Lyme and Other Tickborne Illnesses Report

2024 Annual Report

Report Period January 1, 2024 to December 31, 2024

Required by:
22 M.R.S. §1645; PL 2009 c. 494

Submitted by:
Maine Department of Health and Human Services
Maine Center for Disease Control and Prevention

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Executive Summary

Pursuant to 22 M.R.S. §1645, the Department of Health and Human Services Maine Center for Disease Control and Prevention (Maine CDC) annually reports information on Lyme disease and other tickborne illnesses in Maine, including incidence rates, recommendations related to the prevention and treatment, and related program activities.

Lyme disease is one of the tickborne diseases designated as a notifiable condition in the State of Maine requiring reporting to the Department as means of surveillance, in accordance with rule 10-144 CMR chapter 258[1]. The goal of tick-related disease surveillance is to help define demographic, geographic, and seasonal distribution; monitor disease trends; identify risk factors for transmission; and promote prevention and education efforts among the public and medical communities. An epidemiologist classifies reported cases as *probable*, *suspect*, and *not a case* based on laboratory testing interpreted using criteria established by the Council of State and Territorial Epidemiologists[2]. The surveillance case definition is not intended to be used in clinical diagnosis. Lyme disease surveillance is passive, dependent upon lab testing, and therefore likely to be an under-representation of the true burden of Lyme disease in Maine. The U.S. CDC released an updated statement in 2021 that the true burden of Lyme disease may be more than ten times the number of reported cases. In 2022, they estimated that the aggregate cost of diagnosed Lyme disease alone could be $345-968 million to U.S. society[3].

Maine Tickborne Disease 2024 Preliminary Data
(preliminary analysis of data extracted April 11, 2025)

- 3,231 probable cases of Lyme disease
- 1,316 confirmed and probable cases of anaplasmosis
- 321 confirmed and probable cases of babesiosis
- 23 confirmed and probable cases of Hard Tick Relapsing Fever
- 7 confirmed cases of Powassan virus disease

[1] 10-144 CMR c. 258, Control of Notifiable Diseases and Conditions Rule, https://www.maine.gov/sos/sites/maine.gov.sos/files/inline-files/144c258.docx
[2] Council of State and Territorial Epidemiologists (CSTE) promotes the effective use of epidemiologic data to guide public health practice and improve health. CSTE accomplishes this by supporting the use of effective public health surveillance and good epidemiologic practice through training, capacity development, and peer consultation, developing standards for practice, and advocating for resources and scientifically based policy. https://www.cste.org/
[3] US CDC, Understanding Lyme and other Tickborne Diseases; https://www.cdc.gov/ticks/communication-resources/press-kit.html

Introduction and Background

Public law 2007 chapter 561, *An Act to Implement the Recommendations of the Joint Standing Committee on Insurance and Financial Services Regarding Reporting on Lyme Disease and Other Tickborne Illnesses*, was enacted by Maine's 123rd Legislature. This law directs Maine Center for Disease Control and Prevention (Maine CDC) to monitor, review and evaluate Lyme disease and other tick-borne illnesses in the State.

Annually, Maine CDC is required to report to the joint standing committee of the Legislature having jurisdiction over health and human services matters and the joint standing committee of the Legislature having jurisdiction over health insurance matters. The report is to include information on Lyme disease, including incidence rates, treatment recommendations and other public awareness activities, and summaries of recent related studies and legislation enacted across the nation.

Maine's annual reporting on Lyme disease and tickborne illnesses reflects preliminary data. Due to ongoing data collection, reporting and analysis, preliminary data is inherently subject to change; Maine CDC processes delayed reports, interstate notifications, and updated clinical information throughout the year, which may cause small changes to the data over time. All data is considered preliminary until final reconciliation with US CDC is completed. Maine' data is cleaned quarterly and the data reported to the legislature is updated annually to ensure the most up to date and accurate information. This 2024 report considers preliminary data available as of April 11, 2025 and serves to provide initial information for timely assessment and reporting and guidance for statewide surveillance and other program activities.

Title 22 §1645 requires Maine CDC to report on:

I. The incidence of Lyme disease and other tickborne illness in Maine;
II. The diagnosis and treatment guidelines for Lyme disease recommended by Maine Center for Disease Control and Prevention and the United States Department of Health and Human Services, Centers for Disease Control and Prevention;
III. A summary or bibliography of peer-reviewed medical literature and studies related to the surveillance, diagnosis, medical management, and treatment of Lyme disease and other tickborne illnesses, including, but not limited to, the recognition of chronic Lyme disease and the use of long-term antibiotic treatment;
IV. The education, training, and guidance provided by Maine CDC to healthcare professionals on the current methods of diagnosing and treating Lyme disease and other tickborne illnesses;
V. The education and public awareness activities conducted by Maine CDC for the prevention of Lyme disease and other tickborne illnesses; and
VI. A summary of the laws of other states enacted during the last year related to the diagnosis, treatment, and insurance coverage for Lyme disease and other tickborne illnesses based on resources made available by the federal Centers for Disease Control and Prevention (CDC) or other organizations.

This is the sixteenth annual report to the Legislature and includes an update on activities conducted January through December 2024.

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I. The incidence of Lyme disease and other tickborne illness in Maine

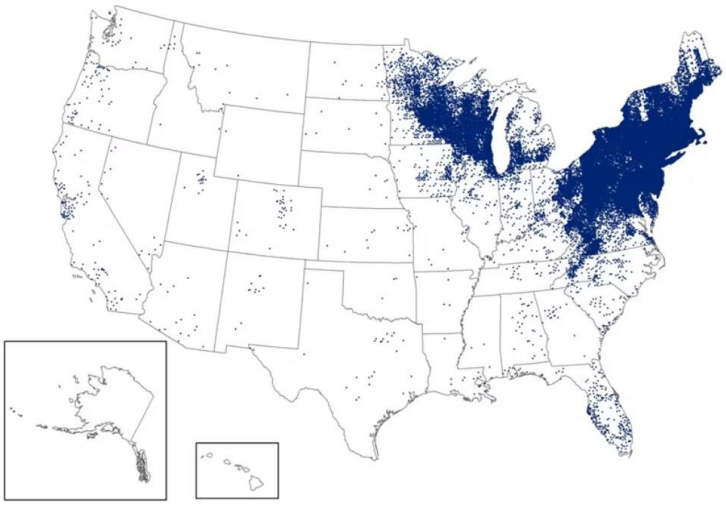
Lyme disease

Lyme disease is caused by the spiral-shaped bacteria *Borrelia burgdorferi,* and in rare cases by *Borrelia mayonii*. Two species of North American ticks, the deer or blacklegged tick (*Ixodes scapularis*) and the western blacklegged tick (*Ixodes pacificus*) can spread these pathogens to humans when they bite. Symptoms of Lyme disease caused by *B. burgdorferi* include the formation of a characteristic expanding rash (*erythema migrans*) that usually appears 3 to 30 days after exposure and may appear on any area of the body. Fever, headache, joint and muscle pains, and fatigue are also common during the first several weeks. Later features of Lyme disease can include arthritis in one or more joints (often the knee), facial palsy, meningitis, and carditis (AV block). Lyme disease is rarely fatal. The great majority of Lyme disease cases can be treated very effectively with oral antibiotics for ten days to a few weeks. Some cases of Lyme disease which affect the nervous system, joints, or heart may need intravenous antibiotics for up to 28 days.

In 2013, scientists at the Mayo Clinic discovered *B. mayonii* while testing blood from patients thought to have Lyme disease with *B. burgdorferi* infection. Instead, they found a new bacterium that is also transmitted by deer ticks. Currently, *B. mayonii* is only found in the Upper Midwest and is not thought to infect ticks in Maine. *Borrelia mayonii* causes a similar illness to *B. burgdorferi*, but can also cause nausea and vomiting; large, widespread rashes; and a higher concentration of bacteria in the blood. Lyme disease caused by *B. mayonii* can be diagnosed with the same tests used to identify Lyme disease due to *B. burgdorferi* infection and treated with the same antibiotics.

In the United States, the highest rates of Lyme disease occur across the eastern seaboard (Maryland to Maine) and in the upper Midwest (Wisconsin and Minnesota), with the onset of most cases occurring during the summer months. Where they are endemic, deer ticks are most abundant in wooded, leafy, and brushy areas ("tick habitat"), especially where deer populations are large.

Reported Cases of Lyme Disease – United States, 2023



1 dot placed randomly within county of residence for each confirmed case.
Source: U.S. CDC Lyme Disease Surveillance Data; https://www.cdc.gov/lyme/data-research/facts-stats/surveillance-data-1.html

Healthcare providers documented the first case of Maine-acquired Lyme disease in 1986. In the 1990s, the great majority of Lyme disease cases occurred among residents of south coastal Maine, principally in York County. Currently, the Midcoast and Downeast areas have the highest incidence of Lyme disease in the State, though Central Maine is quickly emerging as a third area of increased incidence, as well. Based on 2024 data, eight counties have rates of Lyme disease higher than the State rate (Franklin, Hancock, Knox, Lincoln, Sagadahoc, Somerset, Waldo, and Washington). This is the second consecutive year that these same counties have exhibited higher Lyme disease incidence than the State rate.

Preliminary data as of April 11, 2025 indicates that, in 2024, providers reported 3,231 probable cases of Lyme disease among Maine residents, which is a rate of 230 cases of Lyme disease per 100,000 persons in Maine. This is a 8% increase from the 2,943 cases in 2023. Twenty-nine percent (29%) of reported cases were from the Midcoast counties (Knox, Lincoln, Sagadahoc, and Waldo), 15% were from the Downeast counties (Hancock and Washington), and 15% were from the Central counties (Kennebec and Somerset).

Forty-three percent (43%) of cases are female and 57% of cases are male. The median age of cases in 2024 is 61 years of age and the average age is 54 years old). The age at diagnosis ranges from 12 months to greater than 95 years of age. For further Lyme disease statistics in Maine, please see Appendix 1.

Anaplasmosis

Anaplasmosis is a disease caused by the bacterium *Anaplasma phagocytophilum,* which infects white blood cells (neutrophils). Anaplasmosis was previously known as human granulocytic ehrlichiosis (HGE) or human granulocytic anaplasmosis (HGA) but the name changed in 2008 to differentiate between two different organisms that cause similar diseases (anaplasmosis and ehrlichiosis). Signs and symptoms of anaplasmosis include fever, headache, malaise, and body aches. Nervous system involvement may occur but is rare. Later features of anaplasmosis can include respiratory failure, bleeding problems, organ failure, and death. Anaplasmosis is transmitted to a person through the bite of an infected deer tick. As of April 11, 2025, Maine reported 1,316 confirmed and probable cases of anaplasmosis in 2024, a 69% increase from the 777 cases in 2024. Cases occurred in every county in Maine except Aroostook County. For further anaplasmosis disease statistics in Maine, please see Appendix 2.

Babesiosis

Babesiosis is a potentially severe tickborne disease transmitted through the bite of an infected deer tick. Signs of babesiosis range from no symptoms (asymptomatic) to serious disease. Common symptoms include extreme fatigue, aches, fever, chills, sweating, body aches, dark urine, and anemia. Infected people generally make a full recovery if they have a healthy spleen and do not have other diseases that prevent them from fighting infections. As of April 11, 2025, Maine reported 321 confirmed and probable cases of babesiosis in 2024, a 64% increase from the 196 cases in 2023. Cases occurred in every county in Maine except Aroostook County. For further babesiosis disease statistics in Maine please see Appendix 2.

Hard Tick Relapsing Fever

Hard Tick Relapsing Fever (HTRF), previously referred to as *Borrelia miyamotoi* disease, is caused by a species of spiral-shaped bacteria, called *B. miyamotoi,* that is closely related to the bacteria that causes tickborne relapsing fever (TBRF). It is more distantly related to the bacteria that causes Lyme disease. First identified in 1995 in ticks from Japan, two species of North American ticks carry *B. miyamotoi*, the deer or blacklegged tick and the western blacklegged tick. Common symptoms include fever, chills, headache, joint pain, and fatigue. Although HTRF is not nationally notifiable, U.S. CDC, in association with endemic states, developed a case classification to standardize reporting and understand the prevalence in the United States. Hard Tick Relapsing Fever is a notifiable condition in Maine. As of April 11, 2025 Maine reported 23 probable or confirmed cases of HTRF in 2024, a 64% increase from the 14 cases in 2023. Cases occurred in Androscoggin, Cumberland, Franklin, Hancock, Kennebec, Knox, Somerset, and York counties. For further HTRF statistics in Maine, please see Appendix 2.

