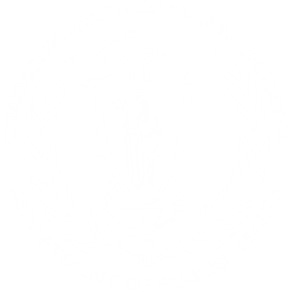
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**Bureau of Infectious Disease and Laboratory Sciences**

**Tickborne Disease Surveillance Summary, 2019**

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Massachusetts Department of Public Health, Bureau of Infectious Disease and Laboratory Sciences.

*Tickborne Disease Surveillance Summary, 2019.*

https://www.mass.gov/lists/tick-borne-disease-surveillance-summaries-and-data

**Bureau of Infectious Disease and Laboratory Sciences**

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**Requests for additional data**

https://www.mass.gov/infectious-disease-surveillance-reporting-and-control

**Acknowledgments**

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2019 Tickborne Disease Surveillance Summary

Introduction

The 2019 Tickborne Disease Surveillance Summary provides data on infections reported to the Massachusetts Department of Public Health (MDPH), Bureau of Infectious Disease and Laboratory Sciences by healthcare providers and laboratories per regulation (105 CMR 300.000). This report focuses on a subset of four tickborne diseases:

* Babesiosis
* Human Granulocytic Anaplasmosis (HGA)
* *Borrelia* *miyamotoi* infection
* Powassanvirus infection

Babesiosis, HGA, and Borrelia *miyamotoi* are tickborne diseases that are endemic to the Commonwealth. Powassan virus is a rare tick-borne flavivirus that can cause neuroinvasive disease in humans. Transmission of all four diseases can happen when an individual is bitten by a black-legged tick (*Ixodes scapularis*). Powassan virus can also be transmitted by the woodchuck tick (*Ixodes cookie*). Most infections occur in the warm spring and summer months when young (nymph) ticks are most active, though adult ticks may feed on humans and transmit disease year-round if temperatures are above freezing. Black-legged ticks are most commonly found in grassy or wooded areas where deer and mice are present. Because these diseases (and others including Lyme disease) are all transmitted by the same species of tick there is risk of co-infection with multiple pathogens from the same bite.

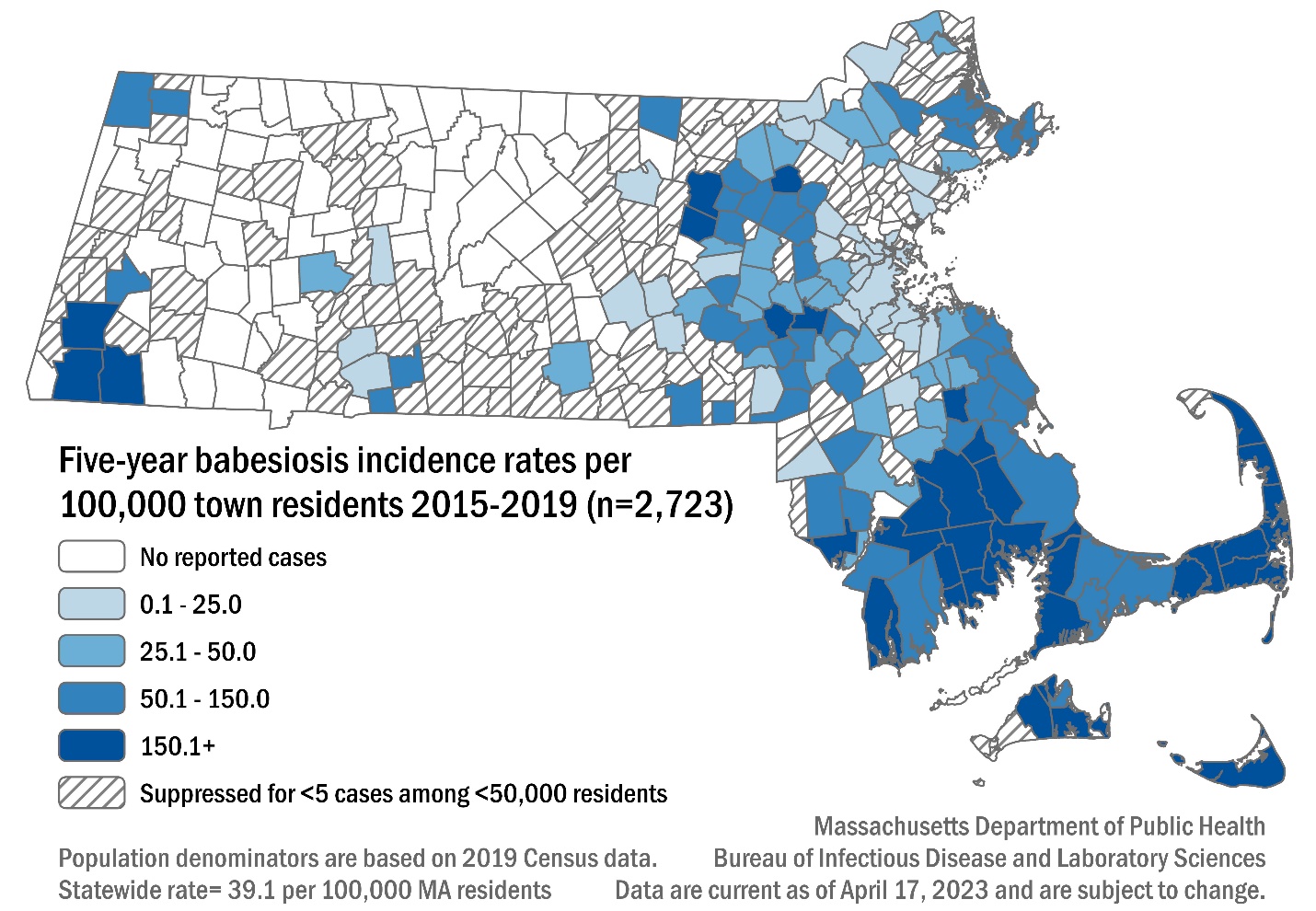
For more information about these and other tickborne diseases, please visit <https://www.mass.gov/tick-borne-diseases>.

