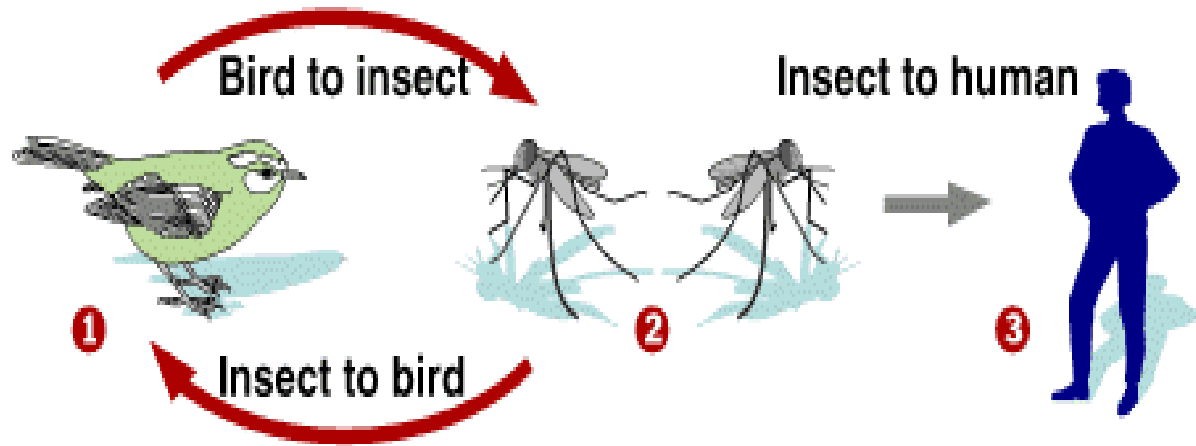
Human EEE Cases in Massachusetts
2000-2022



Human WNV Cases in Massachusetts
2000-2022



Transmission Cycles: Timeline



WNV Amplification Cycle: Escalating interactions between infected birds and mosquitoes

WNV Spill-Over: Incidental transmission to animals and people

— JUNE — JULY — AUGUST — SEPTEMBER — OCTOBER — NOVEMBER —→

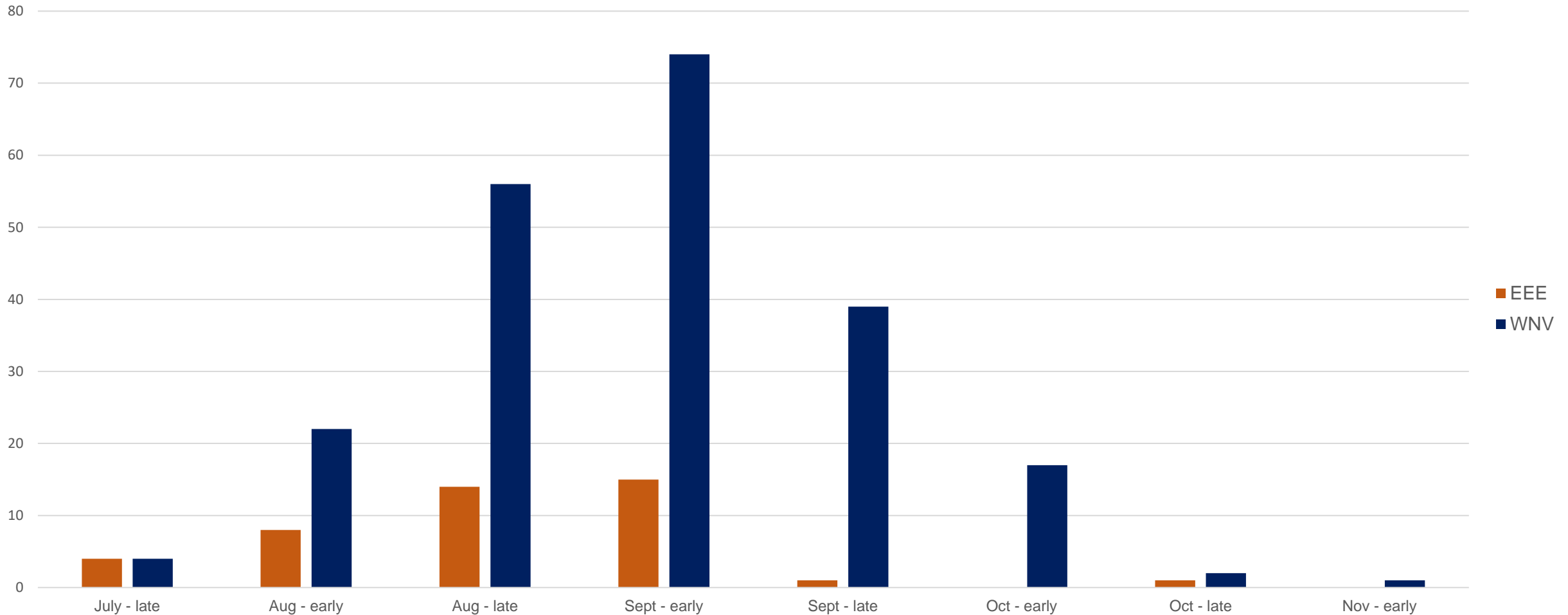
EEE Amplification Cycle: Escalating interactions between infected birds and mosquitoes

