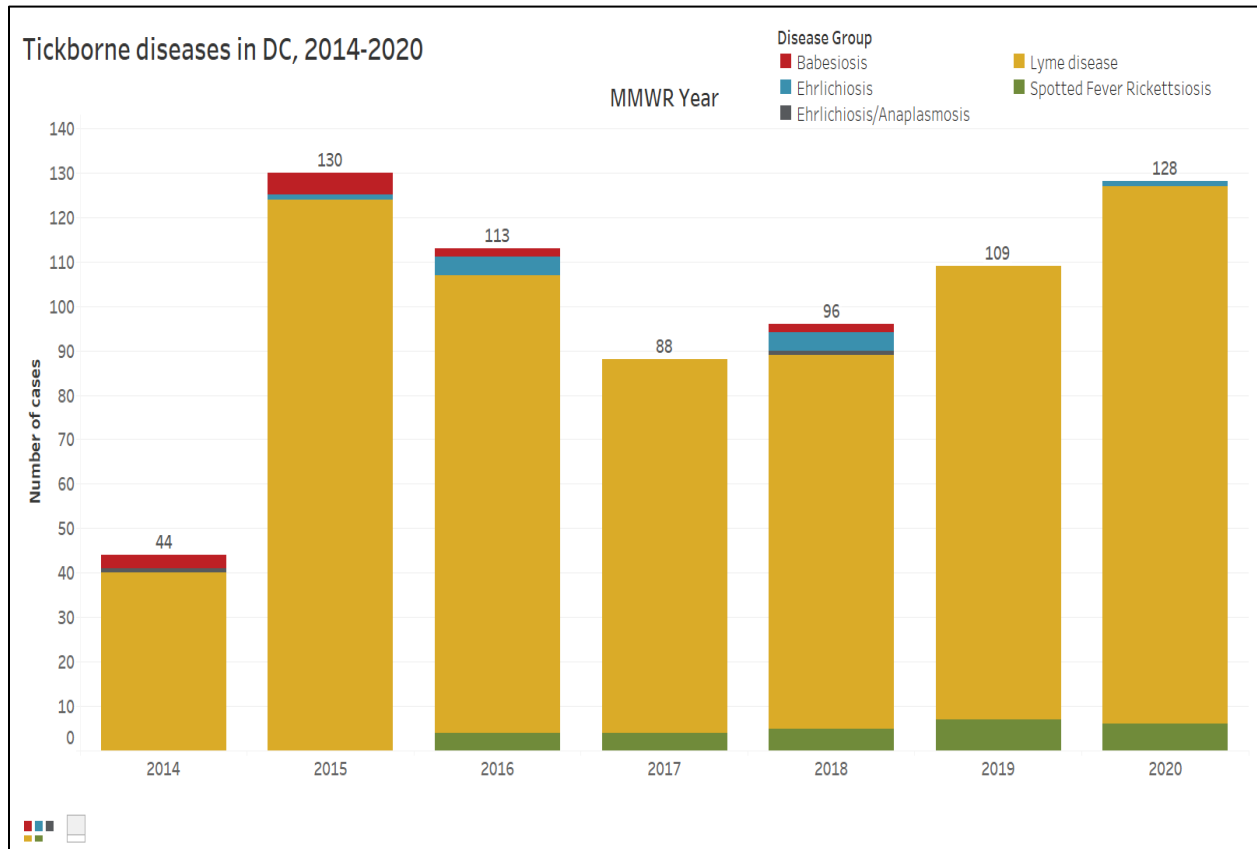


## Tickborne diseases in the District of Columbia, 2014-2020

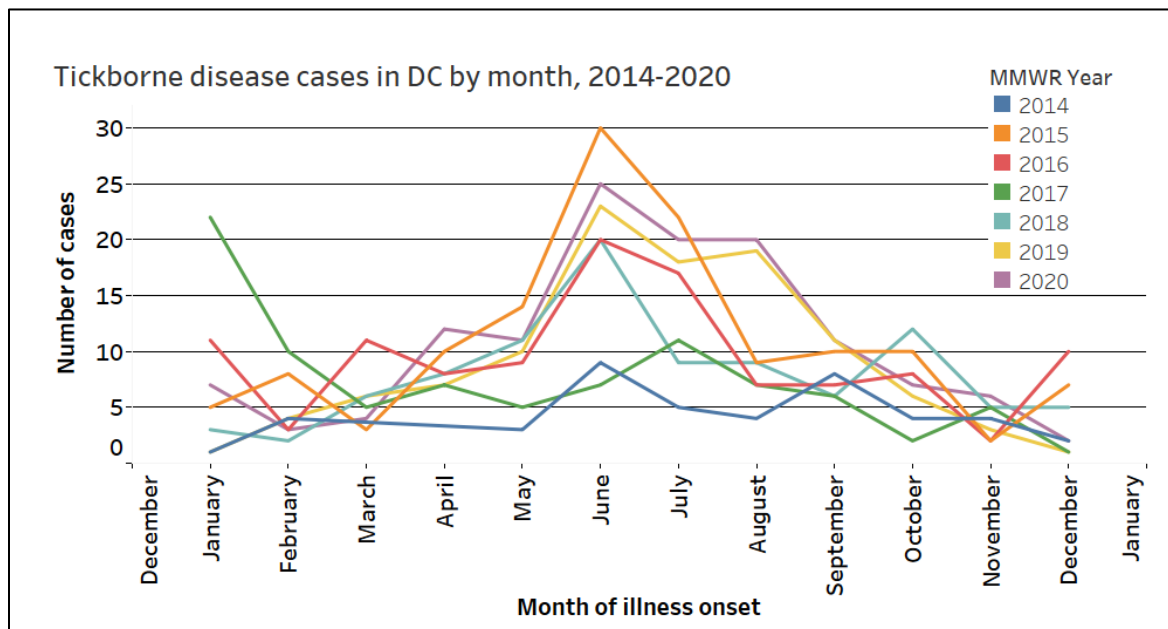
Between 2014 and 2020, the District of Columbia Department of Health (DC Health) received and investigated 1910 cases of possible tickborne illness cases. After investigation of these reports, 709 reported tickborne disease cases were classified as confirmed or probable cases of tickborne disease based on the Centers for Disease Control and Prevention’s (CDC) surveillance case definitions. A surveillance case definition is a set of uniform criteria used to define a disease for public health surveillance and allows for consistent classification and counting of cases across reporting jurisdictions. Based on relevant symptoms and laboratory results, a case is classified as confirmed or probable. All tickborne diseases discussed in this report include confirmed and probable cases.