Surveillance Highlights

# Babesiosis

* Babesiosis is a disease caused by a microscopic parasite (*Babesia microti)* that infects red blood cells.
* 638 confirmed and probable cases of babesiosis were reported in Massachusetts in 2019, with an additional 208 cases classified as suspect.
* Statewide, babesiosis incidence increased from 8.0 to 9.2 cases per 100,000 residents compared to 2018. The greatest increase was seen in Dukes and Nantucket counties, which have historically seen the highest rates in the state.
* The majority of cases occurred between the months of June and August.
* Only 25% of cases reported awareness of a recent tick bite prior to symptom onset.
* Individuals over 55 years of age are at greatest risk of contracting the disease with the mean age for cases being 60 years old. Males are more likely than females to be infected, accounting for 68% of cases in the state.
* Nearly 27% of cases were hospitalized and there were two reported deaths. Fatigue (92%), fever (73%), headache (63%), joint pain (64%), and chills (61%) were the most commonly reported symptoms.
* The primary source of transmission is via tick-bite; however, because it infects red blood cells, *Babesia* can also be transmitted from person-to-person through blood transfusions and organ donations. In 2019, six confirmed cases had received a blood transfusion in the six months prior to becoming ill.

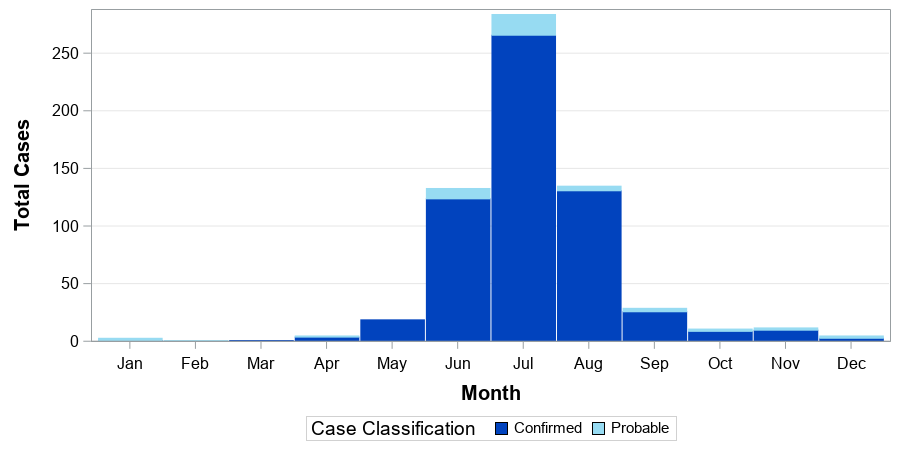
## **Figure 1:** Five-year babesiosis incidence rates per 100,000 population by city/town, Massachusetts, 2015-2019



## **Table 1:** Babesiosis confirmed and probable cases and incidence rates per 100,000 population by county, Massachusetts, 2019

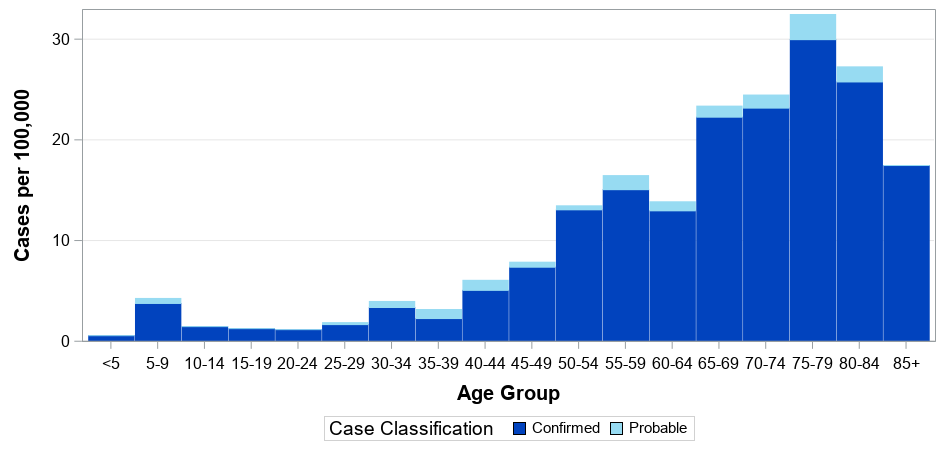
|  |  |  |
| --- | --- | --- |
| **County** | **2019 Cases** | **2019 Incidence Rate per 100,000** |
| Barnstable | 105 | 48.5 |
| Berkshire | 31 | 24.5 |
| Bristol | 109 | 19.1 |
| Dukes & Nantucket | 42 | 145.5 |
| Essex | 28 | 3.5 |
| Franklin | 2 | 2.8 |
| Hampden | 16 | 3.4 |
| Hampshire | 9 | 5.5 |
| Middlesex | 79 | 4.9 |
| Norfolk | 43 | 6.0 |
| Plymouth | 113 | 21.4 |
| Suffolk | 9 | 1.1 |
| Worcester | 52 | 6.2 |
| **State Total** | **638** | **9.2** |