Ehrlichiosis

Ehrlichiosis is a disease caused by the bacteria *Ehrlichia chaffeensis* and *Ehrlichia ewingii* which infect white blood cells (monocytes and granulocytes). In the United States, *E. chaffeensis* causes most cases. Ehrlichiosis was previously known as human monocytic ehrlichiosis (HME). Signs and symptoms of ehrlichiosis include fever, headache, nausea, and body aches. A rash may develop, especially in children. Severe illness, especially when treatment is delayed, may include encephalitis/meningitis, kidney failure, and liver failure. *E. chaffeensis* and *E. ewingii* spread to a person through the bite of an infected lone star tick (*Amblyomma americanum*). This tick does not currently live in Maine, so ehrlichiosis is uncommon. However, as lone star tick populations continue to creep northward, this disease may become more common in Maine in the future. At present, most cases detected in Maine are due to exposure to infected ticks during travel to an endemic state. As of April 11, 2025, Maine reported two confirmed or probable cases of ehrlichiosis in 2024 from Hancock and Penobscot counties. For further ehrlichiosis disease statistics in Maine please see Appendix 2.

Powassan virus disease

Two related viruses cause Powassan virus disease, Powassan virus and deer tick virus, which are transmitted to humans through the bite of an infected woodchuck tick (*Ixodes cookei*) or deer tick, respectively. Signs and symptoms of Powassan virus disease include fever, headache, vomiting, weakness, confusion, seizures, and memory loss. Long-term neurologic problems may occur. As of April 11, 2025, Maine reported seven confirmed case of Powassan encephalitis in Maine in 2024. These cases occurred in Cumberland, Kennebec, Knox, Lincoln, Penobscot, and York counties.

Spotted fever rickettsiosis

Spotted Fever Rickettsioses (SFR) are a group of bacterial illnesses, the most common of which is Rocky Mountain Spotted Fever (RMSF), caused by the bacterium *Rickettsia rickettsii*. Signs and symptoms of RMSF include fever, chills, headache, gastrointestinal symptoms, and a non-itchy spotted rash (called maculopapular) often on the palms and the soles of the feet. Other spotted fever rickettsioses show similar symptoms, including fever, headache, and rash, and may also feature a dark scab at the site of the tick bite (known as an eschar). Rocky Mountain Spotted Fever is transmitted to a person through the bite of an infected American dog tick (*Dermacentor variabilis*) in most of the U.S. Rocky Mountain Spotted Fever is not known to be endemic in Maine but could emerge, as American dog ticks are commonly found across the state. As of April 11, 2025, Maine reported four confirmed or probable cases of SFR in 2024. These cases occurred in Kennebec, Oxford, and Somerset counties. For further

SFR disease statistics in Maine please see Appendix 2.

Alpha-gal syndrome

While not an infectious disease, alpha-gal syndrome (AGS) is an allergic condition associated with tick bites. Alpha-gal (galactose-α-1,3-galactose) is a sugar molecule found on the muscle tissue of most mammals, but not in humans. Alpha-gal can be found in red meat (pork, beef, rabbit, lamb, venison, etc.) and products made from mammal tissues (including gelatin, milk, milk products, and some medical products). Alpha-gal syndrome is a potentially life-threatening allergic condition, also known as red meat allergy. People with AGS experience symptoms up to 10 hours after eating red meat or being exposed to other mammal products. Symptoms are similar to other food allergies and can include hives or itchy rash, cough or difficulty breathing, swelling of the throat or face, severe stomach pain, indigestion, and diarrhea, among others. In the United States, AGS is associated with lone star tick bites. The lone star tick is not believed to be established in Maine, currently, though populations are moving up the east coast and are established in southern Massachusetts. Alpha-gal syndrome is not a reportable condition, either in Maine or nationally.

Other emerging tickborne diseases

U.S. CDC and other researchers are continually on the watch for new or emerging tickborne diseases. Pathogens emerging in the United States include Bourbon virus, Colorado Tick Fever virus, Heartland virus, and *Ehrlichia muris eauclairensis*. While Maine has no documented human cases of any of these diseases, there is serological evidence from whitetail deer of Heartland virus in Maine. Several of these pathogens are transmitted by ticks that already live in Maine or may move into Maine in the future, so Maine CDC monitors for these pathogens. Maine CDC also continues to monitor regional surveillance for the expansion of lone star and longhorned tick (*Haemaphysalis longicornis)* populations in the Northeast.

II. The diagnosis and treatment guidelines for Lyme disease recommended by Maine Center for Disease Control and Prevention and the United States Department of Health and Human Services, Centers for Disease Control and Prevention

Maine CDC continues to adhere to the strongest science-based source of information for the diagnosis and treatment of any infectious disease of public health significance. Nationally, the Infectious Disease Society of America (IDSA) is the leader in setting the standard for clinical practice guidelines on Lyme disease and other tickborne illnesses.

Lyme disease is diagnosed clinically with the aid of laboratory testing. An *erythema migrans* (bullseye rash) on a person from an endemic area is distinctive enough to allow a clinical diagnosis in the absence of laboratory confirmation. Patients should be treated based on clinical findings. Either a standardized or modified two-tier testing algorithm (STTT or MTTT, respectively) is recommended for laboratory testing. With STTT, the first tier includes an enzyme immunoassay (EIA) or immunofluorescence assay (IFA). If this first tier is positive or equivocal, an IgM and/or IgG Immunoblot follows. With MTTT, the first tier uses an EIA, similar to STTT. If positive or equivocal, a second EIA follows. Acute and convalescent testing, or testing run on samples collected during illness and after recovery, is useful to determine final diagnosis. Providers should consider other potential diagnoses for untreated patients who remain seronegative despite having symptoms for 6-8 weeks, as they are unlikely to have Lyme disease. A diagnosis of Lyme disease made by a clinician may or may not meet the federal surveillance case

definition, and therefore may not always be counted as a case. Maine CDC refers physicians with questions about diagnosis to the IDSA guidelines.

In 2015, IDSA convened a panel to assess and update guidelines for the treatment and prevention of Lyme disease and other tickborne diseases. The results from this panel were published in the 2020 Lyme disease guidelines. This panel affirmed "the term 'chronic Lyme disease' as currently used lacks an accepted definition for either clinical use or scientific study." Currently, U.S. CDC recognizes Post-Treatment Lyme Disease Syndrome (PTLDS), defined as symptoms of pain, fatigue, or difficulty thinking that lasts for more than 6 months after completion of Lyme disease treatment. There is no proven treatment for PTLDS, but U.S. CDC notes that patients with PTLDS usually get better over time, though this may take many months. The 2015 panel also noted "[Studies] of persistent symptomatology after treatment of verified Lyme disease have found that prolonged antimicrobial therapy is not helpful and may cause harm. From this, one can infer that prolonged antibiotic treatment is unlikely to benefit individuals who lack a verifiable history of Lyme disease while exposing them to significant risk."

III. A Summary or bibliography of peer reviewed medical literature and studies related to the surveillance, diagnosis, medical management, and the treatment of Lyme disease and other tickborne illnesses, including, but not limited to, the recognition of chronic Lyme disease and the use of long-term antibiotic treatment

A bibliography of peer reviewed journal articles published in 2024, as related to surveillance, diagnostics, medical management, treatment, and other topics relevant in Maine for Lyme and other tickborne illnesses is included in Appendix 3. Maine CDC reviews these journal articles to maintain an understanding of the current research and literature available on Lyme and other tickborne diseases.

IV. The education, training, and guidance provided by Maine Center for Disease Control and Prevention to healthcare professionals on the current methods of diagnosing and treating Lyme disease and other tickborne illnesses

Maine CDC continues to emphasize prevention and control of Lyme disease and other tickborne diseases. The Division of Disease Surveillance, Infectious Disease Epidemiology Program conducts surveillance for tickborne diseases, since anaplasmosis, babesiosis, ehrlichiosis, Hard Tick Relapsing Fever (*B. miyamotoi* disease), Lyme disease, Powassan virus disease, and spotted fever rickettsiosis are notifiable by both medical practitioners and clinical laboratories. Reporting clinicians must submit subsequent clinical and laboratory information following the initial report. Maine CDC also monitors tickborne diseases through syndromic surveillance. By querying participating hospital emergency department (ED) patient visit data, Maine CDC can identify patients that complain of a tick bite. An increase in ED visits for tick bites is usually a precursor for the typical seasonal increase in incidences of Lyme and other tickborne diseases. A comparison of 2022, 2023, and 2024 syndromic data is included in Appendix 4. Maine CDC displays 2024 Lyme disease surveillance data at the county level in Appendix 5, showing the geographic spread of the disease in Maine.

Outreach and education to clinicians and other healthcare providers is ongoing. Maine CDC epidemiologists provide consultation to the medical community on tickborne diseases and conditions, offering educational and preventive information as needed. Maine CDC epidemiologists present educational outreach activities and seminars on tickborne disease prevention targeting the medical community at statewide meetings of school nurses and others. During 2024, Maine CDC Infectious

Disease Epidemiology Program mailed a clinical management guide, "Tickborne Diseases of the United States: A Reference Manual for Healthcare Providers," to hospitals, urgent care providers, and family medicine/primary care providers. This guide includes information on ticks found in the US and signs/symptoms, laboratory services, diagnosis, and treatment of twelve tickborne diseases, including Lyme disease.

- Maine CDC distributed 566 copies of this guide in 2024

Maine CDC continues to contribute to national surveillance and prevention activities. During 2024, Maine CDC epidemiologists represented the State at national and regional meetings:

- CDC Vector Week Conference, Colorado, February 2024
- Northeast Regional Center for Excellence in Vectorborne Diseases Vector Biology Bootcamp, Maine, May 2024
- Council of State and Territorial Epidemiologists (CSTE) Annual Conference, Pennsylvania, June 2024
- CSTE Vector-borne and Zoonotic Disesaes Subcommittee Calls (quarterly)
- USDA National Longhorned Tick Stakeholder Calls (monthly)
- Northeast Regional Center for Excellence in Vectorborne Diseases Arbovirus Situational Awareness Calls (weekly through summer and fall)
- National Association of Vectorborne Disease Control Officials (NAVCO) Board Meetings (throughout the year)
- NAVCO Regional Calls (throughout the year)
- NAVCO Membership Calls (throughout the year)
- New England Center of Excellence in Vectorborne Diseases (NEWVEC) Stakeholder Advisory Council (throughout the year)

Maine Epidemiologists are active contributors in federal working groups on:

- Alpha-gal allergy (monthly)

V. The education and public awareness activities conducted by Maine Center for Disease Control and Prevention for the prevention of Lyme disease and other tickborne illnesses

Maine CDC promotes ongoing educational outreach activities targeting the public and Maine municipalities. During 2024, Maine CDC epidemiologists provided consultation to the public on tickborne diseases and conditions, offering educational and preventive information as needed. Maine CDC epidemiologists presented educational outreach activities and seminars on tickborne disease prevention to the general public including:

- Four presentations to community groups, two presentations to health care providers, and one presentation to childcare providers.
- Two tabling events at LL Bean and Maine Early Childhood Education Conference, Portland.
- Three media interviews given by Vectorborne Disease Health Educator.

The director or Maine CDC's Infectious Disease Epidemiology Program chairs the State Vectorborne Disease Work Group, a group comprising both state agencies and private entities that meets on a bimonthly basis to proactively address surveillance, prevention, and control strategies. Members of this group include Maine Department of Health and Human Services; Maine Department of Agriculture, Conservation, and Forestry; Maine Department of Inland Fisheries and Wildlife; Maine Department of Education; Maine Department of Environmental Protection; Maine Forest Service; University of Maine

Cooperative Extension Services; and the United States Department of Agriculture. A full list of members can be found in Appendix 6. Educational efforts by the Vectorborne Work Group in 2024 included:

- Presentations given on ticks and tickborne diseases
- Presence in radio and television interviews
- Distribution of educational materials including Lyme brochures, tick bite prevention posters, fact sheets, etc.