The graph below shows the distribution of tickborne disease types that were diagnosed and reported in the District between 2014 and 2020 (Graph 1). Tickborne transmission in Washington, DC most commonly occurs during warmer months (Graph 2) peaking in June and July. People who spend extended time outdoors in tick-endemic areas in the summer months are at highest risk of exposure (Graph 2). Consistent with national trends, Lyme disease remains the most reported tickborne disease in humans in Washington, DC.



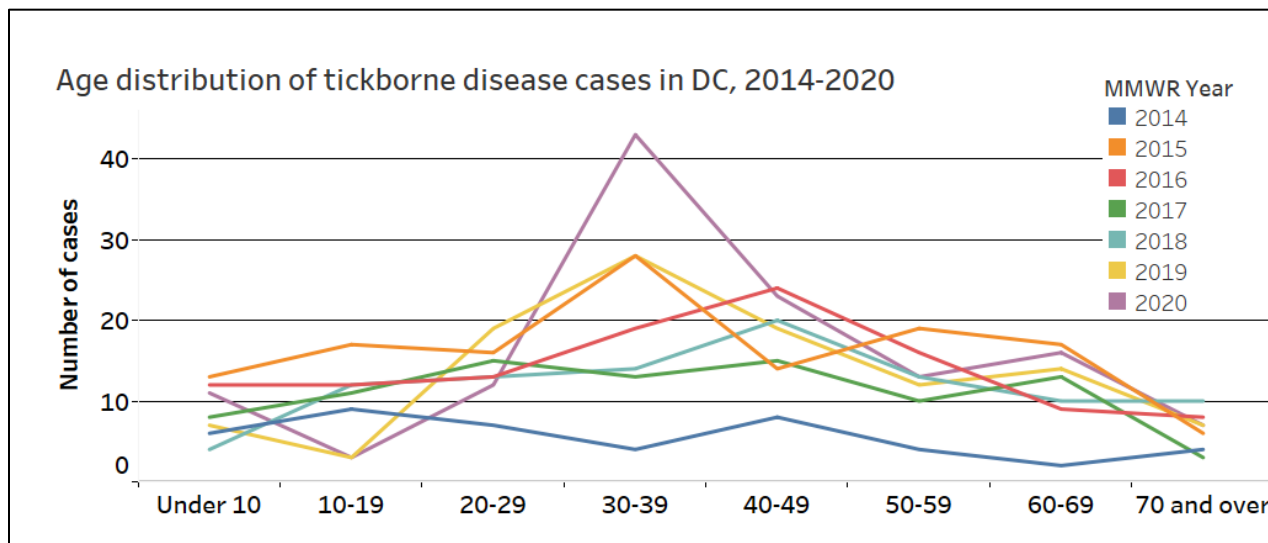
Graph 1. Confirmed and probable tickborne disease cases in DC, 2014-2020

Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.



Graph 2. Tickborne disease reporting by month of illness onset in DC, 2014-2020  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

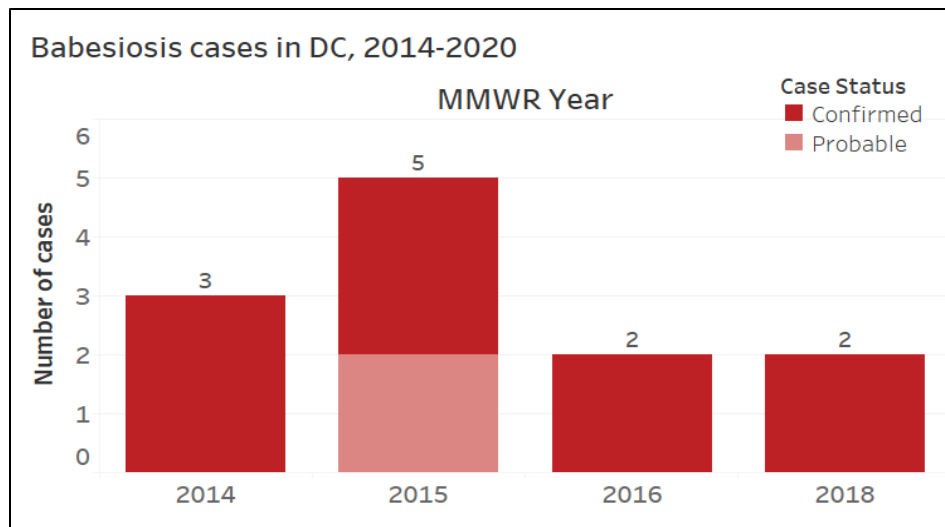
Tickborne diseases between 2014 and 2020 were diagnosed and reported more frequently in the summer months with the highest frequency occurring between May and August (Graph 2). This trend closely follows the temporal activity of tick stages which are most active and able to transmit disease during the summer months, and this varies by tick species. The age distribution of cases diagnosed with tickborne diseases (Graph 3) varies by the type of tickborne disease, but the highest number of cases were reported in people aged 20 to 50 years.