## **Figure 2:** Number of confirmed and probable babesiosis cases by month of symptom onset\*, Massachusetts, 2019, (n= 617)

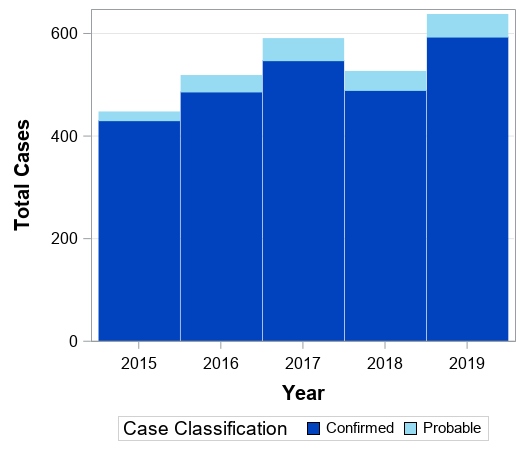


\* Symptom onset date not reported for every confirmed and probable case.

## **Figure 3:** Rate (per 100,000 population) of confirmed and probable babesiosis cases by age group, Massachusetts, 2019, (N= 638)



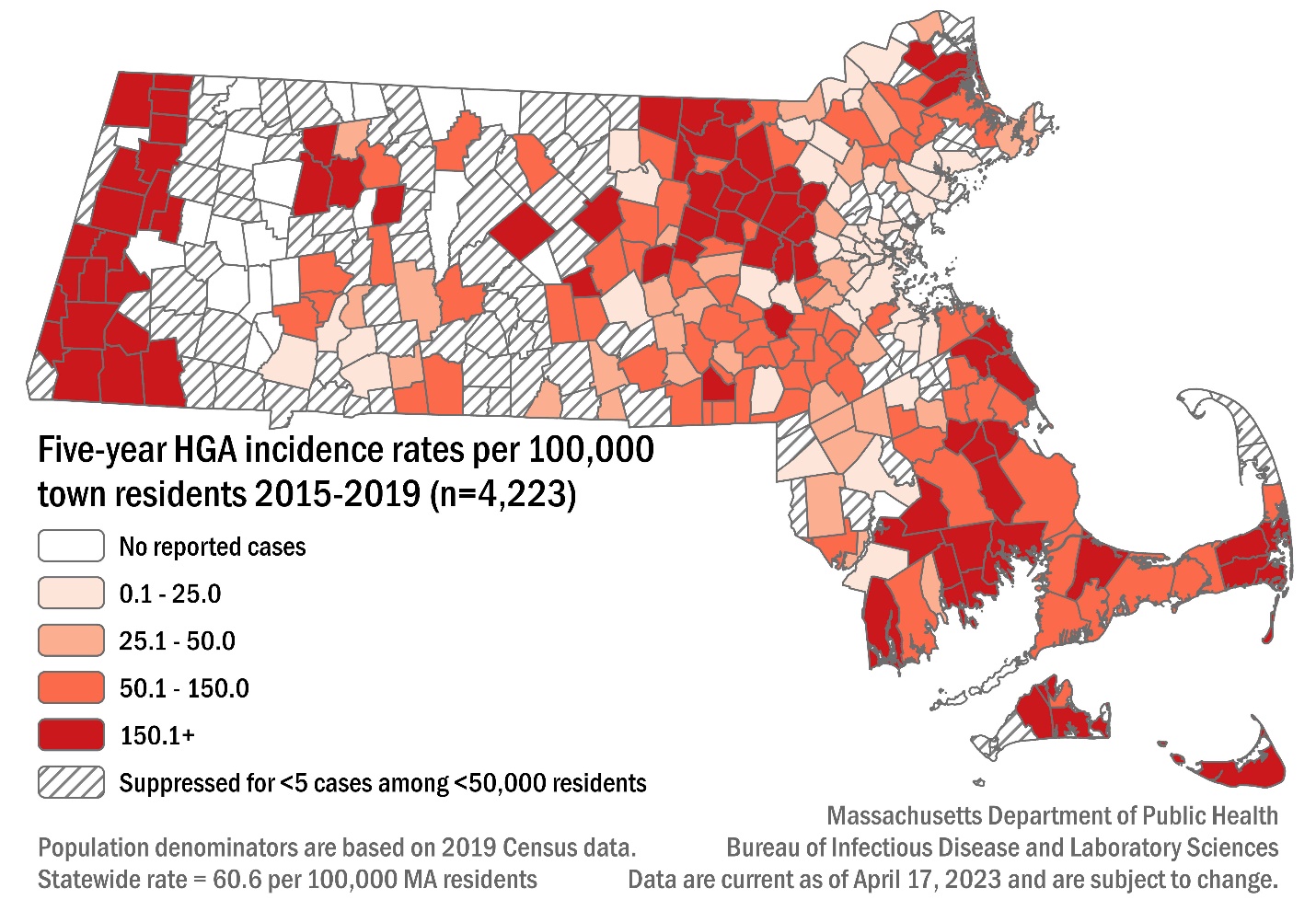
## **Figure 4:** Number of confirmed and probable babesiosis cases by year, Massachusetts, 2015-2019, (N=2,723)