EEE Spill-Over: Incidental transmission to animals and people

Opportunity for adult mosquito control interventions;
includes ground-based and aerial (EEE only)

Transmission Cycles: Human Cases

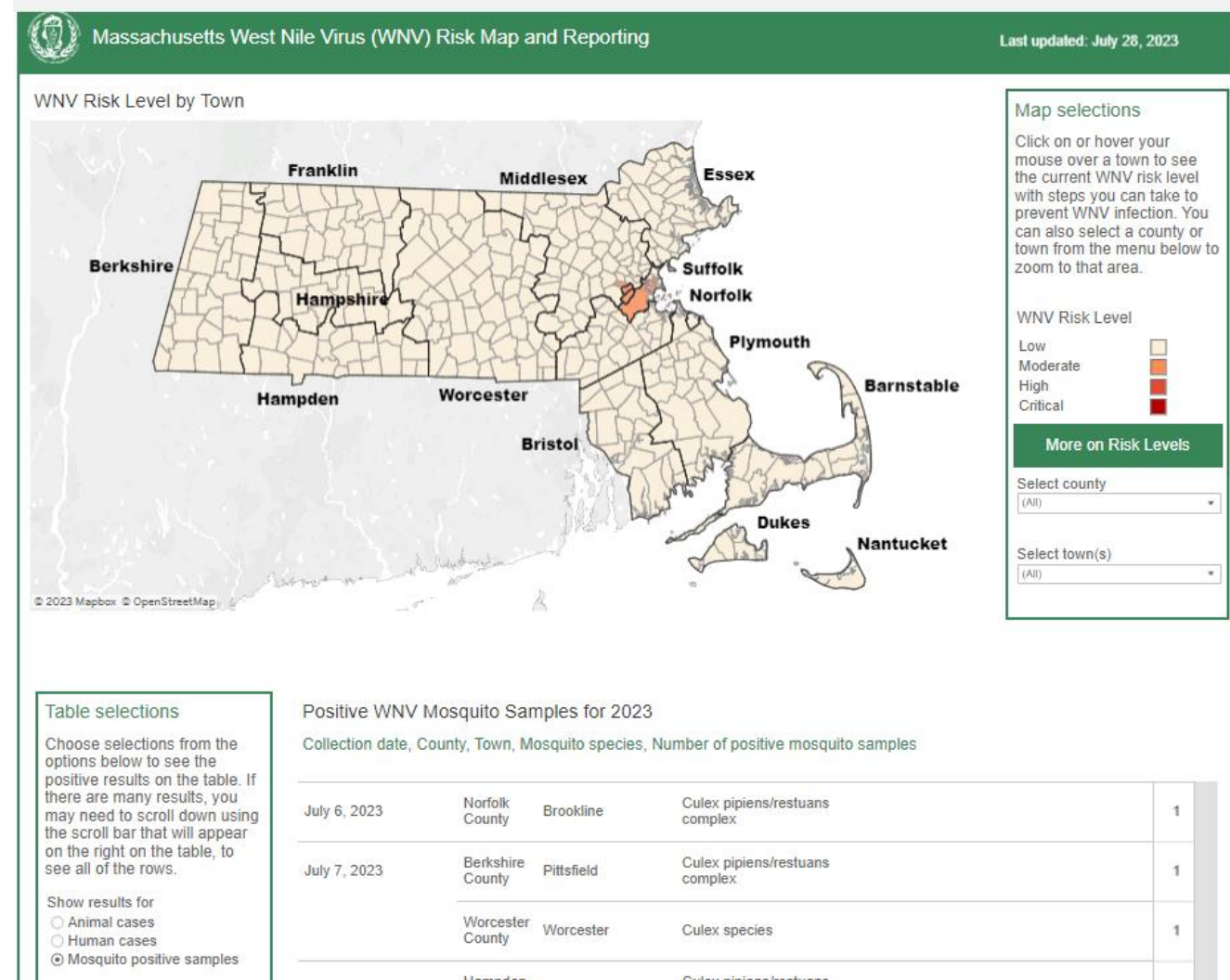
Number of West Nile virus and Eastern Equine Encephalitis Cases by Date of Disease Onset (2000 - 2022)