Graph 3. Age distribution of tickborne disease cases in DC, 2014-2020.  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

**I. Babesiosis**

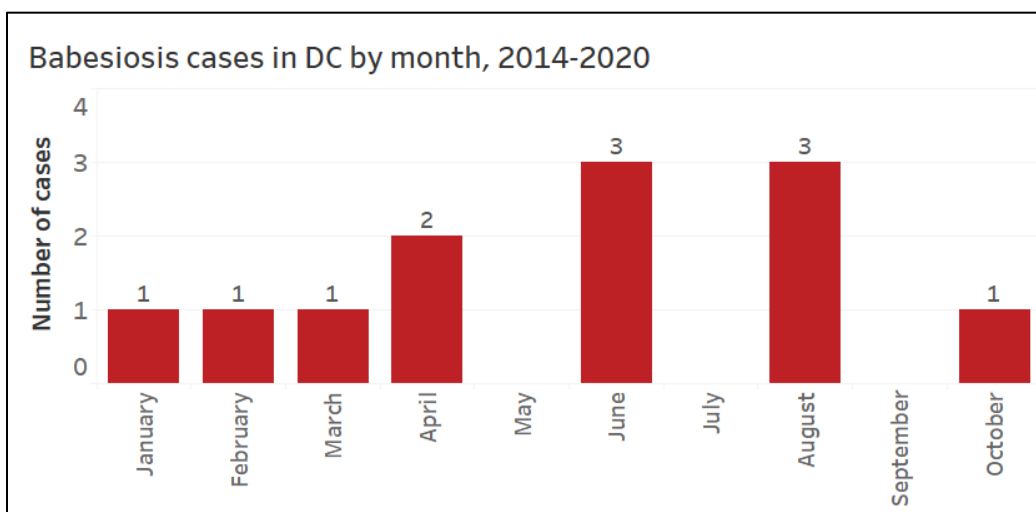
<b>Causative agent</b>	Babesiosis is caused by parasites of <i>Babesia</i> species ( <i>B. microti</i> ) that infect red blood cells
<b>Symptoms, onset</b>	<ul style="list-style-type: none"> <li>• Babesiosis symptoms include fever, chills, headache, muscle/joint pain, and anemia.</li> <li>• Symptoms typically begin 1-3 weeks after tick exposure and weeks to months after transfusion exposure.</li> </ul>
<b>Transmission</b>	<ul style="list-style-type: none"> <li>• Babesiosis is transmitted through the bite of an infected blacklegged/deer tick – <i>Ixodes scapularis</i>.</li> <li>• The tick becomes infected with <i>B. microti</i> after feeding on reservoirs such as white-footed mice.</li> <li>• Babesiosis is not spread from person-to-person. In very rare cases, <i>Babesia</i> species have been transmitted via the transfusion of blood products.</li> </ul>
<b>Risk factors</b>	<ul style="list-style-type: none"> <li>• Spending time outdoors in the summer months when ticks (adult and nymph stages) are most active</li> </ul>



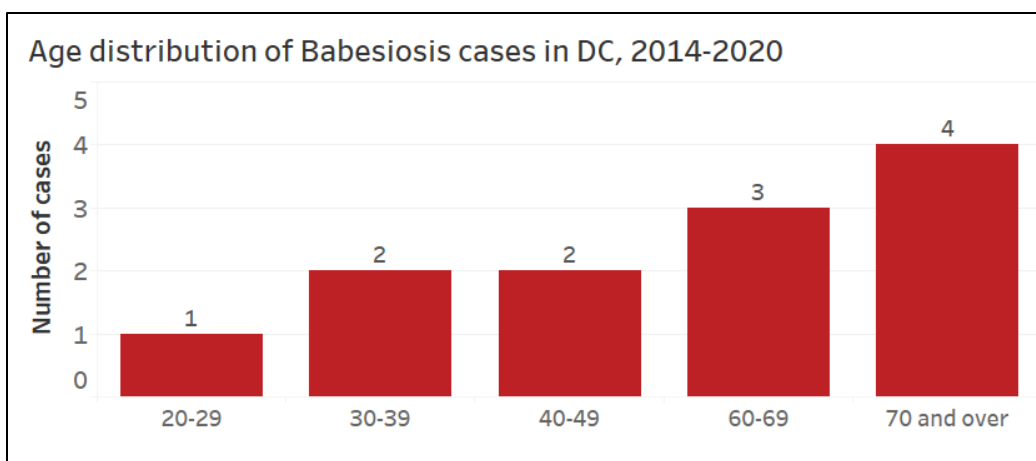
Graph 4. Confirmed and probable Babesiosis cases in DC, 2014-2020  
Data source: “Zoonotic and Vector-borne Disease Program,” Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

The District reports an average of less than two cases of Babesiosis per year. Due to low reported numbers, the following statistics and graphs show aggregate numbers from 2014 through 2020:

- Twelve confirmed and probable cases of Babesiosis were reported between 2014 and 2020 (Graph 4).
- Most cases occurred in the peak summer months between June and August (Graph 5).
- Graph 6 shows the age distribution of Babesiosis cases. The average reported age was 59 years and ranged from 20 years to 97 years.
- Approximately 63% of cases were female and 37% of cases were male.