# Human Granulocytic Anaplasmosis (HGA)

* Anaplasmosis is a disease caused by the bacterium *Anaplasma phagocytophilum*.
* 702 confirmed and probable cases of HGA were reported in Massachusetts in 2019, with an additional 587 cases classified as suspect.
* Statewide, HGA incidence increased from 10.0 to 10.1 cases per 100,000 residents compared to 2018. The greatest increase was seen in Berkshire county, which historically has seen the highest rates in the state.
* The majority of cases occurred between the months of May and July, when nymphal black-legged ticks are most active.
* Nearly 47% of cases reported awareness of a recent tick bite.
* Individuals over 55 years of age are at greatest risk of contracting the disease with the mean age for cases being 60 years old. Males were more likely than females to be infected, accounting for 63% of cases in the state.
* Over a quarter (28%) of cases were hospitalized as a result of their infection and there were two reported deaths. Fever (100%), malaise (90%), muscle pain (80%), headache (74%), and joint pain (71%) were the most commonly reported symptoms.

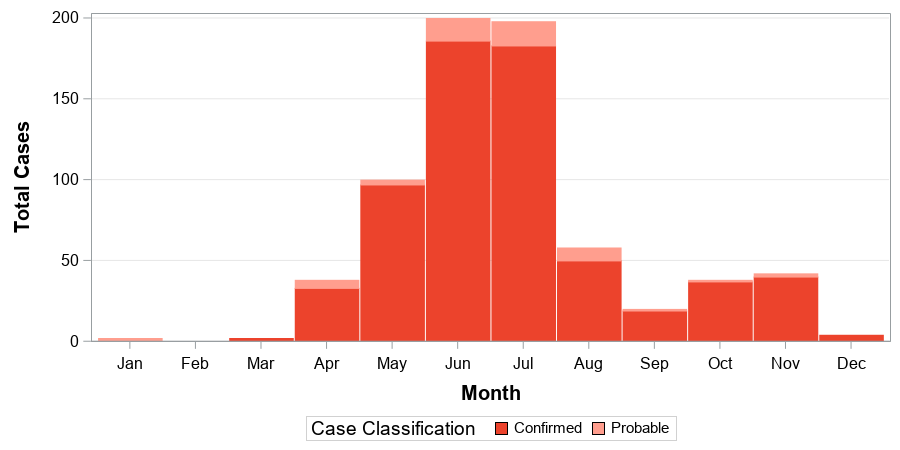
## **Figure 5:** HGA incidence rates per 100,000 population by city/town, Massachusetts, 2015-2019



## **Table 2:** HGA confirmed and probable cases and incidence rates per 100,000 population by county, Massachusetts, 2019

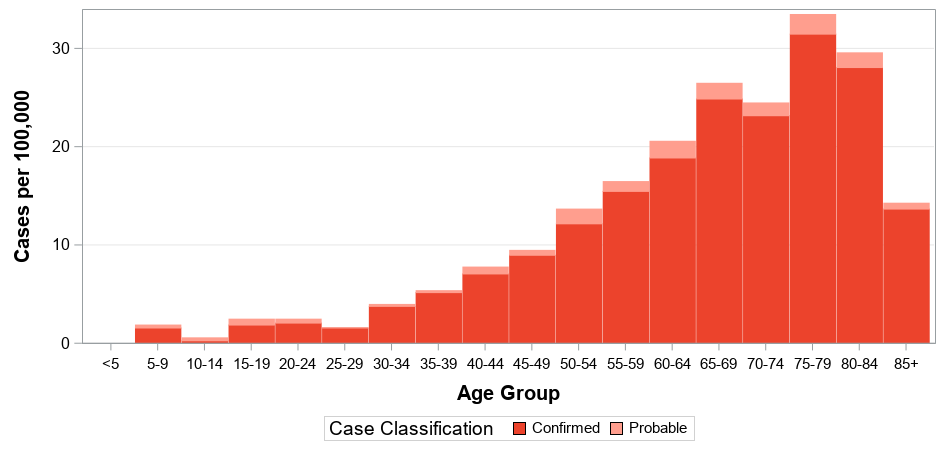
|  |  |  |
| --- | --- | --- |
| **County** | **2019 Cases** | **2019 Incidence Rate per 100,000** |
| Barnstable | 44 | 20.3 |
| Berkshire | 175 | 138.1 |
| Bristol | 53 | 9.3 |
| Dukes & Nantucket | 8 | 27.7 |
| Essex | 35 | 4.4 |
| Franklin | 17 | 23.9 |
| Hampden | 16 | 3.4 |
| Hampshire | 16 | 9.7 |
| Middlesex | 130 | 8.0 |
| Norfolk | 29 | 4.1 |
| Plymouth | 87 | 16.5 |
| Suffolk | 7 | 0.9 |
| Worcester | 85 | 10.1 |
| **State Total** | **702** | **10.1** |