Maine CDC maintains an educational curriculum aimed at teaching students in grades 3 through 8 about tick biology and ecology, tickborne diseases, and tick prevention. The program consists of a twenty-minute PowerPoint presentation on tick biology, ecology, and tickborne disease information; four ten-minute interactive activities; and a take-home packet with games, activities, and information for parents. Maine CDC's interactive workbook called "Take Back Your Yard! A workbook for kids to fight the bite!" is also available with the curriculum. This workbook is designed for 3rd through 5th grade students to work with an adult parent/guardian to identify and remove tick and mosquito habitat around their homes to prevent vectorborne diseases.

Maine CDC works with Maine DOE to share this curriculum with school nurses and administrators throughout the state.

- The school curriculum webpage (www.maine.gov/dhhs/schoolcurricula) recorded 637 unique pageviews in 2024.

In May through July 2024, Maine CDC ran a social media campaign. This campaign consisted of a series of static ads and short videos on Facebook, Instagram, and Twitter. Static ads and videos focused on tick identification, recognition of different life stages of the deer tick (especially nymphs and adults), bite prevention, symptoms of tickborne diseases, and EM rash (bullseye rash) recognition on different anatomical sites and on different skin tones.
Reach and engagement during the campaign include:

- Facebook (12 Total Posts in Campaign)
  - Total reach for campaign: 124,264 (range 553-43,998 per post)
  - Total post engagements for campaign (reactions, link clicks, comments, and shares): 6,837 (range 16-1,805 per post)
- Instagram (11 total posts in campaign)
  - Total reach for campaign: 4,418 (range 67-842 per post)
  - Total post engagements for campaign (reactions, comments, and shares): 227 (range 6-65 per post)

Maine CDC maintains a series of short instructional videos to educate the Maine community in tick prevention and tickborne diseases. These videos include:

- Choosing and Applying Personal Repellents – viewed 31 times in 2024
- Do You Know Who's Most at Risk for Lyme Disease – viewed 33 times in 2024
- How to Choose a Residential Pesticide Applicator – viewed 24 times in 2024
- How to Perform a Tick Check – viewed 4,207 times in 2024
- Know How to do Tick Checks – viewed 1,074 times in 2024
- Know How to Prevent Tick Bites – viewed 130 times in 2024
- Know How to Remove Ticks – viewed 215 times in 2024

- Reducing Tick Habitat Around Your Home- viewed 110 times in 2024
- Tick Identification – viewed 6,218 times in 2024
- Tickborne Diseases in Maine: Anaplasmosis – viewed 945 times in 2024
- Tickborne Diseases in Maine: Babesiosis – viewed 101 times in 2024
- Tickborne Diseases in Maine: Lyme Disease- viewed 60 times in 2024
- Tickborne Diseases: Powassan Encephalitis– viewed 281 times in 2024

Maine CDC's Lyme disease website (https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/lyme/) is continually updated to provide information to the public and to health professionals about Lyme disease in Maine. In 2024:

- The Lyme disease homepage received 3,410 unique pageviews.
- The tick frequently asked questions page received 1,470 unique pageviews.

Each of the tickborne disease webpages is designed in a health literate format to increase material comprehension and features sections on symptoms, prevention (both personal prevention and environmental management), and resources. Tickborne disease educational resources on Maine CDC's website include:

- Printable resources: Fact sheets (Anaplasmosis, Babesiosis, Ehrlichiosis, Hard Tick Relapsing Fever, Lyme disease, Powassan virus disease, Rocky Mountain Spotted Fever, and Repellents), arboviral testing handout for health care providers, tick bite prevention and tick identification posters
- Tickborne disease videos: Tickborne diseases in Maine webinar (updated yearly), short educational videos on each endemic disease, short video on property management and pesticide application
- Interactive tick identification game
- Tickborne disease school curriculum
- Tick frequently asked questions (with peer-reviewed citations)
- Disease surveillance data: Maine Tracking Network, surveillance reports for selected diseases, link to University of Maine Cooperative Extension Tick Lab tick testing data

During 2024, Maine CDC distributed Lyme disease educational materials to partners and members of the public. All printed materials are also available for download. Approximate numbers of materials distributed in 2024 include:

- 2,480 wallet-sized laminated tick identification cards
- 737 Tick ID posters
- 607 What to Do after a Tick Bite posters
- 772 Prevent Tickborne Diseases bookmark
- 566 Tickborne Diseases in the United States: A Reference Manual for Healthcare Providers
- 507 EM Rash poster
- 48 Lyme Disease Awareness Month 2023 posters
- 270 Prevent Tickborne Diseases in People and Pets bookmark
- 382 Lyme disease brochures
- 23 Prevent Tick Bites trail sign

Members of the Vectorborne Disease Working Group assist Maine CDC in distributing educational materials as widely as possible throughout the State.

Maine CDC releases Health Alerts, press releases, and other information on disease concerns of public health significance, including tickborne diseases. Maine CDC also responds to numerous press inquiries and releases press statements as appropriate. Official releases in 2024 included:

- 2024 Lyme and Other Tickborne Disease Information (Health Alert) – May 13th
- Maine CDC Marks Lyme Disease Awareness Month with "Little Tick, Big Deal" Campaign (Press Release) – May 10th
- Arbovirus Update for Healthcare Providers in Maine (Health Alert) – July 9th
- Maine CDC Congratulates Winners of 2024 Lyme disease Awareness Month Poster Contest (Press Release) – June 11th
- Maine CDC Reports Death from Powassan Virus (Press Release) – June 13th
- Maine CDC Encourages Tick Bite Prevention This Fall (Press Release) – October 25th
- 2024 Record Number of Tickborne Illnesses Reported (Health Alert) – October 25th

Pursuant to legislation enacted in the second regular session of the 126th Legislature, May 2024 was declared to be Lyme Disease Awareness Month (PL 2009 c. 494). Educational activities took place throughout the entire month including:

- Governor's Proclamation of Lyme Disease Awareness Month (Appendix 7)
- Information distributed through social media (Facebook, Instagram, and Twitter)
- Information distributed through multiple newsletters throughout the state (medical, veterinary, and other general audiences)
- Information distributed through multiple media interviews across the State of Maine
- Educational tabling events at LL Bean in Freeport and the Maine Early Childhood Education Conference in Portland

Another major Lyme Disease Awareness Month activity was the statewide poster contest for students in grades K-8. Maine CDC asked students to create a poster with the theme "Little Tick, Big Deal" demonstrating at least one of the four Lyme disease prevention methods (wear protective clothing, use repellent, use caution in tick infested areas, and perform daily tick checks). The four winning posters and one honorable mention poster are available for viewing at the Lyme disease website. Maine CDC used one of the winning posters for our 2024 statewide educational campaign (Appendix 8). An online poster gallery of all artworks submitted over the past fourteen years is available for viewing on Maine CDC's Lyme Disease Awareness Month website.

The Maine Tracking Network (MTN) Portal, a web-based portal that allows users to access environmental and health data, shares near real-time data on Lyme disease, anaplasmosis, and babesiosis for the current and previous year. Near real-time data is updated weekly with the rates (per 100,000) and number of cases. The data portal also shares data on suspected tick-related emergency department visits (as counts and percent of all emergency visits) and historical case data. The portal allows users to customize data inquiries at the town, county, and state level. The Tickborne Disease portion of the portal was accessed 6,433 times during 2024. The MTN Tickborne Disease Data is accessible on Maine CDC's website at www.maine.gov/idepi.
Please see Appendix 9 for a sample table, Appendix 10 for sample maps, and Appendix 11 for a sample trend chart. Data can be broken down by:

- Town
- County
- Gender

- Age Group

Maine CDC's main prevention message is encouraging Maine residents and visitors to use personal protective measures to prevent tick exposures. Personal protective measures include avoiding tick habitat, using EPA-approved repellents, wearing long sleeves and pants, and daily tick checks and tick removal after being in tick habitats (ticks must be attached >24 hours to transmit Lyme disease). Persons who spent time in tick habitats should consult a medical provider if they have unexplained rashes, fever, or other unusual illnesses during the first several months after exposure. Possible community approaches to prevent Lyme disease include landscape management and control of deer herd populations.

Maine CDC partners with the University of Maine Cooperative Extension Office to monitor the identification of deer ticks (*Ixodes scapularis*) in Maine through a passive submission system.

Beginning in April 2019, the University of Maine Cooperative Extension Office offers the testing of deer ticks for the pathogens that cause Lyme disease, anaplasmosis, and babesiosis. In 2020, the Cooperative Extension Office added a panel to test non-*Ixodes* tick species, including the American dog tick and lone star tick for the pathogens that cause Rocky Mountain Spotted Fever, ehrlichiosis, and tularemia. In 2023, the Cooperative Extension Office added Powassan and Heartland virus testing to the *Ixodes* and non-*Ixodes* panels, respectively. While the testing of ticks should not be used for clinical diagnosis or medical treatment decisions, this service provides surveillance information on ticks and tickborne diseases in Maine. For more information on this service, please visit www.ticks.umaine.edu. Data on the tick submission and tick testing results for 2024 can be found in Appendix 12.

VI. A summary of laws of other states enacted during the past year related to the diagnosis, treatment, and insurance coverage for Lyme disease and other tickborne illnesses based on resources made available by federal Centers for Disease Control and Prevention or other organizations

Maine CDC performed a search of state and federal legislation. A state-by-state listing of legislation relating to Lyme and other tickborne diseases can be found in Appendix 13.

Appendices

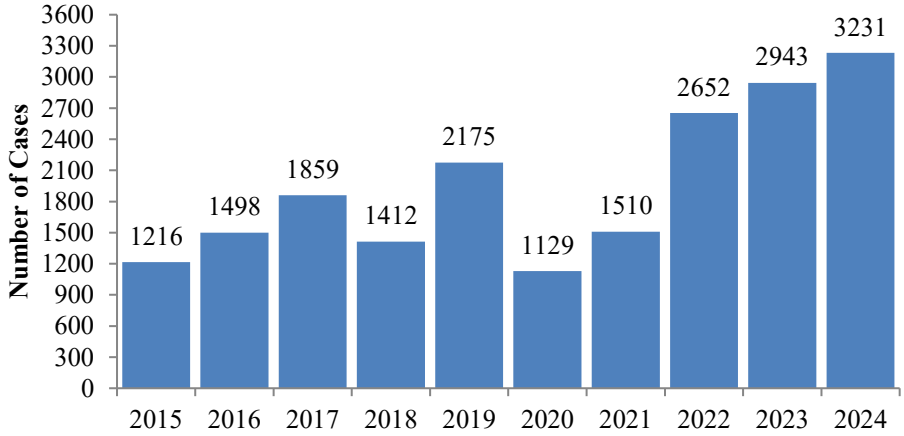
Appendix 1
Maine Lyme disease statistics

Number and Rate per 100,000 persons of Lyme Disease Cases by County of Residence – Maine, 2020-2024*

County	2020 Count	2020 Rate	2021 Count	2021 Rate	2022 Count	2022 Rate	2023 Count	2023 Rate	2024 Count	2024 Rate
Androscoggin	40	36.9	64	57.6	79	69.9	140	123.9	153	132.7
Aroostook	4	6.0	3	4.5	13	19.3	13	19.3	9	13.5
Cumberland	178	60.3	226	74.0	355	115.5	387	125.9	414	131.9
Franklin	18	59.6	24	80.8	40	131.3	70	229.7	75	242.7
Hancock	117	212.8	186	331.0	363	640.2	321	566.1	382	670.8
Kennebec	125	102.2	167	134.2	233	185.6	264	210.3	295	229.6
Knox	121	304.2	138	335.9	264	641.3	281	682.6	292	712.5
Lincoln	65	187.7	65	181.4	184	508.1	183	505.3	255	698.8
Oxford	43	74.2	57	97.2	65	109.3	102	171.4	131	218.2
Penobscot	85	55.9	126	82.5	239	155.5	239	155.5	255	162.6
Piscataquis	4	23.8	5	29.1	15	86.1	25	143.5	20	114.7
Sagadahoc	27	75.3	45	121.4	101	270.1	124	331.6	139	369.9
Somerset	37	73.3	80	158.1	127	248.5	134	262.2	177	344.8
Waldo	91	229.1	113	283.1	203	504.5	256	636.2	247	608.1
Washington	33	105.2	38	122.1	94	299.0	73	232.2	101	321.8
York	141	67.9	173	80.6	277	127.8	331	152.7	286	129.9
State	**1129**	**84.0**	**1510**	**110.0**	**2652**	**190.9**	**2943**	**212.4**	**3231**	**230.0**