Graph 5. Babesiosis cases by month of illness onset, 2014-2020  
Data source: “Zoonotic and Vector-borne Disease Program,” Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

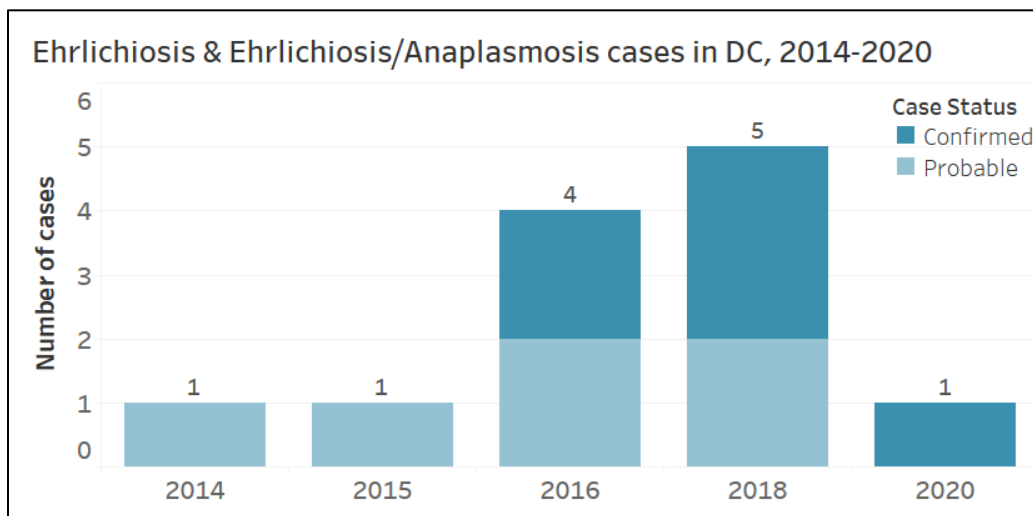


Graph 6. Age distribution of Babesiosis cases, 2014-2020  
Data source: “Zoonotic and Vector-borne Disease Program,” Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

## II. Ehrlichiosis/Anaplasmosis

**NOTE: Due to limitations in current diagnostic tests, it is often difficult to distinguish between an Ehrlichiosis and Anaplasmosis infection.**

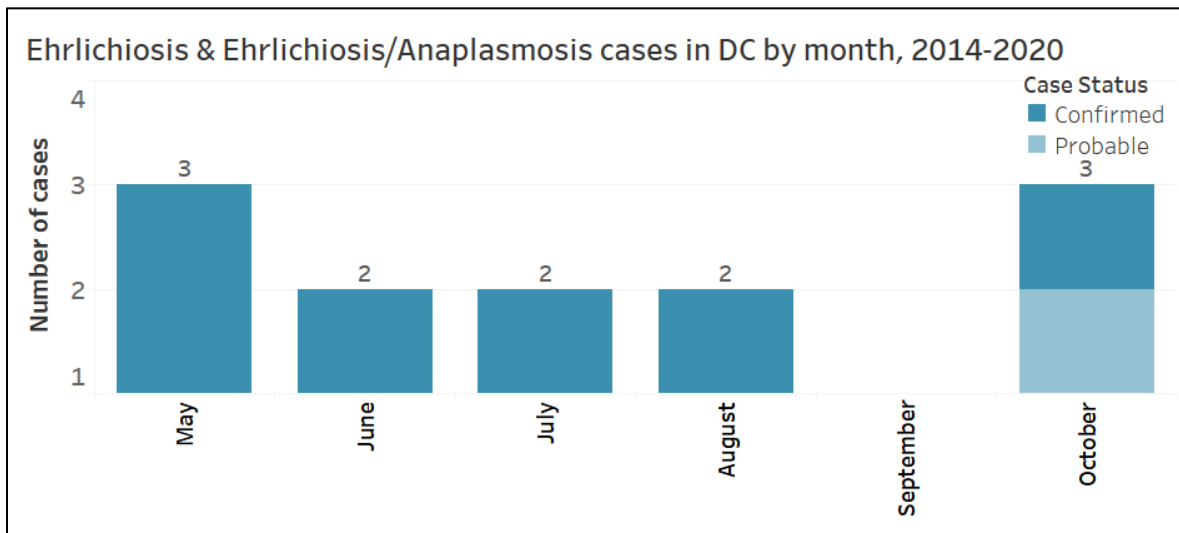
<b>Causative agent</b>	Ehrlichiosis is a group of diseases caused by bacteria in <i>Ehrlichia</i> species ( <i>E. chaffeensis</i> , <i>E. ewingii</i> , or <i>E. muris euclairensis</i> ) Anaplasmosis is a disease caused by the bacterium <i>Anaplasma phagocytophilum</i>
<b>Symptoms, onset</b>	<ul style="list-style-type: none"> <li>Ehrlichiosis/Anaplasmosis will often have fever, chills, headache, muscle aches.</li> <li>1 in 3 people with Ehrlichiosis report a rash ~5 days after fever onset. This occurs more commonly in children.</li> <li>Symptoms typically begin 1-2 weeks after tick exposure</li> </ul>
<b>Transmission</b>	<ul style="list-style-type: none"> <li><i>Ehrlichia</i> are spread to people primarily through the bite of infected ticks including the lone star tick (<i>Amblyomma americanum</i>) and the blacklegged/deer tick (<i>Ixodes scapularis</i>). In rare cases, transmission through blood transfusion and organ transport have occurred.</li> <li><i>Anaplasma</i> are spread to people through the bite of infected blacklegged tick (<i>Ixodes scapularis</i>) and western blacklegged ticks (<i>Ixodes pacificus</i>).</li> </ul>
<b>Risk factors for severe illness</b>	<ul style="list-style-type: none"> <li>Delayed antibiotic treatment can lead to severe illness, organ failure, and/or death</li> <li>Age: being very young or very old</li> <li>Weakened immune system</li> <li>Living in or spending time in known tick habitats</li> </ul>