## **Figure 6:** Number of confirmed and probable HGA cases by month of symptom onset\*, Massachusetts, 2019, (n= 694)

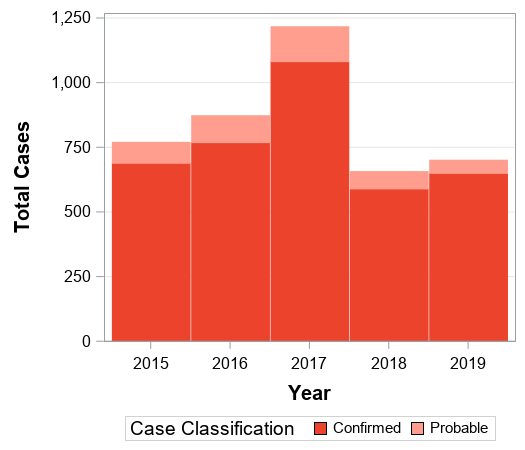


\* Symptom onset date not reported for every confirmed and probable case.

## **Figure 7:** Rate (per 100,000 population) of confirmed and probable HGA cases by age group, Massachusetts, 2019, (N= 702)



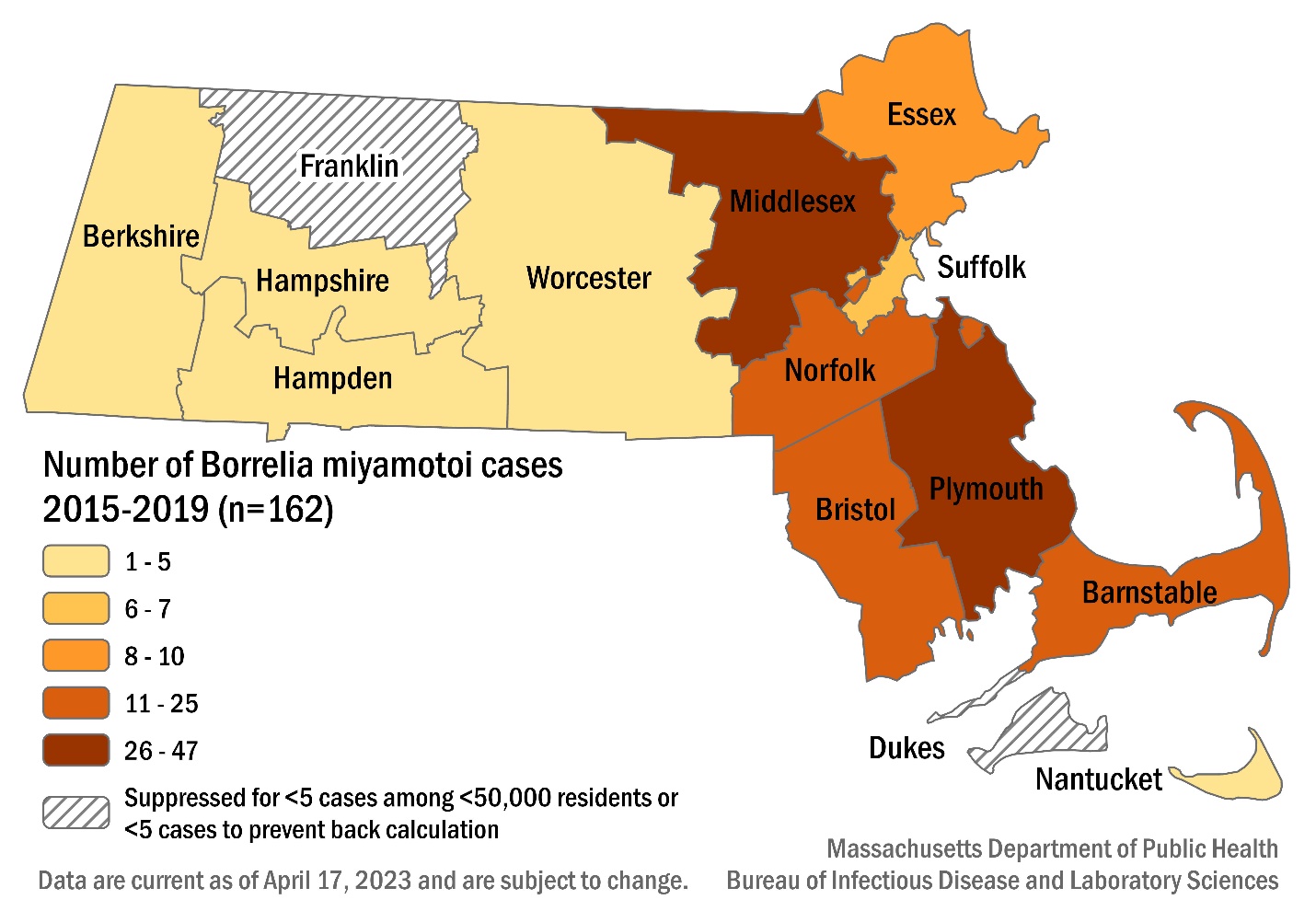
## **Figure 8:** Number of confirmed and probable HGA cases by year, Massachusetts, 2015-2019 (N= 4,223)