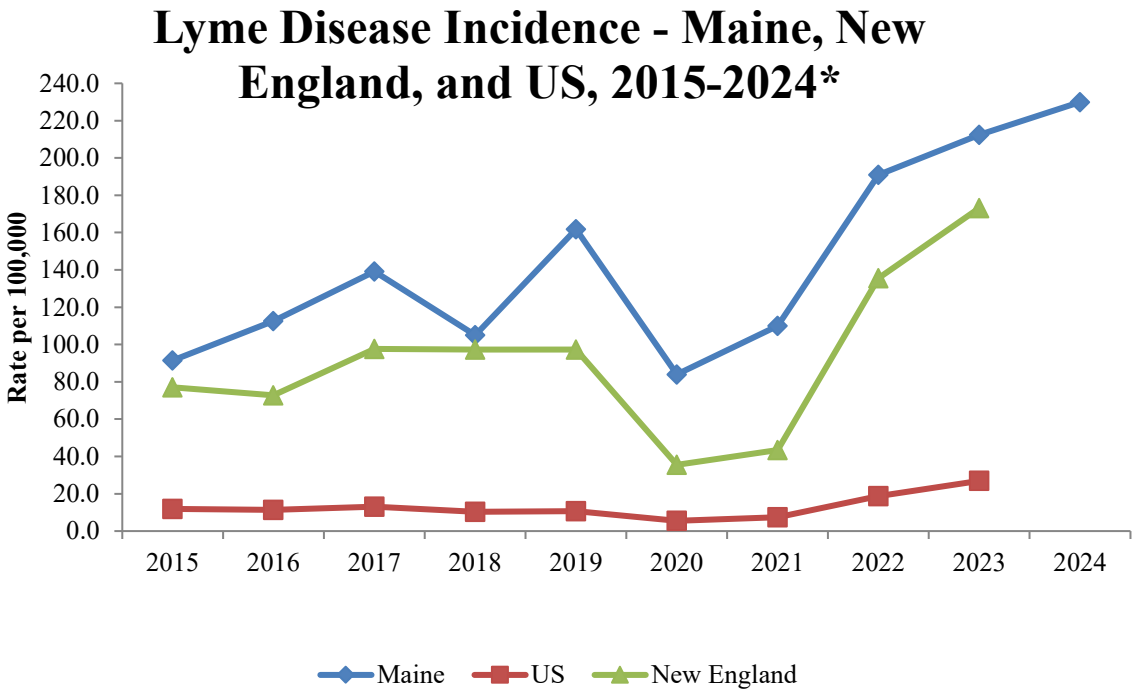
*2024 data are preliminary as of 04/11/2025

Lyme Disease Cases - Maine, 2015-2024*

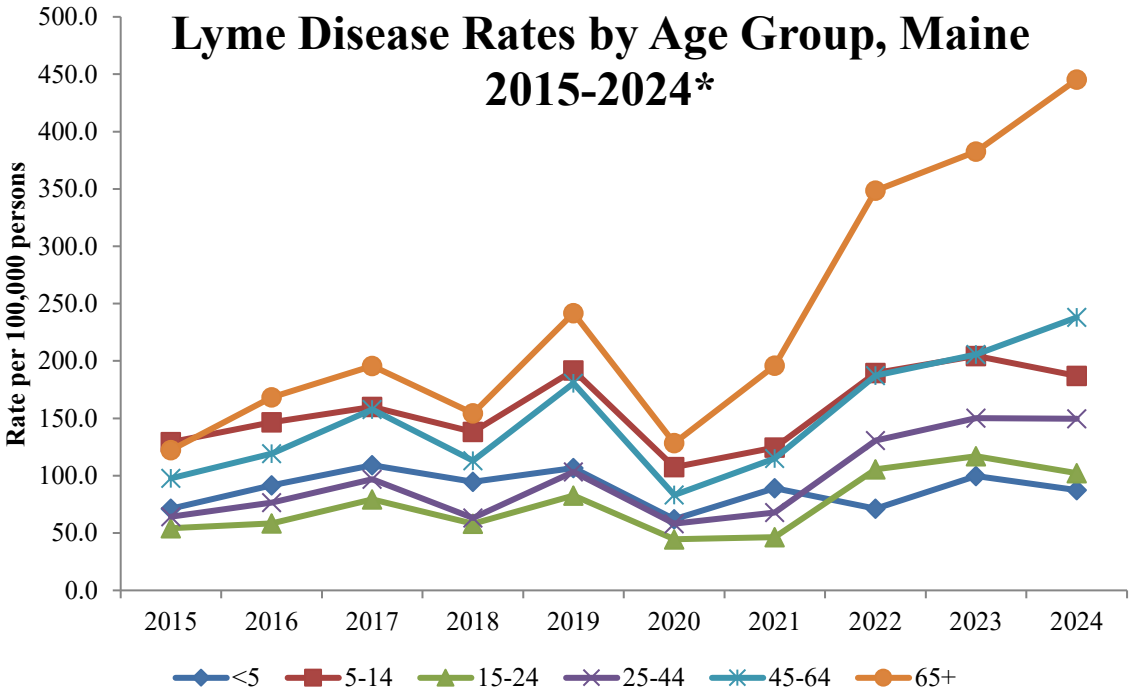


*2024 data are preliminary as of 04/11/2025

Note about the data: Effective 01/02/2022, CSTE changed the Lyme disease surveillance case definition to a lab-only definition, which includes only probable cases. All data prior to 2022 includes confirmed and probable cases.



*2024 data are preliminary as of 04/11/2025



*2024 data are preliminary as of 04/11/2025

Note about the data: Effective 01/02/2022, CSTE changed the Lyme disease surveillance case definition to a lab-only definition, which includes only probable cases. All data prior to 2022 includes confirmed and probable cases.

Appendix 2
Maine tickborne disease statistics (excluding Lyme disease)

Number of Selected Tickborne Disease Cases by County of Residence – Maine, 2024*

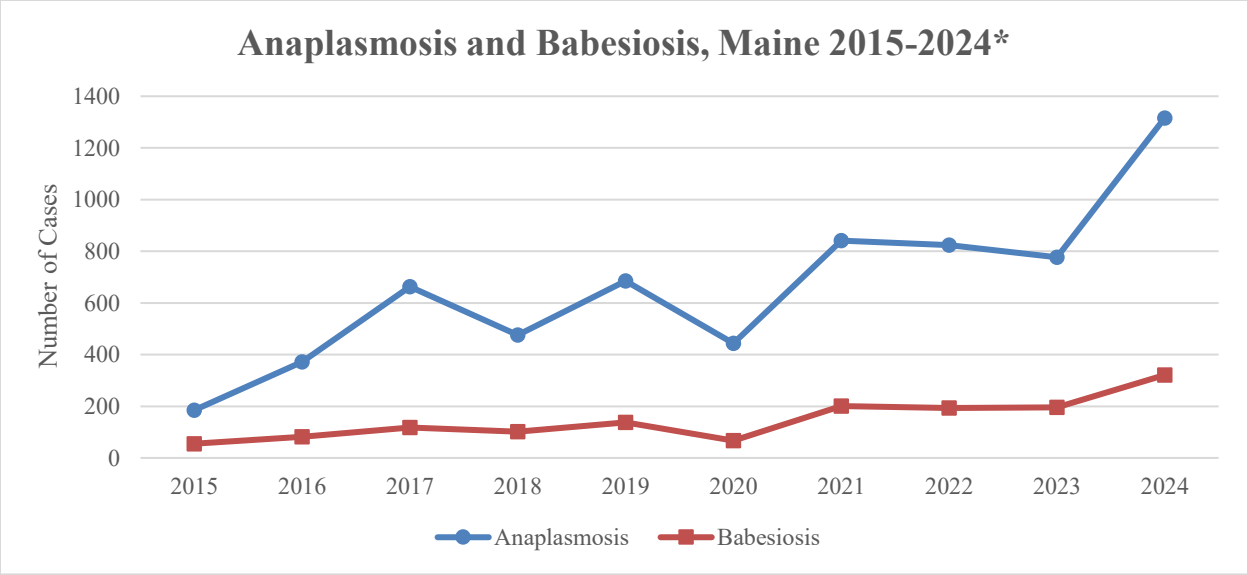
County	Anaplasmosis	Babesiosis	Ehrlichiosis	Hard Tick Relapsing Fever	Powassan	Spotted Fever Rickettsiosis
Androscoggin	45	20	0	1	0	0
Aroostook	0	0	0	0	0	0
Cumberland	147	39	0	5	2	0
Franklin	39	6	0	1	0	0
Hancock	165	36	1	9	0	0
Kennebec	112	41	0	2	1	2
Knox	126	41	0	1	1	0
Lincoln	161	29	0	0	1	0
Oxford	52	10	0	0	0	1
Penobscot	71	21	1	0	1	0
Piscataquis	4	1	0	0	0	0
Sagadahoc	76	14	0	0	0	0
Somerset	65	13	0	1	0	1
Waldo	137	26	0	0	0	0
Washington	37	7	0	0	0	0
York	79	17	0	3	1	0
Total	**1316**	**321**	**2**	**23**	**7**	**4**

* 2024 data are preliminary as of 04/11/2025

Number of Selected Tickborne Disease Cases– Maine, 2015 - 2024*

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Anaplasmosis	185	372	663	476	685	443	841	824	777	1316
Babesiosis	55	82	118	101	138	66	201	193	195	321
Ehrlichiosis	5	7	10	19	13	2	4	7	3	2
Hard Tick Relapsing Fever	0	0	6	8	13	12	9	12	14	23
Powassan	1	1	3	0	2	1	3	4	7	7
SFR	1	4	3	10	5	0	2	1	0	4

* 2024 data are preliminary as of 04/11/2025



* 2024 data are preliminary as of 04/11/2025

Appendix 3

Peer-reviewed medical literature related to tickborne diseases – bibliography: 2024

Diagnostics and Surveillance

- Ali AE, Gardner AM, Shugart HH, Walter JA. Opposing Patterns of Spatial Synchrony in Lyme Disease Incidence. Ecohealth. 2024 Mar;21(1):46-55. doi: 10.1007/s10393-024-01677-8. Epub 2024 May 4. PMID: 38704455; PMCID: PMC11127889.

- Chand M, Vydyam P, Pal AC, Thekkiniath J, Darif D, Li Z, Choi JY, Magni R, Luchini A, Tonnetti L, Horn EJ, Tufts DM, Ben Mamoun C. A set of diagnostic tests for detection of active Babesia duncani infection. Int J Infect Dis. 2024 Oct;147:107178. doi: 10.1016/j.ijid.2024.107178. Epub 2024 Jul 25. PMID: 39025200.

- Clark KL, Hartman S. PCR Detection of Bartonella spp. and Borreliella spp. DNA in Dry Blood Spot Samples from Human Patients. Pathogens. 2024 Aug 28;13(9):727. doi: 10.3390/pathogens13090727. PMID: 39338918; PMCID: PMC11435347.

- Colasante G, Makari K, Hummel TI, Murphy C. Sample-to-answer direct real-time PCR detection of Anaplasma phagocytophilum, Ehrlichia spp., and Babesia spp. infections in whole-blood specimens. Microbiol Spectr. 2024 Aug 6;12(8):e0065524. doi: 10.1128/spectrum.00655-24. Epub 2024 Jul 9. PMID: 38980020; PMCID: PMC11302060.

- Earley AR, Schiffman EK, Wong KK, Hinckley AF, Kugeler KJ. Epidemiologic and tick exposure characteristics among people with reported Lyme disease - Minnesota, 2011-2019. Zoonoses Public Health. 2024 Nov;71(7):779-789. doi: 10.1111/zph.13143. Epub 2024 May 28. PMID: 38807328; PMCID: PMC11455615.

- Eisen RJ, Foster E, Kjemtrup A, Saunders MEM, Brown J, Green L, Cervantes K, Prusinski MA, White J, Barbarin AM, Williams C, Kwit N, Bernick J, Gaines D, Dykstra E, Oltean HN, Dotseth E, Lee X, Osborn R. Perspectives from federal and state public health departments on their participation in and the utility of Ixodes scapularis (Acari: Ixodidae) and Ixodes pacificus tick and tick-borne pathogen surveillance in the United States. J Med Entomol. 2024 Dec 9:tjae149. doi: 10.1093/jme/tjae149. Epub ahead of print. PMID: 39657826.