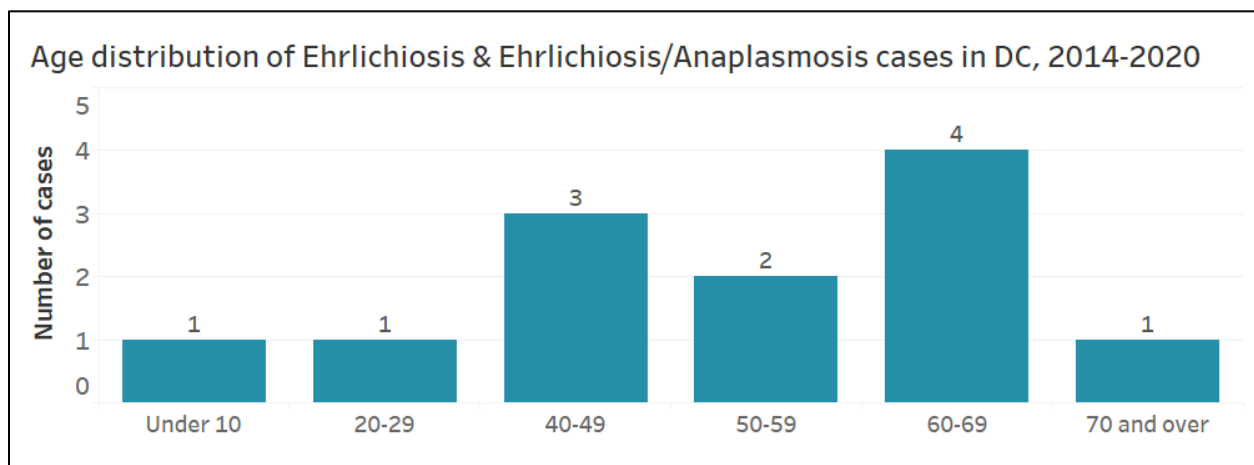
Graph 7. Confirmed and probable Ehrlichiosis and Ehrlichiosis/Anaplasmosis cases in DC, 2014-2020  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

The District reports an average of less than two cases of Ehrlichiosis/Anaplasmosis per year. These diseases are caused by closely related bacteria, and sometimes a causative agent is not determined. To protect the identity of individuals, statistics and graphs show aggregate numbers from 2014 to 2020:

- 12 confirmed and probable cases of Ehrlichiosis, Anaplasmosis and undetermined Ehrlichiosis/Anaplasmosis were reported between 2014 and 2020 (Graph 7).
- Cases were reported to occur between May and October (Graph 8).
- Graph 9 shows the age distribution of Ehrlichiosis, Anaplasmosis, and undetermined Ehrlichiosis/Anaplasmosis cases. The average reported age was 50 years and ranged between 3 and 78 years. Approximately 45% of cases were female and 55% of cases were male.



Graph 8. Ehrlichiosis and Ehrlichiosis/Anaplasmosis cases by month of illness onset, 2014-2020  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

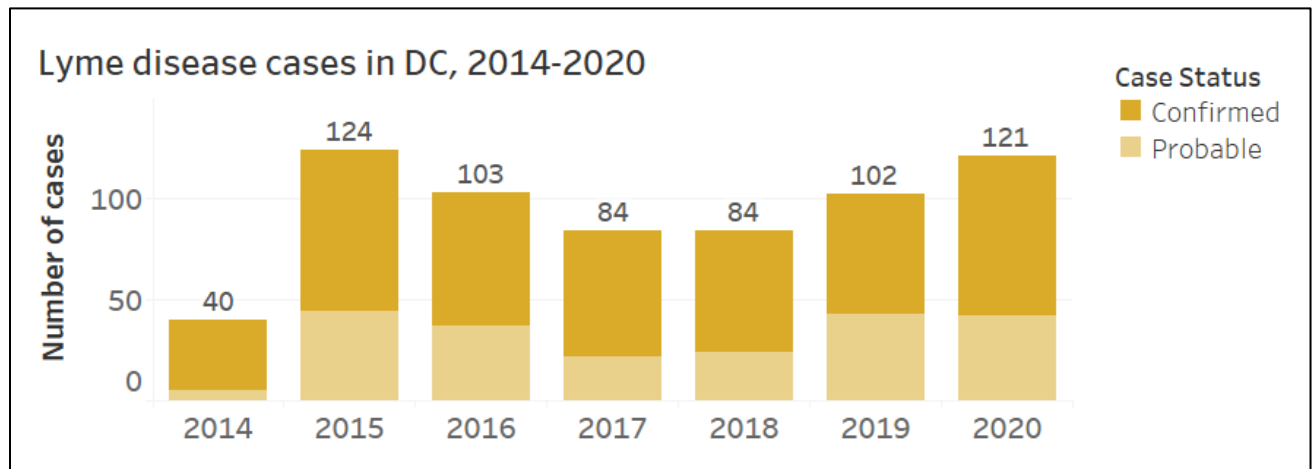


Graph 9. Age distribution of Ehrlichiosis and Ehrlichiosis/Anaplasmosis cases, 2014-2020  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