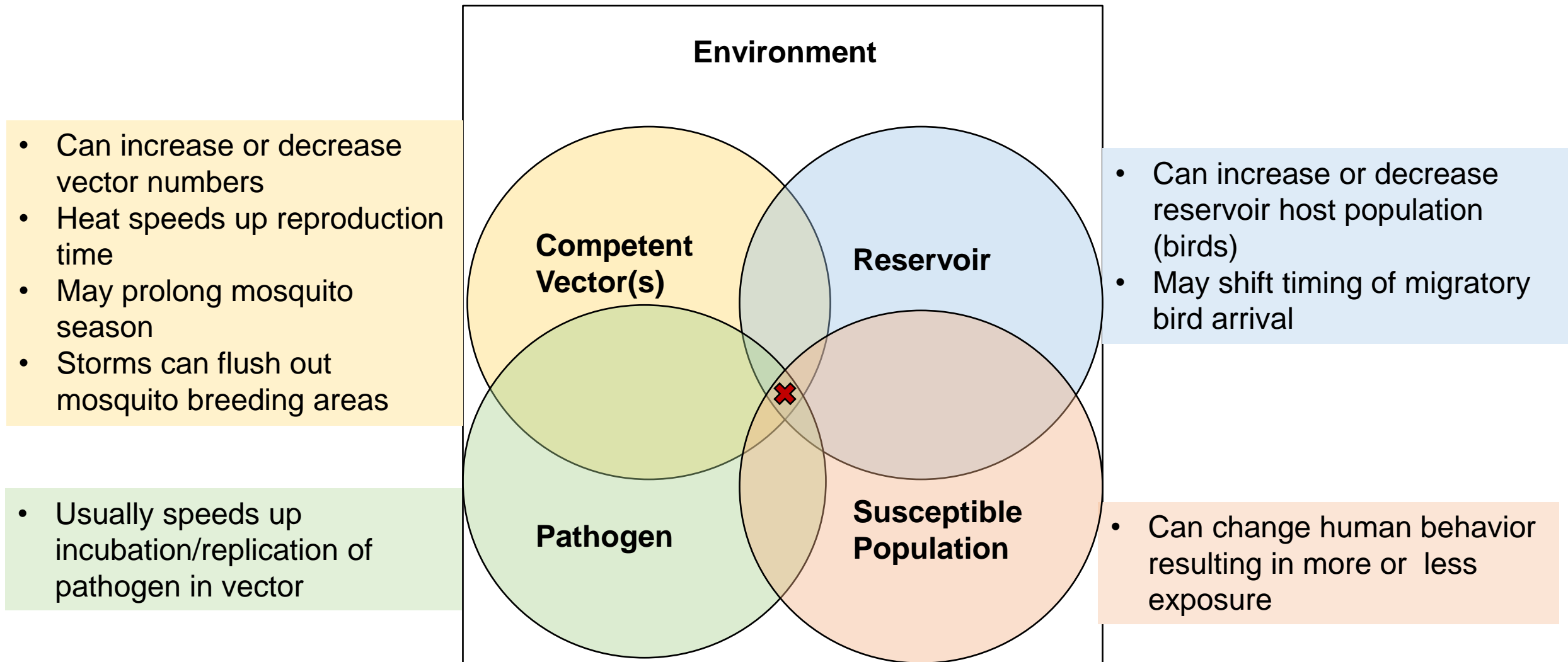
**Note: Early = Days 1-15 in month, Late = Days 16+ in month*