- García-Bretón G, Rojas-Castro FC, Espino-Vázquez AN, Fajardo-Yamamoto LM. Clinical Algorithm and Diagnostic Tools for Lyme Disease. Methods Mol Biol. 2024;2742:239-243. doi: 10.1007/978-1-0716-3561-2_16. PMID: 38165626.

- Geffert SWF. Diagnosis of Tick-Borne Diseases in New England. Clin Lab Med. 2025 Mar;45(1):145-152. doi: 10.1016/j.cll.2024.10.010. Epub 2024 Dec 10. PMID: 39892933.

- Ghosh R, Joung HA, Goncharov A, Palanisamy B, Ngo K, Pejcinovic K, Krockenberger N, Horn EJ, Garner OB, Ghazal E, O'Kula A, Arnaboldi PM, Dattwyler RJ, Ozcan A, Di Carlo

D. Rapid single-tier serodiagnosis of Lyme disease. Nat Commun. 2024 Aug 20;15(1):7124. doi: 10.1038/s41467-024-51067-5. PMID: 39164226; PMCID: PMC11336255.

- Gould LH, Fathalla A, Moïsi JC, Stark JH. Racial and ethnic disparities in Lyme disease in the United States. Zoonoses Public Health. 2024 Aug;71(5):469-479. doi: 10.1111/zph.13137. Epub 2024 Apr 24. PMID: 38659178.

- Gould LH, Fee R, White J, Webb N, Carlyle M, Dick L, Tan Y, Walker V, Angulo FJ, Moïsi JC, Stark JH, Pugh S. Risk factors for Lyme disease among residents of rural, suburban, and urban areas in the United States: A Case-Control Study. Am J Epidemiol. 2024 Sep 20:kwae368. doi: 10.1093/aje/kwae368. Epub ahead of print. PMID: 39307534.

- Jones BS, DeWitt ME, Wenner JJ, Sanders JW. Lyme Disease Under-Ascertainment During the COVID-19 Pandemic in the United States: Retrospective Study. JMIR Public Health Surveill. 2024 Sep 12;10:e56571. doi: 10.2196/56571. PMID: 39264291; PMCID: PMC11411844.

- Kim P, Maxwell S, Parijat N, Kim D, McNeely CL. Targeted Tick-Borne Disease Recognition: Assessing Risk for Improved Public Health. Healthcare (Basel). 2024 May 10;12(10):984. doi: 10.3390/healthcare12100984. PMID: 38786395; PMCID: PMC11121250.

- Klontz EH, Chowdhury N, Branda JA. Laboratory Testing for Powassan Virus: Past, Present, and Future. J Infect Dis. 2024 Aug 14;230(Supplement_1):S70-S75. doi: 10.1093/infdis/jiae197. PMID: 39140722.

- Kugeler KJ, Earley A, Mead PS, Hinckley AF. Surveillance for Lyme Disease After Implementation of a Revised Case Definition - United States, 2022. MMWR Morb Mortal Wkly Rep. 2024 Feb 15;73(6):118-123. doi: 10.15585/mmwr.mm7306a1. PMID: 38358952; PMCID: PMC10899080.

- Landry ML, Hassan S, Rottmann BG, Pesak SJ, Ordazzo M, Skrzyniarz M, Deponte S, Peaper DR. Performance of two modified two-tier algorithms for the serologic diagnosis of Lyme disease. J Clin Microbiol. 2024 May 8;62(5):e0013924. doi: 10.1128/jcm.00139-24. Epub 2024 Apr 10. PMID: 38597655; PMCID: PMC11077974.

- Lee G, Pretsch P, Ursery L, Giandomenico D, Abernathy HA, Evans L, Qurollo BA, Breitschwerdt EB, Boyce RM. Evaluation of the Veterinary IDEXX SNAP 4Dx Plus Test for the Diagnosis of Lyme Disease in Humans. Vector Borne Zoonotic Dis. 2024 Nov;24(11):715-719. doi: 10.1089/vbz.2024.0047. Epub 2024 Jun 19. PMID: 39049534.

- Mead P, Hinckley A, Kugeler K. Lyme Disease Surveillance and Epidemiology in the United States: A Historical Perspective. J Infect Dis. 2024 Aug 14;230(Supplement_1):S11-S17. doi: 10.1093/infdis/jiae230. PMID: 39140721.

- Murphy B, Veras J, Kolli S, Formanowski B, Greenberg P, Kleinman L, Malhotra A, Bhise

V. Seroprevalence of Lyme Disease in Children With Facial Nerve Palsy. J Child Neurol. 2024 Aug;39(9-10):310-316. doi: 10.1177/08830738241272069. Epub 2024 Aug 28. PMID: 39196299.

- Nagavedu K, Eberhardt K, Willis S, Morrison M, Ochoa A, Soliva S, Scotland S, Cocoros NM, Callahan M, Randall LM, Brown CM, Klompas M. Electronic Health Record Data for Lyme Disease Surveillance, Massachusetts, USA, 2017-2018. Emerg Infect Dis. 2024 Jul;30(7):1374-1379. doi: 10.3201/eid3007.230942. PMID: 38916563; PMCID: PMC11210632.

- Nawrocki CC, Earley AR, Hook SA, Hinckley AF, Kugeler KJ. Optimizing identification of Lyme disease diagnoses in commercial insurance claims data, United States, 2016-2019. BMC Infect Dis. 2024 Nov 20;24(1):1322. doi: 10.1186/s12879-024-10195-5. PMID: 39567874; PMCID: PMC11580348.

- Reller ME, Clemens EG, Bakken JS, Dumler JS. Emerging Tick-borne Infections in the Upper Midwest and Northeast United States Among Patients With Suspected Anaplasmosis. Open Forum Infect Dis. 2024 Mar 15;11(4):ofae149. doi: 10.1093/ofid/ofae149. PMID: 38651141; PMCID: PMC11034950.

- Samar H, Kenney MJ. Modified Two-Tiered Serodiagnostic Testing Algorithms for Acute Phase or Early Disseminated Lyme Disease. Am Fam Physician. 2024 Jul;110(1):85-86. PMID: 39028789.

- Schwartz AM, Nelson CA, Hinckley AF. Epidemiology of Lyme Disease Diagnoses among Older Adults, United States, 2016-20191. Emerg Infect Dis. 2024 Sep;30(9):1926-1929. doi: 10.3201/eid3009.240454. PMID: 39174032; PMCID: PMC11346992.

- Ssentongo P, Venugopal N, Zhang Y, Chinchilli VM, Ba DM. Beyond Human Babesiosis: Prevalence and Association of Babesia Coinfection with Mortality in the United States, 2015-2022: A Retrospective Cohort Study. Open Forum Infect Dis. 2024 Oct 8;11(10):ofae504. doi: 10.1093/ofid/ofae504. PMID: 39381028; PMCID: PMC11460071.

- Taylor ML, Kersh GJ, Salzer JS, Jones ES, Binder AM, Armstrong PA, Choudhary SK, Commins GK, Amelio CL, Biggerstaff BJ, Beard CB, Petersen LR, Commins SP. Intrinsic risk factors for alpha-gal syndrome in a case-control study, 2019 to 2020. Ann Allergy Asthma Immunol. 2024 Jun;132(6):759-764.e2. doi: 10.1016/j.anai.2024.01.029. Epub 2024 Feb 8. PMID: 38341029; PMCID: PMC11318600.

- Walsh ME, Sietsma DJ, Martin IW, Brunelle LA. Comparison of 2 Sets of Immunoassays Used in Modified 2-Tiered Testing Algorithms for the Diagnosis of Lyme Disease. J Appl Lab Med. 2024 Oct 30:jfae127. doi: 10.1093/jalm/jfae127. Epub ahead of print. PMID: 39478348.

- Wormser GP, Schneider LM, Joseph JT, Fish D. Surveillance data from 2011-2020 indicate a lower risk of Lyme disease in the USA in even-numbered years. Wien Klin Wochenschr.

2024 Nov;136(21-22):636-638. doi: 10.1007/s00508-024-02452-z. Epub 2024 Oct 1. PMID: 39352479.

- Anis H, Basha Shaik A, Karabulut E, Uzun M, Tiwari A, Nazir A, Uwishema O, Alemayehu A. (2023). Upsurge of Powassan virus disease in northeastern United States: a public health concern-a short communication. *Ann Med Surg (Lond)*. 85(11):5823-5826. doi: 10.1097/MS9.0000000000001313.

Management and Treatment

- Adler BL, Chung T, Rowe PC, Aucott J. Dysautonomia following Lyme disease: a key component of post-treatment Lyme disease syndrome? Front Neurol. 2024 Feb 8;15:1344862. doi: 10.3389/fneur.2024.1344862. PMID: 38390594; PMCID: PMC10883079.

- Baarsma ME, Hovius JW. Persistent Symptoms After Lyme Disease: Clinical Characteristics, Predictors, and Classification. J Infect Dis. 2024 Aug 14;230(Supplement_1):S62-S69. doi: 10.1093/infdis/jiae203. PMID: 39140720.

- Bostic TD, Kugeler KJ, Hinckley AF. Pregnancy Among Reported Lyme Disease Cases-United States, 1992-2019. Zoonoses Public Health. 2024 Dec;71(8):972-977. doi: 10.1111/zph.13183. Epub 2024 Sep 27. PMID: 39333056.

- Curtis MW, Lopez JE. Tick-Borne Diseases and Pregnancy: A Narrative Review Evaluating Pregnancy Complications Caused by Tick-Borne Diseases. Trop Med Infect Dis. 2024 Oct 24;9(11):254. doi: 10.3390/tropicalmed9110254. PMID: 39591260; PMCID: PMC11598240.

- Dersch R, Torbahn G, Rauer S. Treatment of post-treatment Lyme disease symptoms-a systematic review. Eur J Neurol. 2024 Jul;31(7):e16293. doi: 10.1111/ene.16293. Epub 2024 Apr 12. PMID: 38606630; PMCID: PMC11235603.

- Earley AR, Kugeler KJ, Mead PS, Hinckley AF. Frequency of tick bites and associated care-seeking behaviors in the United States. Ticks Tick Borne Dis. 2024 Nov;15(6):102416. doi: 10.1016/j.ttbdis.2024.102416. Epub 2024 Nov 29. PMID: 39615314.

- Eilbert W, Matella A. Tick-Borne Diseases. Emerg Med Clin North Am. 2024 May;42(2):287-302. doi: 10.1016/j.emc.2024.01.004. Epub 2024 Feb 29. PMID: 38641392.

- Hahn C, Bhavsar SM. Vector-Borne Diseases Potpourri. Pediatr Rev. 2024 Oct 1;45(10):547-559. doi: 10.1542/pir.2023-006341. PMID: 39349849.

- Hamadou L, Buteau F, Petrosyan E, Martineau D, Sauvat L, Audibert M, Lesens O. Costs associated with informal health care pathway for patients with suspected Lyme borreliosis. Infect Dis Now. 2024 Mar;54(2):104841. doi: 10.1016/j.idnow.2023.104841. Epub 2023 Nov 25. PMID: 38012989.

- Keshtkarjahromi M, Rebman AW, Antar AAR, Manabe YC, Gutierrez-Alamillo L, Casciola-Rosen LA, Aucott JN, Miller JB. Autoantibodies in post-treatment Lyme disease and association with clinical symptoms. Clin Exp Rheumatol. 2024 Jul;42(7):1487-1490. doi: 10.55563/clinexprheumatol/qcupkk. Epub 2024 Apr 5. PMID: 38607687.

- Maliha M, Abittan N, Frishman WH, Aronow WS, Harburger J. Cardiac Manifestations of Lyme Disease. Cardiol Rev. 2024 Oct 24. doi: 10.1097/CRD.0000000000000807. Epub ahead of print. PMID: 39445839.

- Marx GE, Beck A, Corey C, Fuller CC, Haug N, Ko JS, Martin D, Hinckley AF. Lyme Disease Prophylaxis by Single-Dose Doxycycline in the United States, 2010-2020. Open Forum Infect Dis. 2024 Oct 29;11(10):ofae593. doi: 10.1093/ofid/ofae593. PMID: 39474446; PMCID: PMC11521345.