### III. Lyme Disease

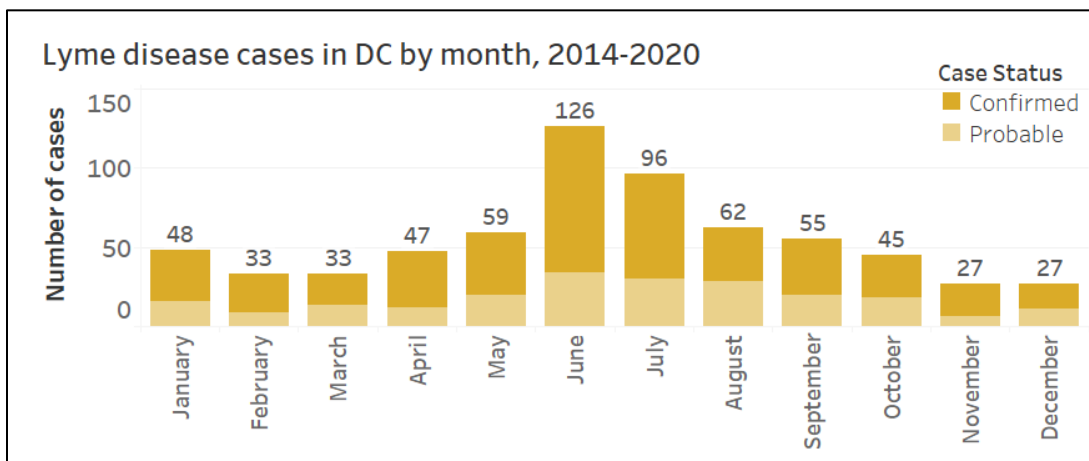
<b>Causative agent</b>	Lyme disease is caused by the bacterium <i>Borrelia burgdorferi</i>
<b>Symptoms, onset</b>	<ul style="list-style-type: none"> <li>• Include fever, headache, fatigue, muscle aches, and a characteristic “bull’s eye” rash called erythema migrans.</li> <li>• Typically begin 7-10 days after tick exposure but can range between 3-30 days.</li> <li>• Untreated infection can evolve into severe clinical symptoms, including loss of facial muscle tone and heart palpitations.</li> </ul>
<b>Transmission</b>	<ul style="list-style-type: none"> <li>• Lyme disease is transmitted through the bite of an infected immature (nymphs) blacklegged/deer tick (<i>Ixodes scapularis</i>).</li> <li>• Deer and small rodents are known reservoirs for Lyme disease.</li> <li>• There is no evidence that Lyme disease is transmitted from person-to-person, including mother-to-child. Lyme disease is not spread from dogs/cats to humans.</li> </ul>
<b>Risk factors</b>	<ul style="list-style-type: none"> <li>• Spending time outdoors, especially in the spring and summer months (April-September) when nymph-stage ticks are most active.</li> </ul>

Between 2014 and 2020, 658 confirmed and probable cases of Lyme disease were reported to DC Health, with an average of 94 cases of Lyme diseases per year. As a result, Washington, DC is categorized as a “high-incidence” jurisdiction for Lyme disease. In 2020, the District saw an increase in Lyme disease cases with 121 cases reported compared with 2019 with 102 cases reported (Graph 10). In contrast, other tickborne diseases did not see notable disparities in case count in 2020 compared with 2019.

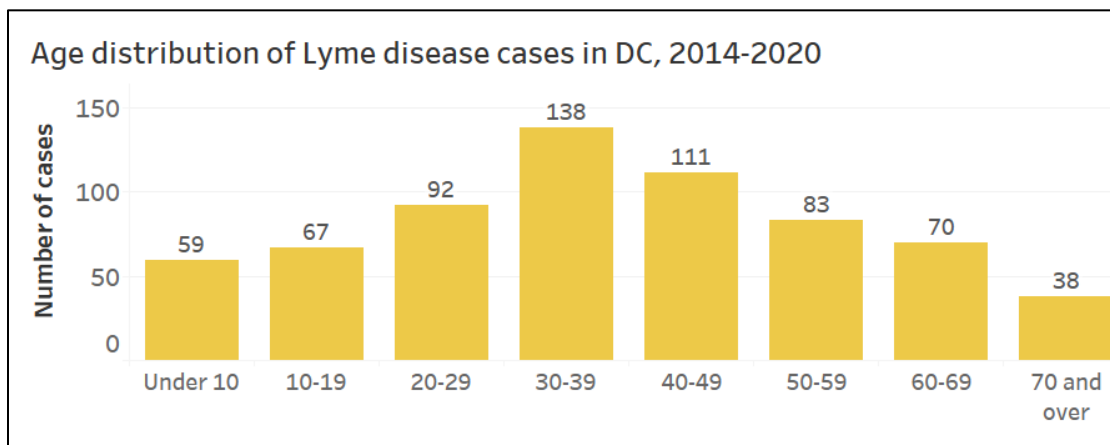


Graph 10. Confirmed and probable Lyme disease cases in DC, 2014-2020  
Data source: “Zoonotic and Vector-borne Disease Program,” Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

- Most Lyme disease cases occur in the peak summer months between May and August (Graph 11). This is closely correlated with the months between late spring through early summer during which deer tick (*Ixodes*) nymphs are most active.
- Graph 12 shows the age distribution of Lyme disease cases. The average reported age was 39 years and ranged between 1 and 87 years.
- Approximately 45% of cases were female and 55% of cases were male.
- Between 2014 and 2020, approximately 57% of cases were male, 43% of cases were females. Sex was unknown for 2 cases out of 658 total cases in this time frame.



Graph 11. Lyme disease cases by month of illness onset, 2014-2020  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.



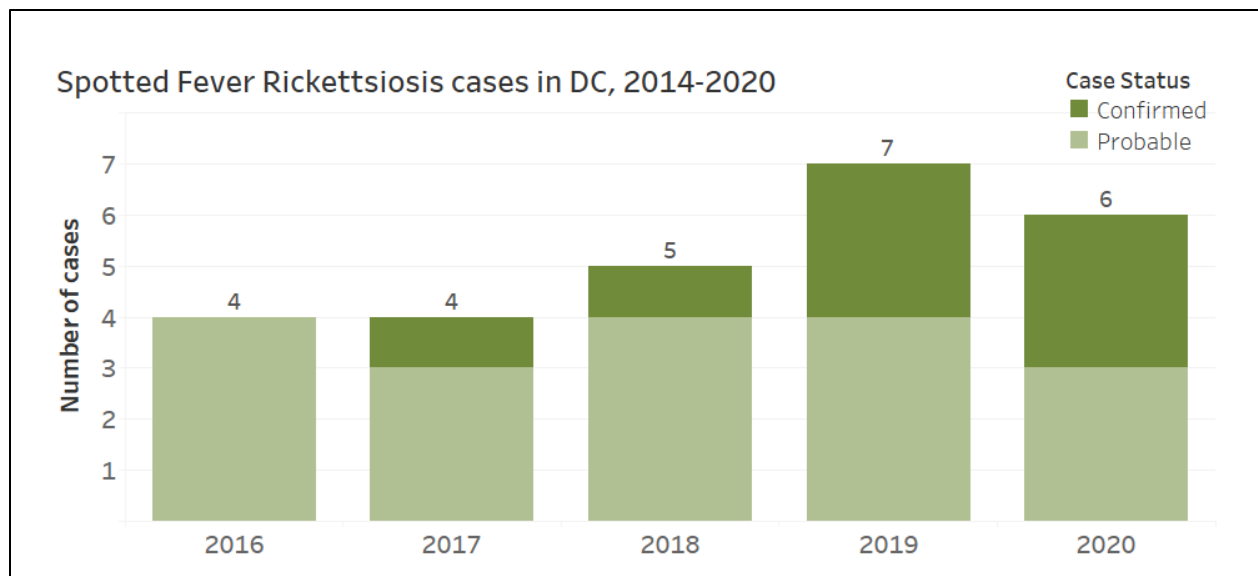
Graph 12. Age distribution of Lyme disease cases, 2014-2020  
Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.