# *Borrelia* *miyamotoi* infection

* *Borrelia miyamotoi* is a type of spiral-shaped bacteria that is closely related to the bacteria that cause tickborne relapsing fever. Infection is often referred to as borreliosis.
* B*. miyamotoi* is a relatively new, emerging disease, with the first recorded cases identified in New England in 2011.
* 32 confirmed and probable cases of *Borrelia* *miyamotoi* were reported in 2019, representing a 51% decrease in cases compared to 2018. There were an additional 90 cases classified as suspect in 2019.
* Nearly half of the cases in the state were reported in Middlesex county residents. Bristol and Plymouth counties each reported four cases.
* The majority of reported cases occurred between the months of May and August, with the peak coming in July.
* The mean age of cases was 48 years old. Males and females were affected equally.
* The most common symptoms reported were fatigue (96%), chills (92%), muscle pain (81%), headache (75%), and fever (74%).
* Five cases were hospitalized and there were no known deaths.

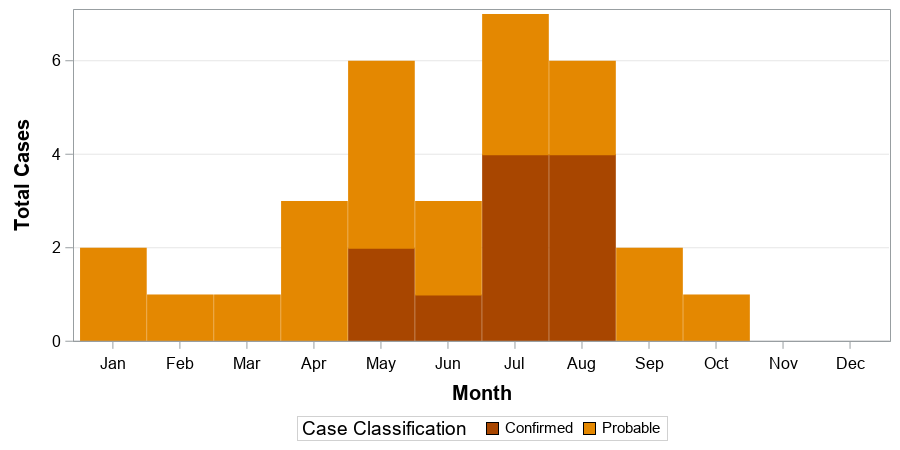
## **Figure 9:** *Borrelia* *miyamotoi* cases by city/town of residence, Massachusetts, 2015-2019



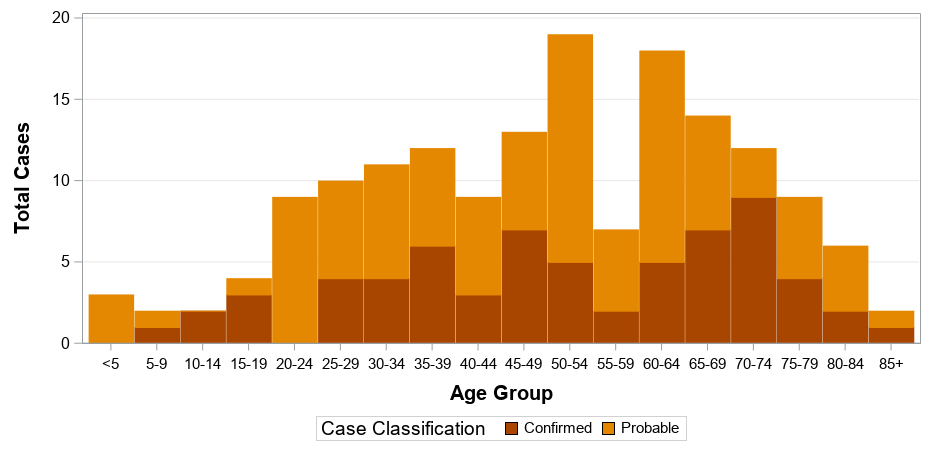
## **Table 3:** *Borrelia* *miyamotoi* confirmed and probable cases by county, Massachusetts, 2019

|  |  |  |
| --- | --- | --- |
| **County** | **2019 Cases** | **Frequency (%)** |
| Barnstable | 3 | 9 |
| Berkshire | 0 | 0 |
| Bristol | 4 | 13 |
| Dukes & Nantucket | 0 | 0 |
| Essex | 0 | 0 |
| Franklin | 0 | 0 |
| Hampden | 0 | 0 |
| Hampshire | 1 | 3 |
| Middlesex | 14 | 44 |
| Norfolk | 3 | 9 |
| Plymouth | 4 | 13 |
| Suffolk | 1 | 3 |
| Worcester | 2 | 6 |
| **State Total** | **32** | **100** |