- Mollah F, Zacharek MA, Benjamin MR. What Is Alpha-Gal Syndrome? JAMA. 2024 Jan 2;331(1):86. doi: 10.1001/jama.2023.23097. PMID: 38064235.

- Monaghan M, Norman S, Gierdalski M, Marques A, Bost JE, DeBiasi RL. Pediatric Lyme disease: systematic assessment of post-treatment symptoms and quality of life. Pediatr Res. 2024 Jan;95(1):174-181. doi: 10.1038/s41390-023-02577-3. Epub 2023 Mar 30. PMID: 36997691.

- Nymark A, Huniche L, Skarphedinsson S, Christensen HM. Initial symptoms and late complication in Lyme neuroborreliosis from the perspective of patients and relatives: a qualitative study. BMC Prim Care. 2024 Oct 23;25(1):379. doi: 10.1186/s12875-024-02624-w. PMID: 39443866; PMCID: PMC11498949.

- Rebman AW, Yang T, Aucott JN. Invalidation by medical professionals in post-treatment Lyme disease. Sci Rep. 2024 Aug 21;14(1):19406. doi: 10.1038/s41598-024-70556-7. PMID: 39169257; PMCID: PMC11339258.

- Roca Mora MM, Cunha LM, Godoi A, Donadon I, Clemente M, Marcolin P, Valenzuela S A, Wormser GP. Shorter versus longer duration of antimicrobial therapy for early Lyme disease: A systematic review and meta-analysis. Diagn Microbiol Infect Dis. 2024 Jun;109(2):116215. doi: 10.1016/j.diagmicrobio.2024.116215. Epub 2024 Feb 15. PMID: 38493509.

- Schudel S, Gygax L, Kositz C, Kuenzli E, Neumayr A. Human granulocytotropic anaplasmosis-A systematic review and analysis of the literature. PLoS Negl Trop Dis. 2024 Aug 5;18(8):e0012313. doi: 10.1371/journal.pntd.0012313. PMID: 39102427; PMCID: PMC11326711.

- Schutzer SE, Coyle PK. How Do I Approach the Evaluation and Treatment of Early Lyme Disease? NEJM Evid. 2024 Aug;3(8):EVIDccon2300131. doi: 10.1056/EVIDccon2300131. Epub 2024 Jul 23. PMID: 39041869.

- Steere AC. Lyme Arthritis: A 50-Year Journey. J Infect Dis. 2024 Aug 14;230(Supplement_1):S1-S10. doi: 10.1093/infdis/jiae126. PMID: 39140724; PMCID: PMC11322885.

- Taylor-Salmon E, Shapiro ED. Tick-borne infections in children in North America. Curr Opin Pediatr. 2024 Apr 1;36(2):156-163. doi: 10.1097/MOP.0000000000001326. Epub 2024 Jan 3. PMID: 38167816; PMCID: PMC10932821.

- Thompson AD, Neville DN, Chapman LL, Balamuth F, Ladell MM, Kharbanda AB, Aresco R, Nigrovic LE. Increased usage of doxycycline for young children with Lyme disease. Front Antibiot. 2024 May 21;3:1388039. doi: 10.3389/frabi.2024.1388039. PMID: 39816267; PMCID: PMC11732018.

- Wester KE, Nwokeabia BC, Hassan R, Dunphy T, Osondu M, Wonders C, Khaja M. What Makes It Tick: Exploring the Mechanisms of Post-treatment Lyme Disease Syndrome. Cureus. 2024 Jul 20;16(7):e64987. doi: 10.7759/cureus.64987. PMID: 39161484; PMCID: PMC11332314.

- Williams ME, Schwartz DA, DeBiasi RL, Mulkey SB. Examining Infant and Child Neurodevelopmental Outcomes After Lyme Disease During Pregnancy. Pathogens. 2024 Nov 22;13(12):1029. doi: 10.3390/pathogens13121029. PMID: 39770289; PMCID: PMC11676172.

- Wu M, Mirkin S, McPhail MN, Wajeeh H, Nagy S, Florent-Carre M, Blavo C, Demory Beckler M, Amini K, Kesselman MM. A Comprehensive Review of Lyme Disease: A Focus on Cardiovascular Manifestations. Cureus. 2024 May 21;16(5):e60821. doi: 10.7759/cureus.60821. PMID: 38910626; PMCID: PMC11190629.

- Zafar K, Azuama OC, Parveen N. Current and emerging approaches for eliminating Borrelia burgdorferi and alleviating persistent Lyme disease symptoms. Front Microbiol. 2024 Sep 13;15:1459202. doi: 10.3389/fmicb.2024.1459202. PMID: 39345262; PMCID: PMC11427371.

Other literature relevant to tickborne diseases in Maine

- Anholeto LA, Blanchard S, Wang HV, Chagas ACS, Hillier NK, Faraone N. In vitro acaricidal activity of essential oils and their binary mixtures against ixodes scapularis (Acari: Ixodidae). Ticks Tick Borne Dis. 2024 Mar;15(2):102309. doi: 10.1016/j.ttbdis.2024.102309. Epub 2024 Jan 13. PMID: 38219289.

- Bai Y, McClung KL, Osikowicz LM, Maes S, Eisen RJ. No evidence of Bartonella infections in host-seeking Ixodes scapularis and Ixodes pacificus ticks in the United States. Parasit Vectors. 2024 Aug 19;17(1):345. doi: 10.1186/s13071-024-06386-3. PMID: 39160635; PMCID: PMC11331610.

- Baker E, Dennis M, Jensen A, Garrett KB, Cleveland CA, Yabsley MJ, Brown JD, Why

KV, Gerhold R. Survey for Babesia spp. in wildlife in the eastern United States. Int J Parasitol Parasites Wildl. 2024 Nov 1;25:101015. doi: 10.1016/j.ijppaw.2024.101015. PMID: 39553414; PMCID: PMC11565557.

- Baxter L, Lubelczyk C, Harrington LC, Angelico J, Meagher MC, Smith RP, Robich RM. Features of Consistent Powassan Virus Lineage II Focus in Southern Maine, United States. Am J Trop Med Hyg. 2024 Jul 30;111(6):1302-1310. doi: 10.4269/ajtmh.23-0532. PMID: 39084214; PMCID: PMC11619489.

- Burtis JC, Ford SL, Parise CM, Eisen RJ, Eisen L. Efficacy of unregulated minimum risk tick repellent products evaluated with Ixodes scapularis nymphs in a human skin bioassay. Parasit Vectors. 2024 Feb 1;17(1):50. doi: 10.1186/s13071-024-06146-3. PMID: 38303091; PMCID: PMC10835920.

- Burtis JC, Foster E, Eisen RJ, Eisen L. Willingness and capacity of publicly-funded vector control programs in the USA to engage in tick management. Parasit Vectors. 2024 Jul 22;17(1):316. doi: 10.1186/s13071-024-06400-8. PMID: 39039577; PMCID: PMC11265149.

- Crandall KE, Kerr JT, Millien V. Pathogen presence, prevalence, and diversity in Ixodes scapularis and mammal hosts at their expanding northern range limits. Front Parasitol. 2024 Jan 11;2:1272790. doi: 10.3389/fpara.2023.1272790. PMID: 39816818; PMCID: PMC11732163.

- D'Ambrosio M, Locke T, Hendricks-Sturrup R. Addressing Climate Change-Induced Tick-borne Lyme Disease Patterns Through Data-Driven 'One Health' Policy. J Public Health Manag Pract. 2024 Jul-Aug 01;30(4):E157-E160. doi: 10.1097/PHH.0000000000001975. Epub 2024 Jun 12. PMID: 38870383.

- Dattwyler RJ, Arnaboldi PM. Vaccination hesistancy in Lyme borreliosis. Lancet Infect Dis. 2024 Sep;24(9):945-947. doi: 10.1016/S1473-3099(24)00221-4. Epub 2024 May 31. Erratum in: Lancet Infect Dis. 2024 Sep;24(9):e549. doi: 10.1016/S1473-3099(24)00402-X. Erratum in: Lancet Infect Dis. 2024 Sep;24(9):e549. doi: 10.1016/S1473-3099(22)00067-6. PMID: 38830376.

- Dill GM, Rounsville TF, Bryant AM, Groden E, Gardner AM. Effects of Peromyscus spp. (Rodentia: Cricetidae) presence, land use, and ecotone on Ixodes scapularis (Acari: Ixodidae) ecology in an emergent area for tick-borne disease. J Med Entomol. 2024 Nov 14;61(6):1478-1488. doi: 10.1093/jme/tjae113. PMID: 39214519; PMCID: PMC11562968.

- Dziedziech A, Krupa E, Persson KEM, Paul R, Bonnet S. Tick exposure biomarkers: A One Health approach to new tick surveillance tools. Curr Res Parasitol Vector Borne Dis. 2024 Aug 24;6:100212. doi: 10.1016/j.crpvbd.2024.100212. PMID: 39286798; PMCID: PMC11404153.

- Eisen L. Efficacy of Unregulated Minimum Risk Products to Kill and Repel Ticks. Emerg

Infect Dis. 2024 Jan;30(1):1-7. doi: 10.3201/eid3001.230813. PMID: 38146965; PMCID: PMC10756381.

- Eisen RJ, Eisen L. Evaluation of the association between climate warming and the spread and proliferation of Ixodes scapularis in northern states in the Eastern United States. Ticks Tick Borne Dis. 2024 Jan;15(1):102286. doi: 10.1016/j.ttbdis.2023.102286. Epub 2023 Nov 27. PMID: 38016209; PMCID: PMC10884982.

- Elias SP, Rand PW, Lubelczyk CB, McVety MR, Smith RP. Partial trailside Japanese barberry (Ranunculales: Berberidaceae) removal did not reduce the abundance of questing blacklegged ticks (Acari: Ixodidae). Environ Entomol. 2024 Jun 13;53(3):417-424. doi: 10.1093/ee/nvae012. PMID: 38493298.

- Ferguson LV, El Nabbout A, Adamo SA. Warming, but not infection with Borrelia burgdorferi, increases off-host winter activity in the ectoparasite, Ixodes scapularis. J Therm Biol. 2024 Apr;121:103853. doi: 10.1016/j.jtherbio.2024.103853. Epub 2024 Apr 12. PMID: 38626664.

- Foster E, Holcomb KM, Eisen RJ. Density of host-seeking Ixodes scapularis nymphs by region, state, and county in the contiguous United States generated through national tick surveillance. Ticks Tick Borne Dis. 2024 May;15(3):102316. doi: 10.1016/j.ttbdis.2024.102316. Epub 2024 Feb 6. PMID: 38325243; PMCID: PMC11288111.

- Gidengil C, Scherer AM, Parker AM, Gedlinske A, Fleck-Derderian S, Hinckley AF, Hook SA, Lindley MC, Marx GE. Lyme disease vaccine attitudes and intentions among parents of children aged 5-18 years in the United States. Vaccine. 2024 Mar 19;42(8):1899-1905. doi: 10.1016/j.vaccine.2024.01.081. Epub 2024 Feb 28. PMID: 38418339.

- Goethert H, O'Callahan A, Johnson R, Roden-Reynolds P, Telford S. Minor Hosts Have a Major Impact on the Enzootic Transmission of Borrelia burgdorferi. Am J Trop Med Hyg. 2024 Nov 12;112(1):101-110. doi: 10.4269/ajtmh.24-0283. PMID: 39531726; PMCID: PMC11720800.

- Gould LH, Stark JH, McFadden B, Patel N, Kelly PH, Riis J. Using the Health Belief Model to understand intention to vaccinate for Lyme disease in the United States. Zoonoses Public Health. 2024 Aug;71(5):526-537. doi: 10.1111/zph.13142. Epub 2024 May 10. PMID: 38730082.

- Hansen AP, Wilkinson MM, Niesobecki S, Rutz H, Meek JI, Niccolai L, Hinckley AF, Hook S. Barriers to the Uptake of Tickborne Disease Prevention Measures: Connecticut, Maryland 2016-2017. J Public Health Manag Pract. 2025 Jan-Feb 01;31(1):E52-E60. doi: 10.1097/PHH.0000000000002033. Epub 2024 Sep 24. PMID: 39321400.

- Hojgaard A, Foster E, Maes SE, Osikowicz LM, Parise CM, Villalpando J, Eisen RJ. Geographic variation in the distribution of Anaplasma phagocytophilum variants in host-

seeking Ixodes scapularis nymphs and adults in the eastern United States elucidated using next generation sequencing. Ticks Tick Borne Dis. 2024 Sep;15(5):102360. doi: 10.1016/j.ttbdis.2024.102360. Epub 2024 May 30. PMID: 38820870; PMCID: PMC11774202.