**IV. Spotted Fever Rickettsioses**

<b>Causative agent</b>	Spotted fever rickettsioses are caused by a group of bacteria called <i>Rickettsia</i> ( <i>R. rickettsii</i> , <i>R. parkeri</i> , <i>R. philipii</i> ).
<b>Symptoms, onset</b>	<ul style="list-style-type: none"> <li>• Range from relatively mild infections to fatal disease.</li> <li>• Mild symptoms include fever, headache, rash, muscle aches, chills, and nausea/vomiting.</li> <li>• First symptoms include an eschar (dark scab at tick bite site)</li> <li>• Most cases of RMSF develop a rash 2-4 days following fever onset. However, treatment should not be delayed until appearance of a rash.</li> </ul>
<b>Transmission</b>	<ul style="list-style-type: none"> <li>• The American dog tick (<i>Dermacentor variabilis</i>), the Rocky Mountain wood tick (<i>Dermacentor andersoni</i>), and the brown dog tick (<i>Rhiphicephalus sanguineus</i>) are the most common tick vectors of spotted fevers.</li> </ul>
<b>Risk factors</b>	<ul style="list-style-type: none"> <li>• Spending time outdoors, especially in the spring and summer months (April-September) when nymph-stage ticks are most active.</li> <li>• RMSF is fatal if not properly diagnosed and treatment is delayed or not provided.</li> </ul>
<b>Special consideration</b>	<ul style="list-style-type: none"> <li>• RMSF is the most reported spotted fever group rickettsioses in the US.</li> <li>• RMSF is also the most serious type of spotted fever illness and can be fatal if not properly diagnosis and treatment is delayed or not provided..</li> </ul>

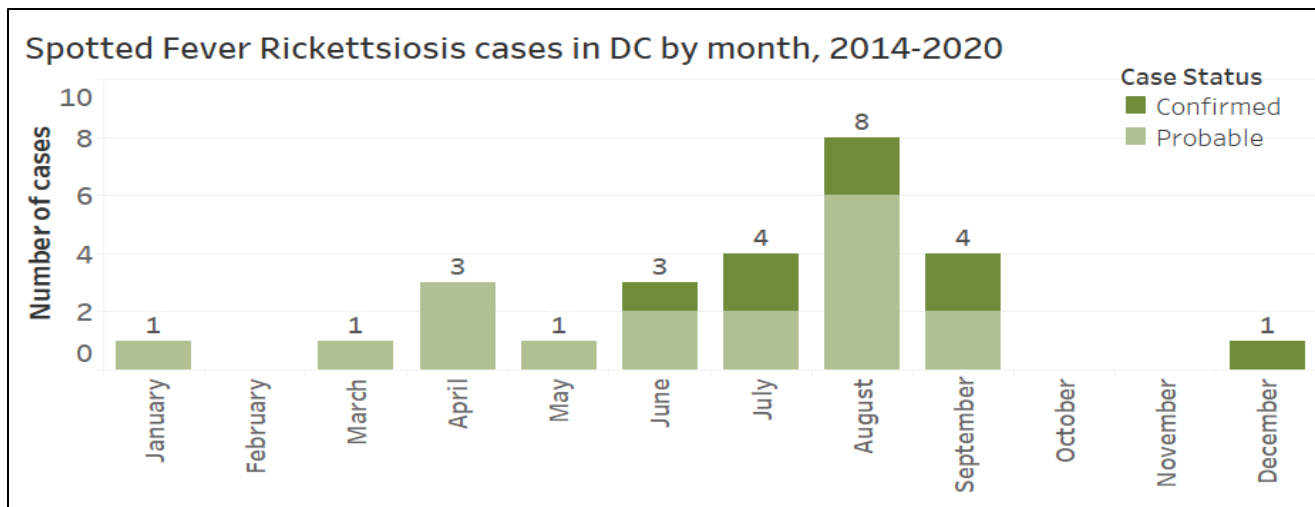
Between 2014 and 2020, 26 confirmed and probable cases of spotted fevers were reported to DC Health with an average of less than four cases of spotted fevers per year. Most routine laboratory tests are unable to distinguish between RMSF and other rickettsial diseases listed below since they are too closely related. Although the numbers of spotted fever rickettsiosis cases reported in Washington, DC are low,



Graph 13. Confirmed and probable Spotted Fever Rickettsioses cases in DC, 2014-2020  
Data source: “Zoonotic and Vector-borne Disease Program,” Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