Risk Analysis and Communication

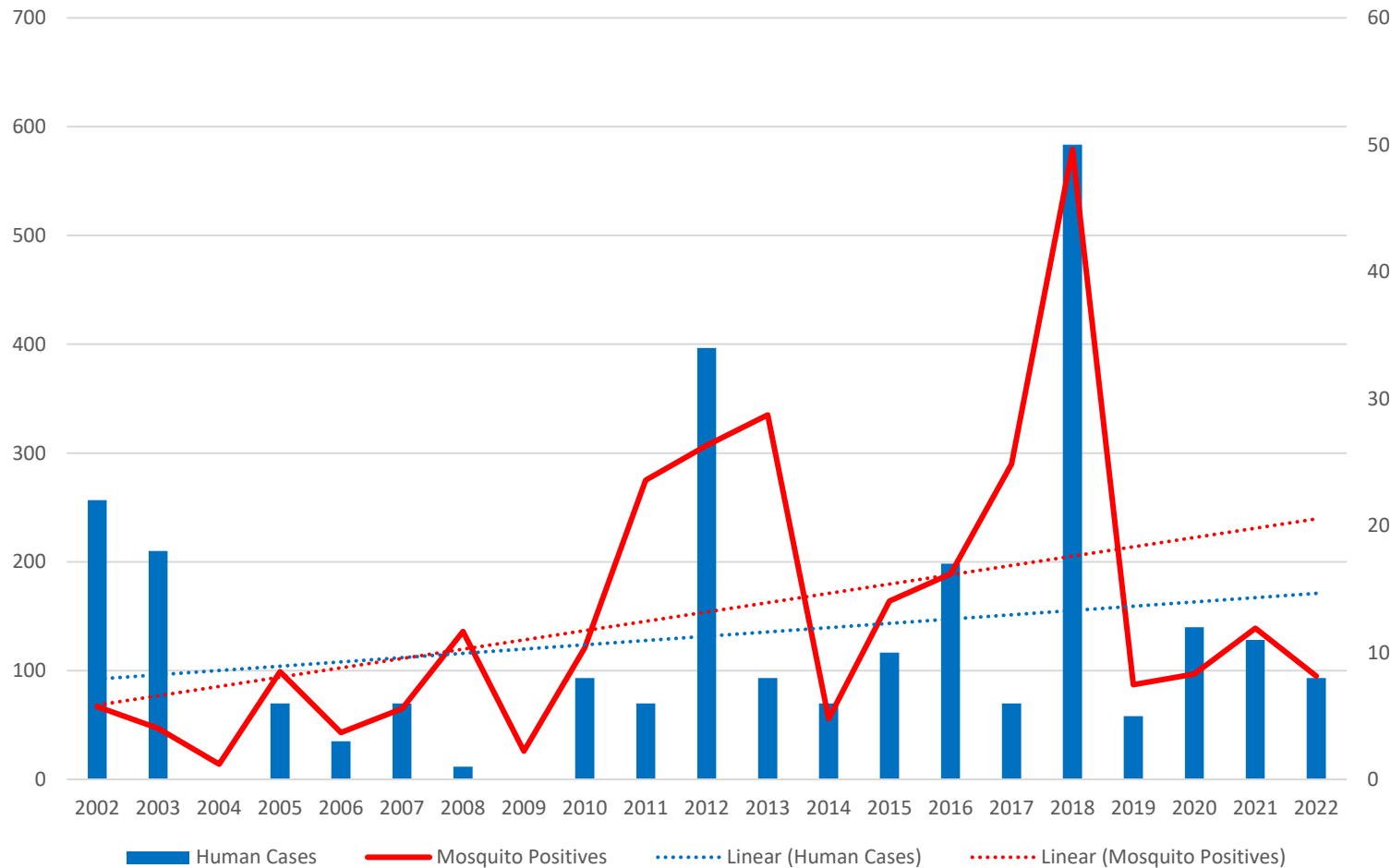
- Plan provides an evolving set of public health recommendations based on risk assessed by geography (risk levels remote – critical)
- Website includes maps of risk levels and information about all positive results (mosquito, animal and human): <https://www.mass.gov/info-details/massachusetts-arbovirus-update>