- Hornbostel VL, Meek JI, Hansen AP, Niesobecki SA, Nawrocki CC, Hinckley AF, Connally NP. Operational Considerations for Using Deer-Targeted 4-Poster Tick Control Devices in a Tick-borne Disease Endemic Community. J Public Health Manag Pract. 2024 Jan-Feb 01;30(1):111-121. doi: 10.1097/PHH.0000000000001809. Epub 2023 Aug 9. PMID: 37566802; PMCID: PMC10840788.

- Howard K, Beck A, Kaufman A, Rutz H, Hutson J, Crum D, Rowe A, Marx G, Hinckley A, White J. Assessment of Knowledge, Attitudes, and Practices Toward Ticks and Tickborne Disease among Healthcare Professionals Working in Schools in New York and Maryland. J Sch Nurs. 2024 Aug;40(4):372-379. doi: 10.1177/10598405221099484. Epub 2022 Jun 1. PMID: 35651309; PMCID: PMC10902910.

- Hurd SN, Kenefic LS, Leahy JE, Sponarski CC, Gardner AM. Cascading impacts of overstory structure in managed forests on understory structure, microclimate conditions, and Ixodes scapularis (Acari: Ixodidae) densities. J Med Entomol. 2024 May 13;61(3):686-700. doi: 10.1093/jme/tjae030. PMID: 38491994.

- Johnson EE, Hart TM, Fikrig E. Vaccination to Prevent Lyme Disease: A Movement Towards Anti-Tick Approaches. J Infect Dis. 2024 Aug 14;230(Supplement_1):S82-S86. doi: 10.1093/infdis/jiae202. PMID: 39140718; PMCID: PMC11322886.

- Johnson RW, Roden-Reynolds P, Snow AA, Rich SM. The Spread of Lone Star Ticks (Amblyomma americanum) and Persistence of Blacklegged Ticks (Ixodes scapularis) on a Coastal Island in Massachusetts, USA. Insects. 2024 Sep 17;15(9):709. doi: 10.3390/insects15090709. PMID: 39336677; PMCID: PMC11432020.

- Lange RE, Prusinski MA, Dupuis AP 2nd, Ciota AT. Direct Evidence of Powassan Virus Vertical Transmission in Ixodes scapularis in Nature. Viruses. 2024 Mar 16;16(3):456. doi: 10.3390/v16030456. PMID: 38543821; PMCID: PMC10974323.

- Lehane Á, Mader EM, Poggi JD, McCoy KD, Gruntmeir J, Weldon CT. A scoping review of applied tick control research in North America: funding, implementation, and advancement. J Med Entomol. 2024 Dec 31:tjae155. doi: 10.1093/jme/tjae155. Epub ahead of print. PMID: 39739609.

- Linske MA, Williams SC. Evaluation of landscaping and vegetation management to suppress host-seeking Ixodes scapularis (Ixodida: Ixodidae) nymphs on residential properties in Connecticut, USA. Environ Entomol. 2024 Apr 11;53(2):268-276. doi: 10.1093/ee/nvae007. PMID: 38376061.

- Ostfeld RS, Adish S, Mowry S, Bremer W, Duerr S, Evans AS Jr, Fischhoff IR, Keating F,

Pendleton J, Pfister A, Teator M, Keesing F. Effects of residential acaricide treatments on patterns of pathogen coinfection in blacklegged ticks. Parasitology. 2024 Aug;151(9):946-952. doi: 10.1017/S0031182024000349. Epub 2024 Mar 18. PMID: 38494476; PMCID: PMC11770522.

- Pelletier J, Bouchard C, Aenishaenslin C, Dibernardo A, Dimitri Masson G, Fernandez-Prada C, Gagnon S, Victoria Ibarra Meneses A, Lindsay R, Ogden N, Rocheleau JP, Leighton P. The effect of fluralaner treatment of small mammals on the endemic cycle of Borrelia burgdorferi in a natural environment. J Med Entomol. 2024 Sep 10;61(5):1203-1213. doi: 10.1093/jme/tjae091. PMID: 39119633; PMCID: PMC11386212.

- Plotkin SA, Shapiro ED. The Current and Future State of Vaccines for Lyme Disease. Clin Infect Dis. 2024 Dec 23:ciae639. doi: 10.1093/cid/ciae639. Epub ahead of print. PMID: 39711074.

- Poché D, Poché R. A rodent and tick bait for controlling white-footed mice (Peromyscus leucopus) and blacklegged ticks (Ixodes scapularis), the respective pathogen host and vector of the Lyme disease spirochetes. Ticks Tick Borne Dis. 2024 Sep;15(5):102362. doi: 10.1016/j.ttbdis.2024.102362. Epub 2024 Jun 8. PMID: 38852539.

- Price LE, Winter JM, Cantoni JL, Cozens DW, Linske MA, Williams SC, Dill GM, Gardner AM, Elias SP, Rounsville TF Jr, Smith RP Jr, Palace MW, Herrick C, Prusinski MA, Casey P, Doncaster EM, Savage JDT, Wallace DI, Shi X. Spatial and temporal distribution of Ixodes scapularis and tick-borne pathogens across the northeastern United States. Parasit Vectors. 2024 Nov 22;17(1):481. doi: 10.1186/s13071-024-06518-9. Erratum in: Parasit Vectors. 2025 Feb 21;18(1):65. doi: 10.1186/s13071-024-06625-7. PMID: 39574137; PMCID: PMC11583392.

- Robich RM, Piantadosi A, Elias SP, Cosenza DS, Schneider EF, Baxter L, LaFon E, Lubelczyk CB, Meagher M, Vogels CBF, Smith RP. Prevalence and Genetic Diversity of Deer Tick Virus (Powassan Virus, Lineage II) in Ixodes scapularis Ticks in Five Habitats at a Nature Reserve in Southern Maine, United States. Am J Trop Med Hyg. 2024 Oct 15;111(6):1311-1319. doi: 10.4269/ajtmh.23-0643. PMID: 39406212; PMCID: PMC11619509.

- Rocheleau JP, Aenishaenslin C, Dumas A, Pelletier J, Leighton P, Bouchard C. Lime for Lyme: Treatment of Leaf Litter with Dolomitic Lime Powder Impairs Activity of Immature Ixodes scapularis Ticks. Vector Borne Zoonotic Dis. 2024 Sep;24(9):578-584. doi: 10.1089/vbz.2023.0158. Epub 2024 May 21. PMID: 38770710.

- Rojas-Cabeza JF, Moreno-Cordova EN, Ayala-Zavala JF, Ochoa-Teran A, Sonenshine DE, Valenzuela JG, Sotelo-Mundo RR. A review of acaricides and their resistance mechanisms in hard ticks and control alternatives with synergistic agents. Acta Trop. 2025 Jan;261:107519. doi: 10.1016/j.actatropica.2024.107519. Epub 2024 Dec 31. PMID: 39746593; PMCID: PMC11729571.

- Siegel E, Xu G, Killinger P, Brown CM, Rich SM. Passive surveillance of Powassan virus in human-biting ticks and health outcomes of associated bite victims. Clin Microbiol Infect. 2024 Oct;30(10):1332-1334. doi: 10.1016/j.cmi.2024.06.012. Epub 2024 Jun 24. PMID: 38925461.

- Singh I, Lee MK, Kon E, Chahil N, Cheung M, Hogan C, Morshed M. Molecular-based laboratory testing confer accuracy over microscopical testing for tick identification. Int J Parasitol Parasites Wildl. 2024 Dec 11;26:101031. doi: 10.1016/j.ijppaw.2024.101031. PMID: 39802584; PMCID: PMC11720100.

- Stark JH, McFadden B, Patel N, Kelly PH, Gould LH, Riis J. Intention to vaccinate for Lyme disease using the Health Belief Model. Zoonoses Public Health. 2024 Jun;71(4):349-358. doi: 10.1111/zph.13107. Epub 2024 Jan 4. PMID: 38177978.

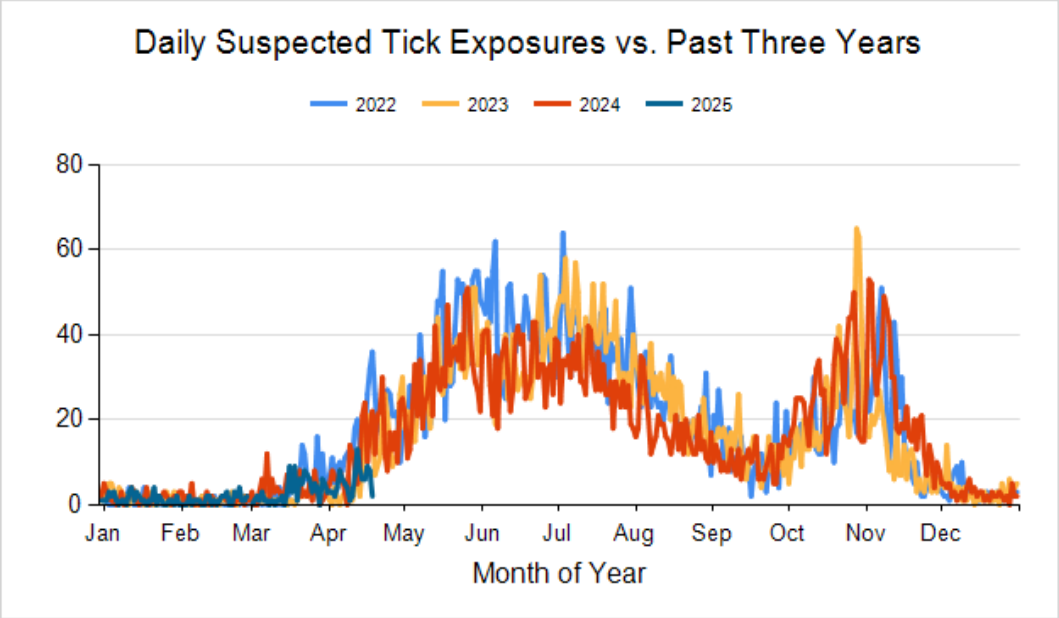
- Tiffin HS, Green KD, Burgess ER 4th, Machtinger ET. Maximizing and sustaining the efficacy of tick tubes for management of Ixodes scapularis through optimized deployment strategies. J Med Entomol. 2024 Nov 14;61(6):1459-1469. doi: 10.1093/jme/tjae114. PMID: 39349992.

- Williams SC, Linske MA. Late fall synthetic acaricide application is effective at reducing host-seeking adult and nymphal Ixodes scapularis (Ixodida: Ixodidae) abundances the following spring. J Med Entomol. 2024 Jul 12;61(4):965-974. doi: 10.1093/jme/tjae044. PMID: 38635041.

- Wormser GP, Mather TN, Rich SM. Could Treating Deer with a Pill that Kills Ticks on Dogs Eliminate Lyme Disease from Humans? Am J Med. 2024 Sep;137(9):801-802. doi: 10.1016/j.amjmed.2024.04.038. Epub 2024 May 10. PMID: 38735353.

- Yang H, Gould CA, Jones R, St Juliana A, Sarofim M, Rissing M, Hahn MB. By-degree Health and Economic Impacts of Lyme Disease, Eastern and Midwestern United States. Ecohealth. 2024 Mar;21(1):56-70. doi: 10.1007/s10393-024-01676-9. Epub 2024 Mar 13. PMID: 38478199; PMCID: PMC11127817.