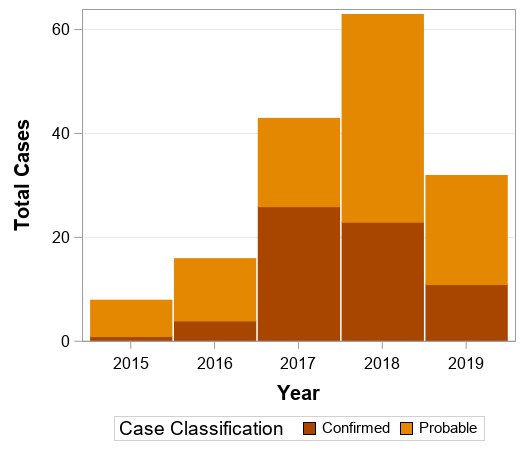
## **Figure 10:** Number of confirmed and probable *Borrelia* *miyamotoi* cases by month of symptom onset, Massachusetts, 2019, (N= 32)



## **Figure 11:** Number of confirmed and probable *Borrelia miyamotoi* cases by age group, Massachusetts, 2015-2019, (N= 162)



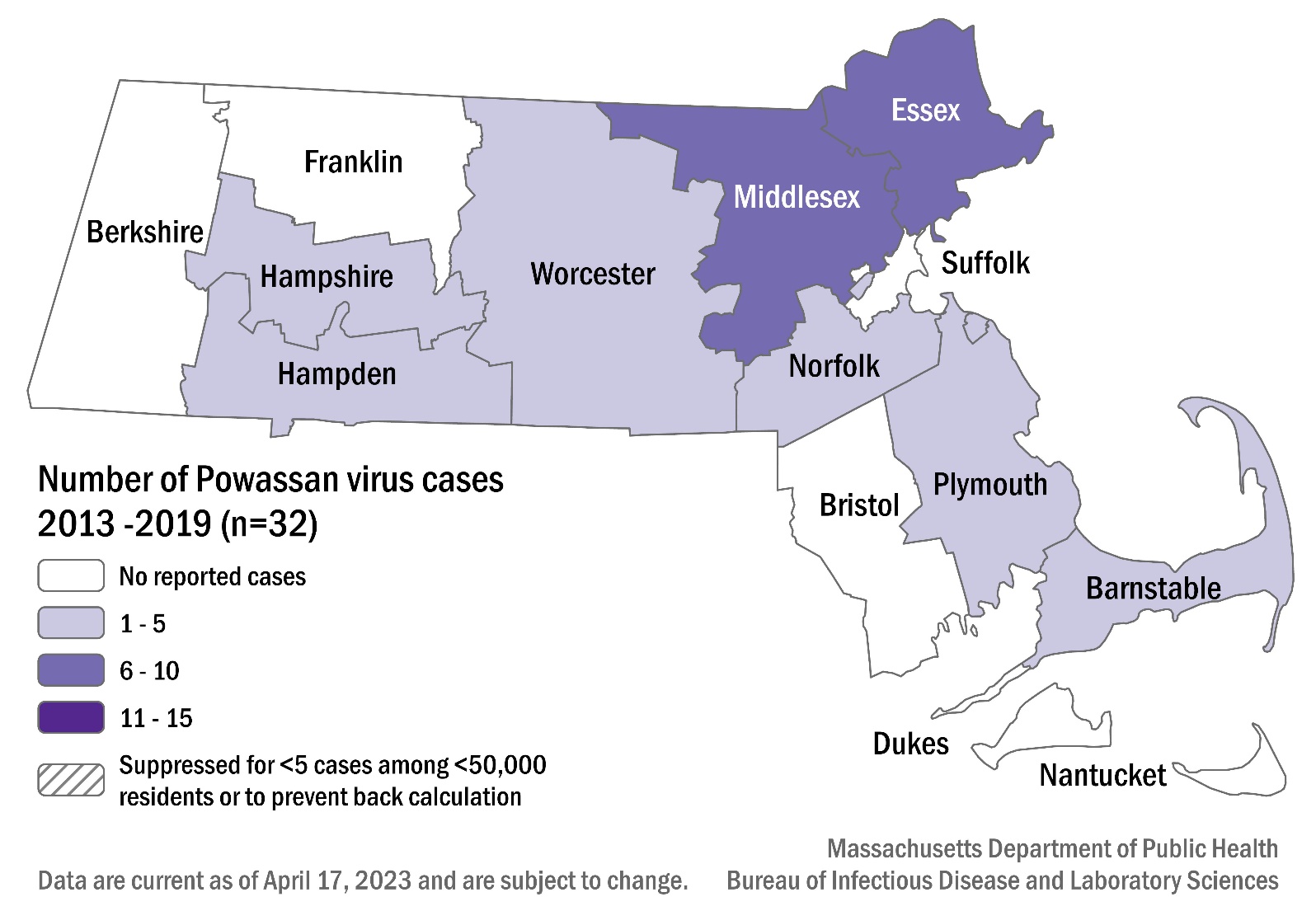
## **Figure 12:** Number of confirmed and probable *Borrelia* *miyamotoi* cases by year, Massachusetts, 2015-2019, (N= 162)