Effects of Temperature and Precipitation Changes

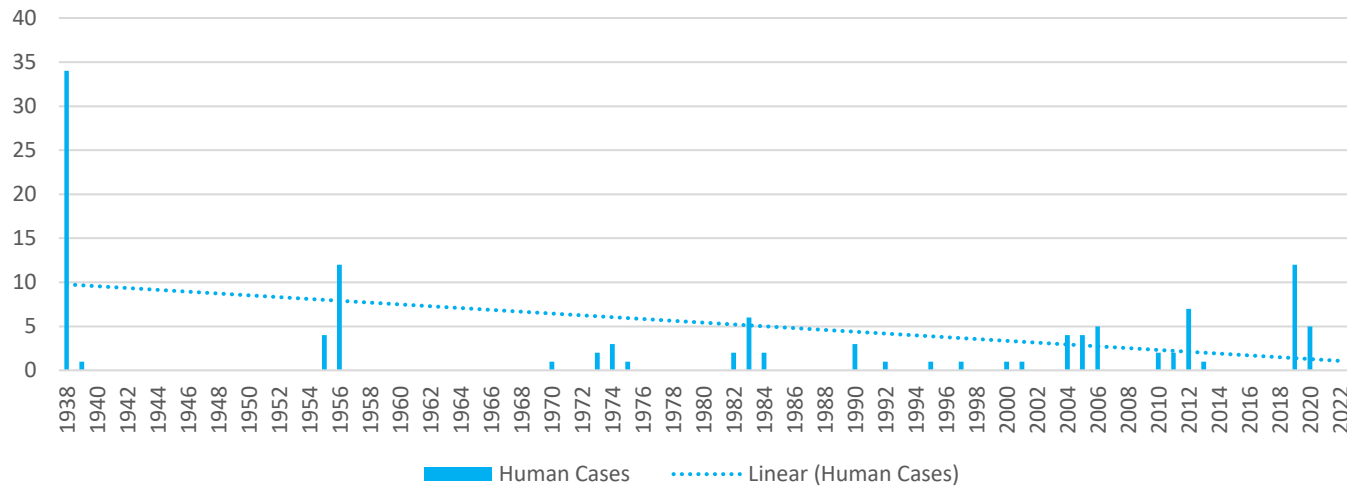


Climate change Effect? - WNV

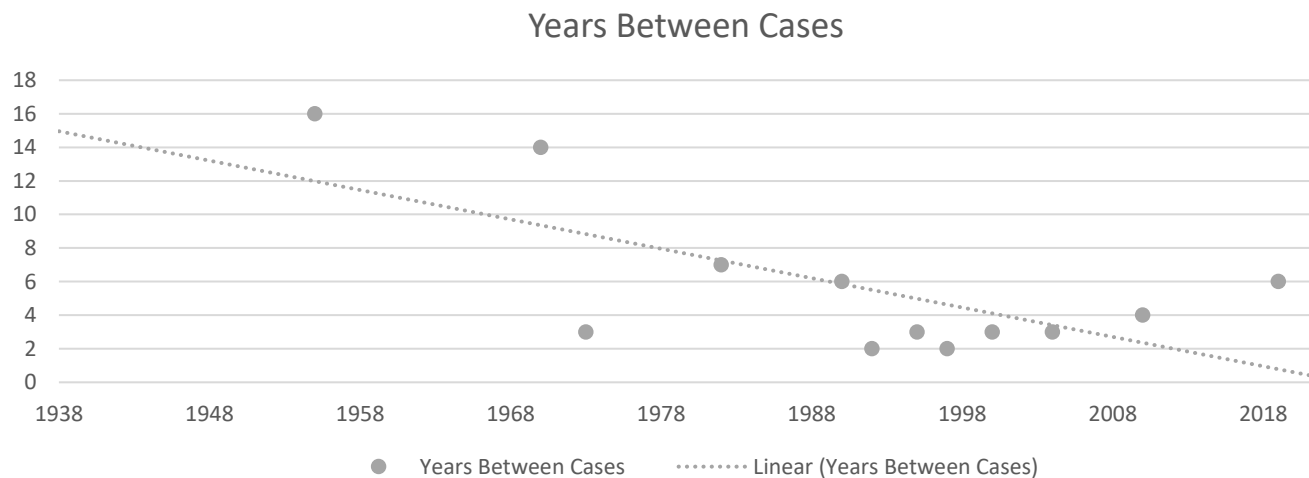


- Trend lines increasing
- But:
 - WNV only first arrived in 2001
 - Relatively short time span
 - Changes in surveillance over time, for both mosquito and human cases