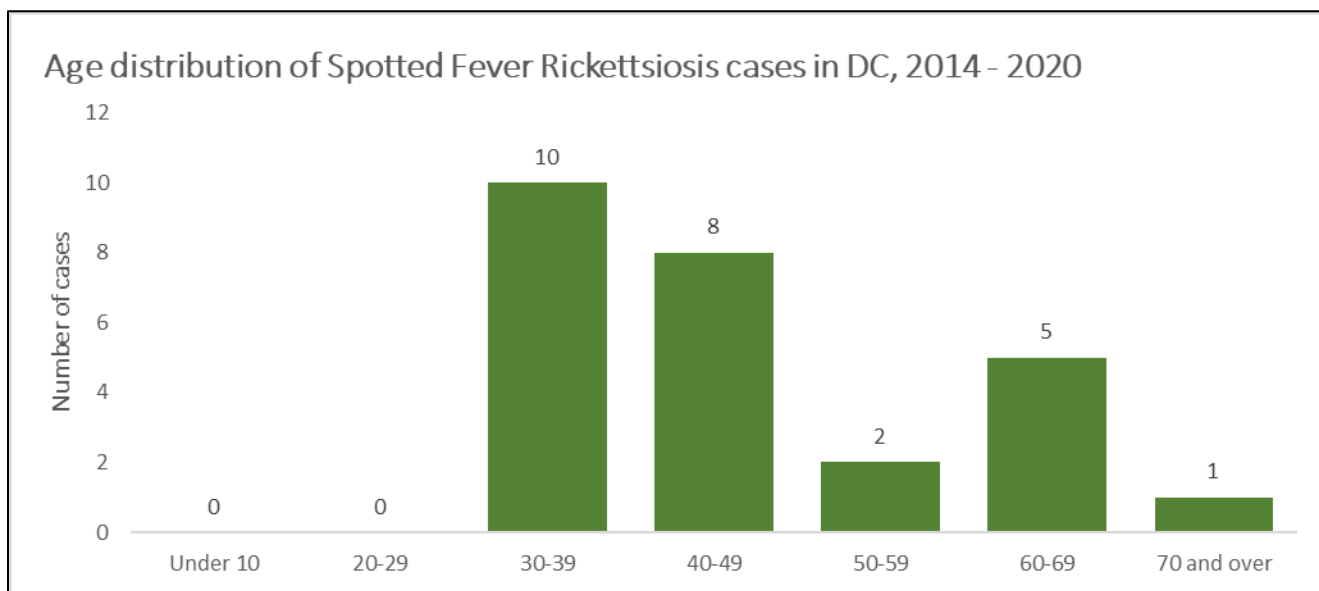
they may increase as laboratory testing and clinical diagnosis continue to evolve and become able to differentiate between different rickettsial diseases (Graph 13).

- Most cases of spotted fever rickettsioses occurred in the peak summer months between June and September (Graph 14).
- Graph 15 shows the age distribution of spotted fever cases. The average reported age was approximately 46 years and ranged from 31 years to 71 years.
- Approximately 54% of cases were female and 42% were male. Sex was unknown for 1 case out of 26 total cases in this time frame.



Graph 14. Cases of Spotted fever rickettsioses by month of illness onset, 2014-2020

Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.



Graph 15. Age distribution of cases of Spotted fever Rickettsioses, 2014-2020

Data source: "Zoonotic and Vector-borne Disease Program," Research Evaluation and Measurement Division, Center for Policy, Planning and Evaluation, DC Department of Health.

## Tickborne disease burden in Washington, DC

In the United States, a two-fold increase in both vector-borne and tickborne diseases were reported between 2004 and 2018<sup>1</sup>. Lyme disease accounted for nearly 70% of all tickborne diseases in 2019<sup>2</sup>.

The District of Columbia is considered a high-incidence jurisdiction for Lyme disease and residents are at risk of frequent tick exposures since 96% of residents live within walking distance of a park. Given the expanding national burden and range of tickborne diseases, DC Health conducts several educational outreach programs for healthcare providers and the public. The DC Health website has information specifically dedicated to tickborne diseases as well as Lyme disease and includes guidance for community members, healthcare providers, and veterinarians. For more information, visit <https://dchealth.dc.gov/page/tickborne-diseases> and <https://dchealth.dc.gov/page/lyme-disease>.

## Recommendations to prevent tickborne infections

Currently, the most effective way to prevent tickborne infections is by preventing exposure to ticks. Exposure risk can be reduced by taking the following precautions:

- Wear light colored, long-sleeved shirts, pants and socks when outdoors.
- Use an EPA-registered insect repellent which contains diethyltoluamide (DEET), picaridin, oil of lemon eucalyptus, IR3535, PMD, or 2-undecanone. Always follow directions on the label.
- Avoid direct contact with ticks by avoiding wooded, grassy, or brushy areas.
- Conduct a full body check for ticks as well as clothing and gear – check daily, especially if extensive time is spent outdoors:
  - Shower soon after being outdoors.
  - If found, remove immediately using fine tweezers and dispose properly.
  - For detailed information, visit our website: <https://dchealth.dc.gov/page/tickborne-diseases>.
- Check pets for ticks daily, especially if pets spend time outdoors.
- Use tick pesticides to control ticks outdoors near your home.

## References

1. Centers for Disease Control and Prevention, Atlanta, GA, 2020, *A National Public Health Framework for the Prevention and Control of Vector-Borne Diseases in Humans*, [https://www.cdc.gov/ncezid/dvbd/pdf/Brochure\\_National\\_Framework\\_VBDs-P.pdf](https://www.cdc.gov/ncezid/dvbd/pdf/Brochure_National_Framework_VBDs-P.pdf). Accessed 11 Aug. 2023.
2. Tickborne Disease Surveillance Data Summary, Centers for Disease Control and Prevention, 11 Aug. 2022, [www.cdc.gov/ticks/data-summary/index.html](http://www.cdc.gov/ticks/data-summary/index.html).