# Powassan virus

* There are two types of Powassan virus in Massachusetts. Type one is found in ticks that feed on woodchucks (groundhogs); while type two is carried by black-legged ticks.
* Cases of Powassan virus infection were first confirmed in Massachusetts via laboratory testing in 2013.
* Between 2013 and 2019, 32 cases of Powassan virus infection were detected in Massachusetts residents. Of those cases, 75% are 50 years of age and older, and overwhelmingly male at 75%.
* Known tick bites before the onset of symptoms were reported in 25% of cases.
* The most common symptoms reported were fever (94.0%), change in mental status (95.0%), mental confusion (94.4%), muscle weakness (75.0%), vomiting (72.2%) and headache (68.8%).
* The types of infection reported were encephalitis (61.3%), meningoencephalitis (32.3%), and meningitis (6.45%).
* Most cases (93.8%) required hospitalization due to the severity of their symptoms.
* Seven individuals (21.9%) were hospitalized more than once.
* There were eight fatalities.

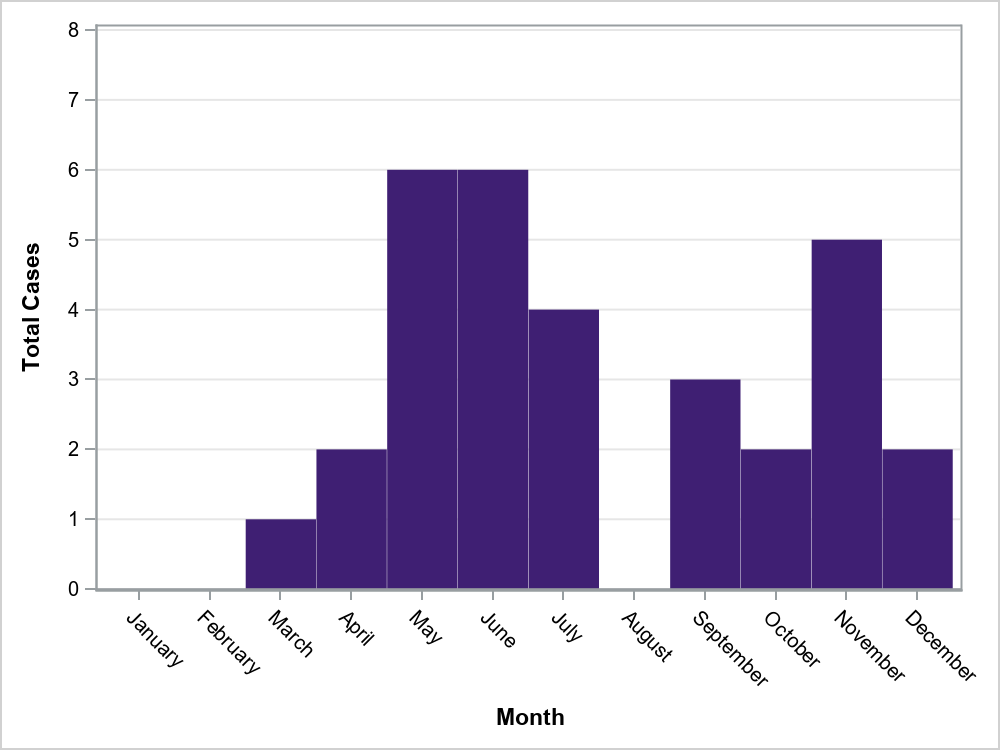
## **Figure 13:** Powassan virus cases by city/town of residence, Massachusetts, 2013-2019



## **Table 4:** Number ofconfirmed and probable Powassan virus cases by county, Massachusetts, 2013-2019

|  |  |
| --- | --- |
| **County** | **Cases** |
| Barnstable | 5 |
| Berkshire | 0 |
| Bristol | 0 |
| Dukes & Nantucket | 0 |
| Essex | 9 |
| Franklin | 0 |
| Hampden | 2 |
| Hampshire | 1 |
| Middlesex | 10 |
| Norfolk | 2 |
| Plymouth | 1 |
| Suffolk | 0 |
| Worcester | 2 |

## **Figure 14:** Number of confirmed and probable Powassan virus cases by month of symptom onset\*, Massachusetts, 2013-2019, (N = 31)



\* Symptom onset date not reported for every confirmed and probable case.

## **Figure 15:** Number of confirmed and probable Powassan virus cases by year, Massachusetts, 2013-2019, (N = 32)