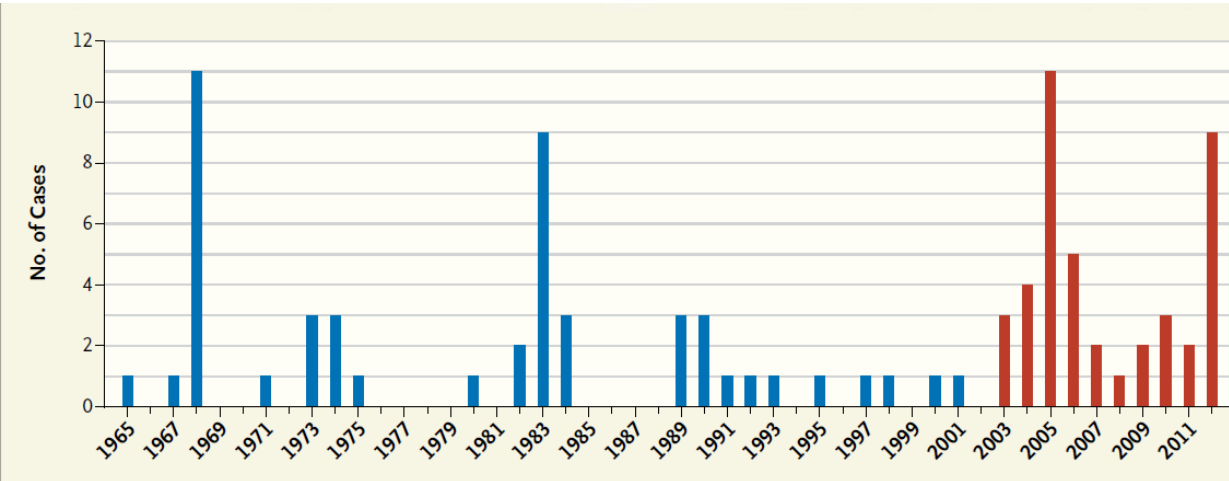
Climate change Effect? - EEE



- Trend line decreasing for number of cases over all time
- But:
 - First outbreak was the largest
 - Some evidence of increase since the 1970s
 - Difficult to evaluate trends with rare outcomes like EEE cases
 - Changes in surveillance over time, for both mosquito and human cases
 - Number of years between cases has decreased
 - Changes in land use



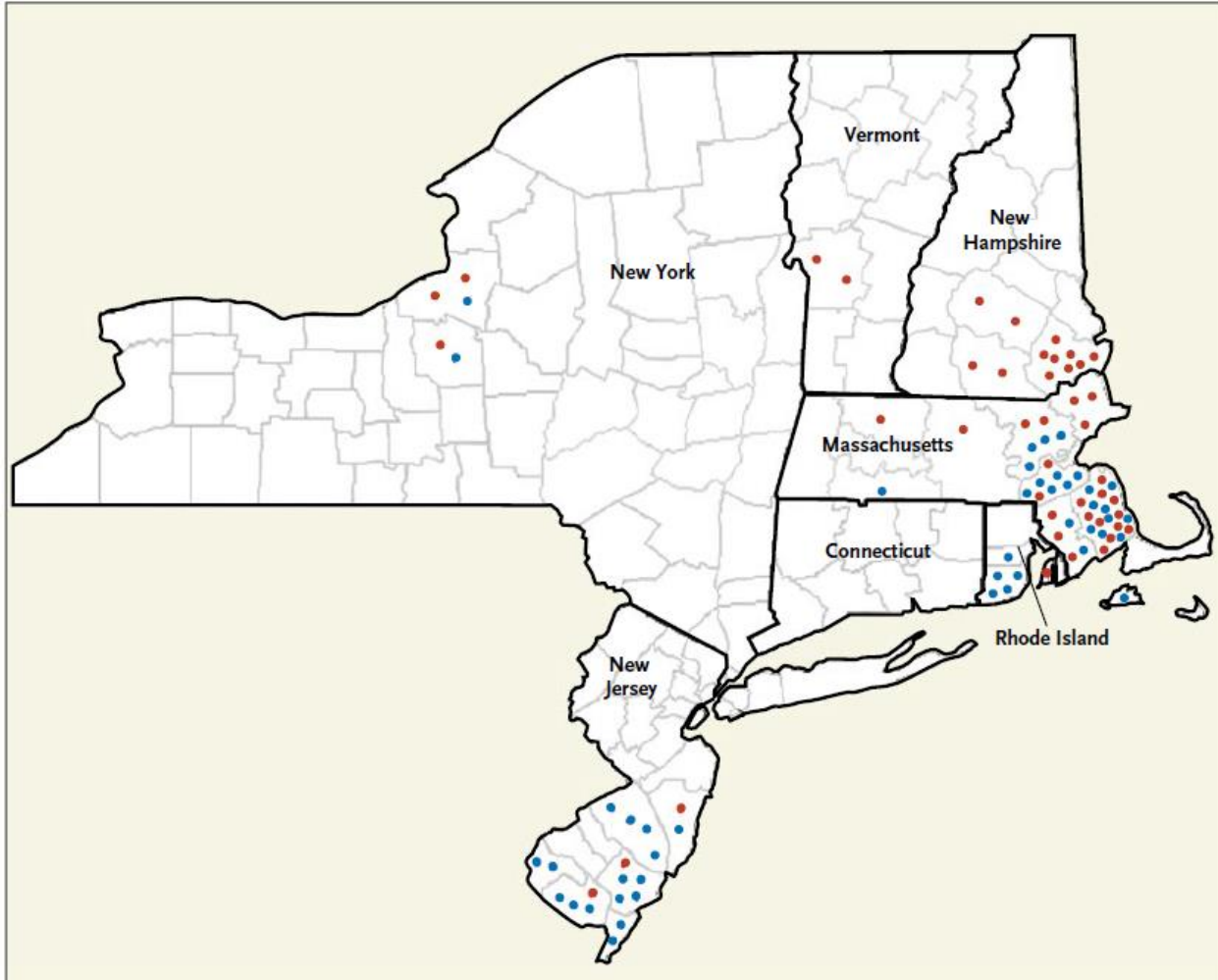
Climate change Effect? - EEE



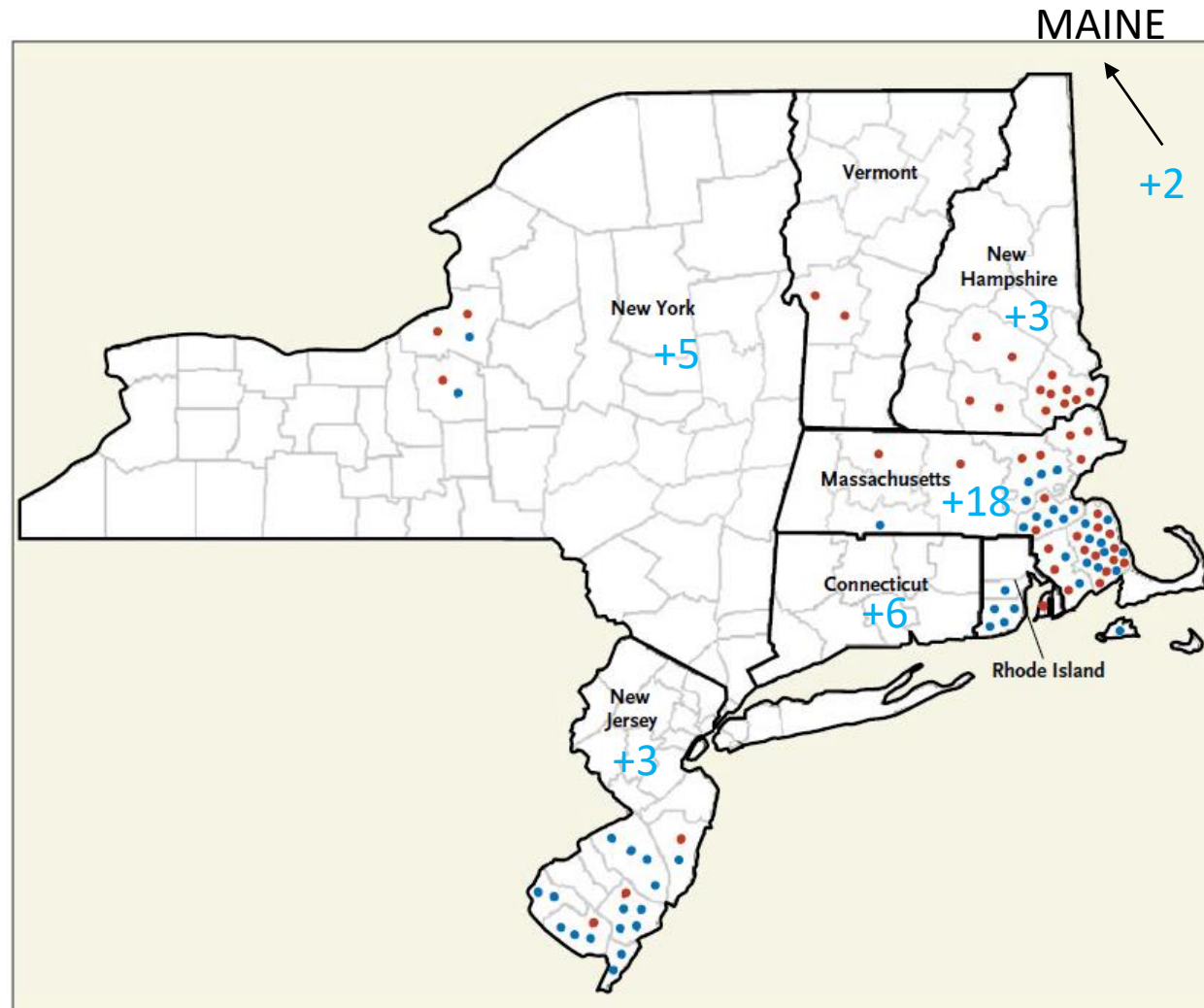
Blue bars and blue dots represent EEE cases in the Northeast prior to 2003

Red bars and red dots represent EEE cases in the Northeast from 2003 – 2012

Armstrong et al. Eastern equine encephalitis – old enemy, new threat. *n engl j med* 368;18 *nejm*.1670 org may 2, 2013

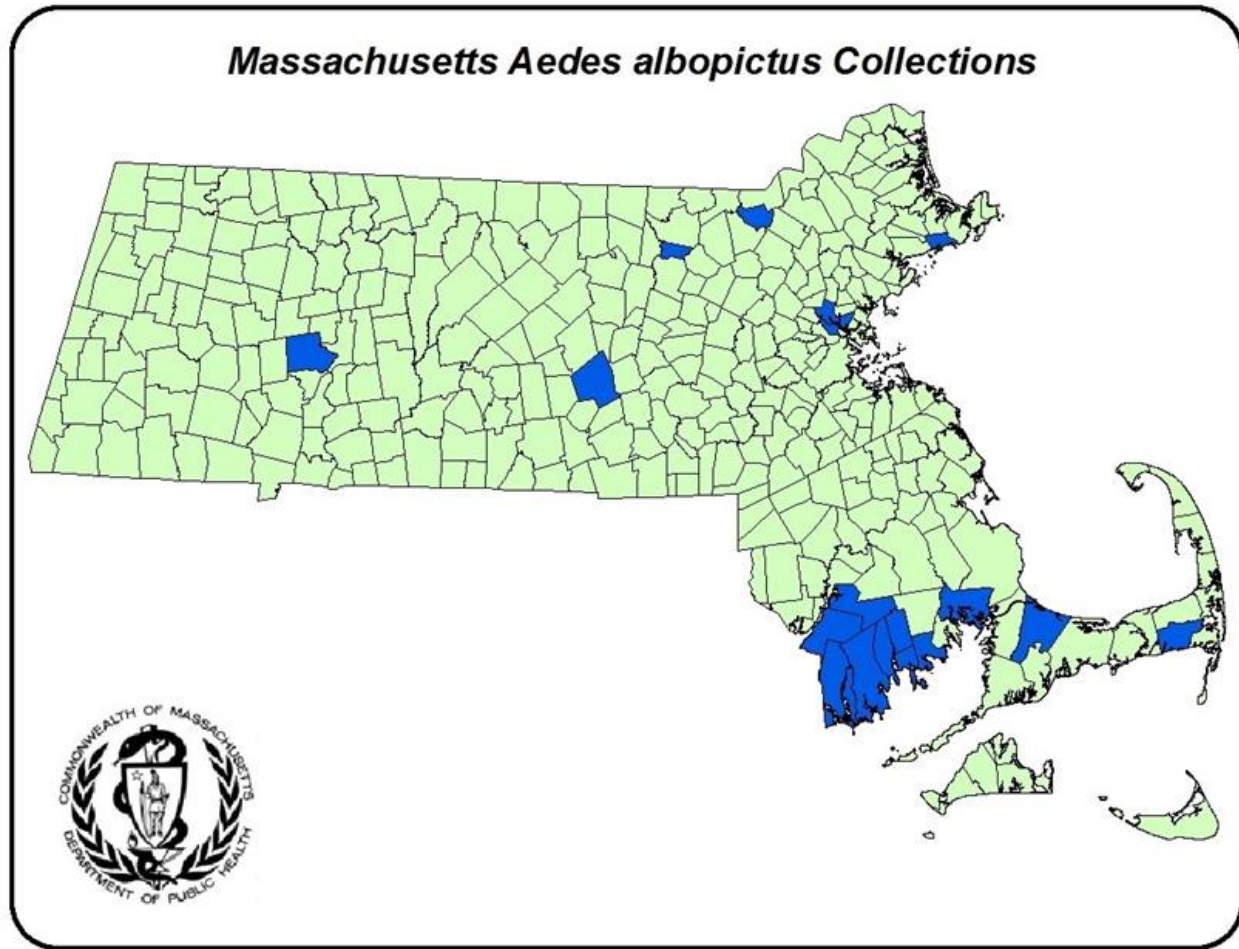


Climate change Effect? - EEE



Massachusetts *Aedes albopictus* Surveillance

- Asian Tiger mosquito
- Can be a vector for Zika, dengue and chikungunya
 - Not as efficient as *Aedes aegypti*
 - Have not seen increases in outbreaks in other parts of the US with more established populations
- Significant nuisance



Take Home Messages

- Mosquito-borne diseases arise from complex ecologic systems
- Difficult to identify change and attribute cause due to complexity (and due to relatively small numbers)
- Change is more likely to be gradual than sudden
- Factors possibly increasing arbovirus cases:
 - Longer mosquito season, heat decreasing reproduction time
- Factors that could decrease arbovirus cases:
 - Increased rainstorms wash out breeding populations, more people indoors with heat and rain, mismatch of bird migration with mosquito population
- Doesn't take into account human population and land use changes
- Maintaining surveillance activities is critical to monitoring current risk and change over time

Thank you for the opportunity to present this information today.

Please direct any questions to:

Catherine M. Brown, DVM, MSc, MPH

State Epidemiologist/State Public Health Veterinarian

Bureau of Infectious Disease and Laboratory Sciences

Catherine.Brown@mass.gov



Massachusetts Department of Public Health

**Next Meeting:
September 13, 2023**