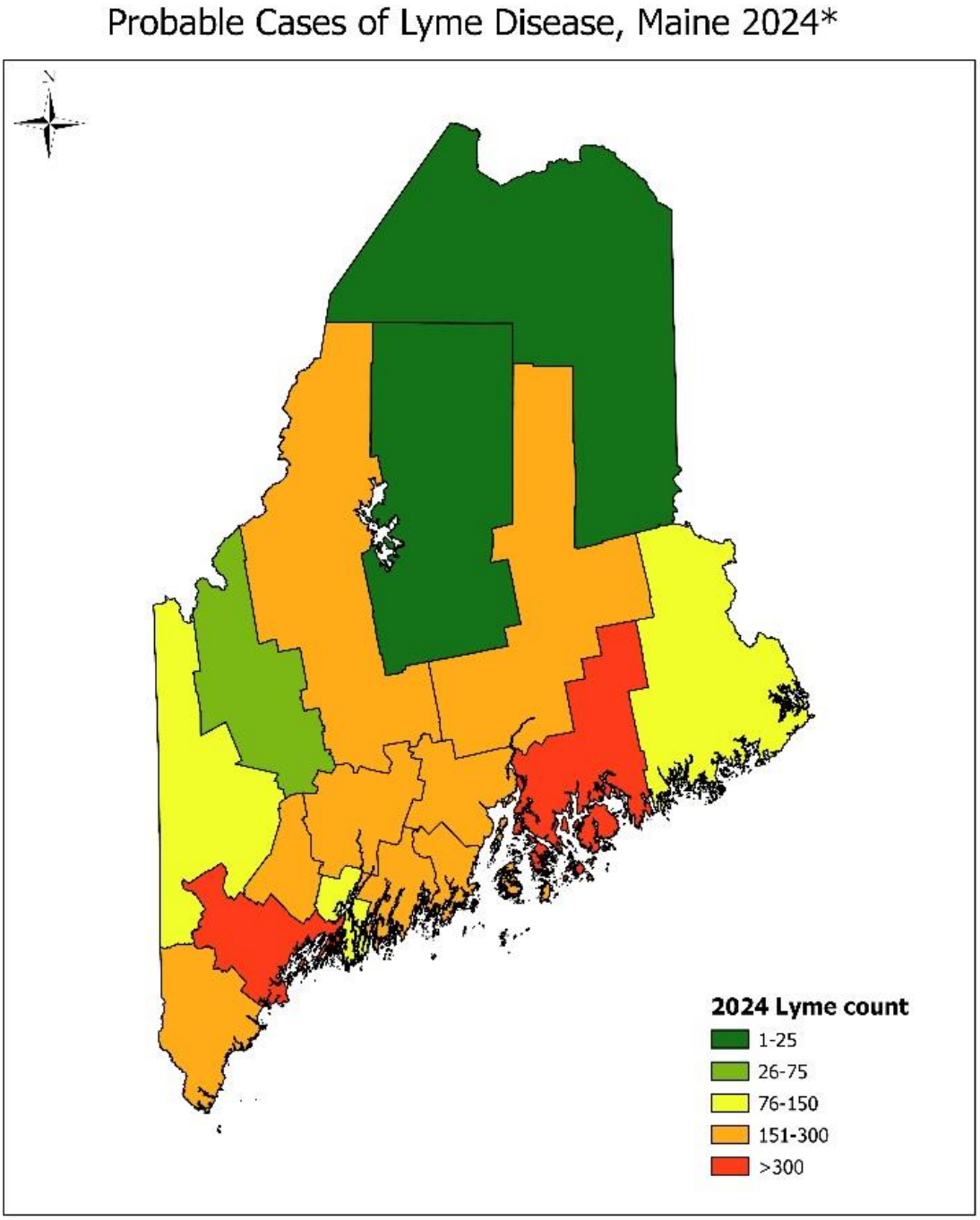
Appendix 4
Maine CDC Syndromic Surveillance Report
Data as of 04/18/2025



Data Notes:

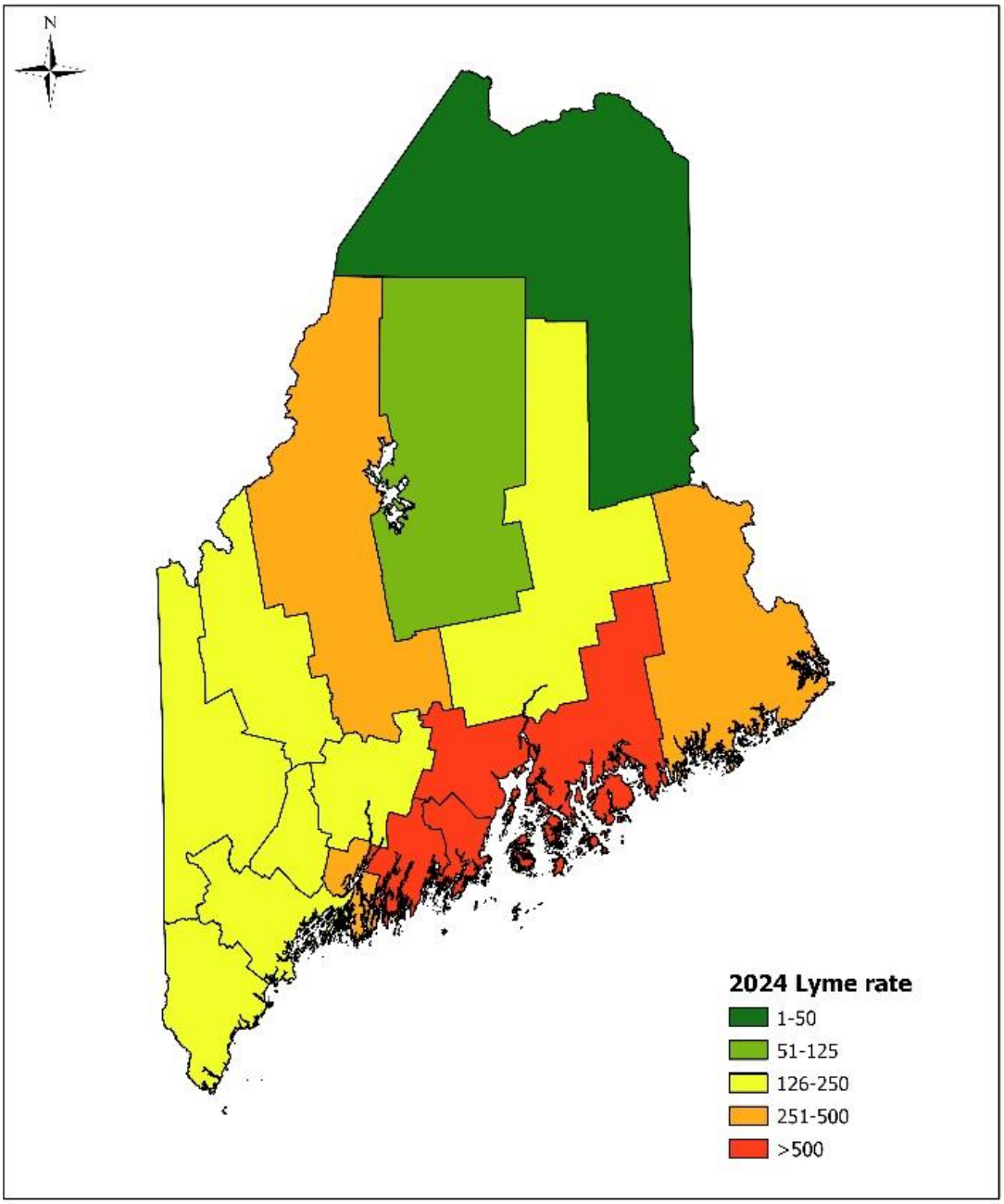
The number of suspected tick exposures is based on automated processing of chief complaint text and diagnosis codes from patient encounters at Maine emergency departments and affiliated urgent care facilities. For more information about Maine's syndromic surveillance data and methods, please contact syndromic@maine.gov.

Appendix 5
Lyme disease cases and rates



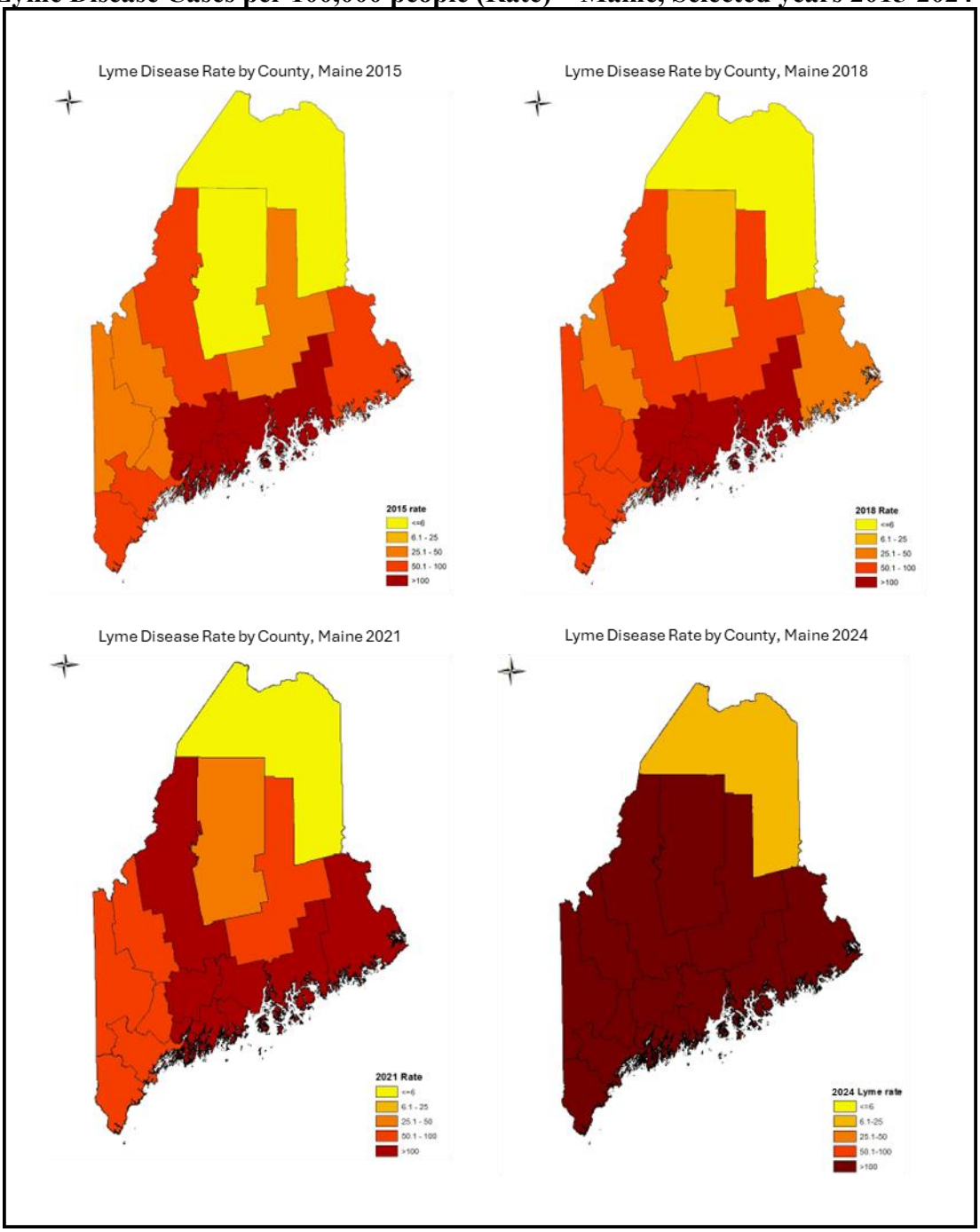
* 2024 data are preliminary as of 04/11/2025

Lyme Disease Cases per 100,000 persons (Rate), Maine 2024*



* 2024 data are preliminary as of 04/11/2025

Lyme Disease Cases per 100,000 people (Rate) – Maine, Selected years 2015-2024*



*2024 data are preliminary as of 04/11/2025

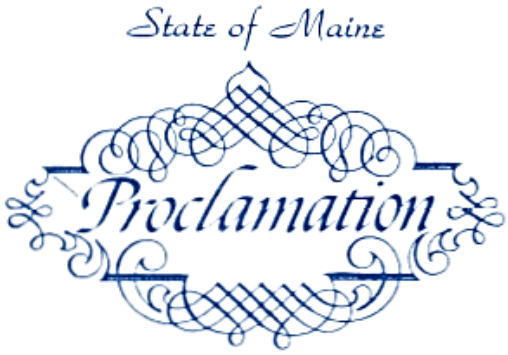
Appendix 6
Maine Vectorborne Work Group

Chair: Sara Robinson, Maine Center for Disease Control and Prevention (Maine CDC)

Benowitz, Isaac	Maine CDC
Bolas, Stefanie	Maine Department of Agriculture, Conservation, and Forestry
Bonthius, Jessica	Maine CDC
DeCato, Sarah	Maine Department of Education
Dill, Griffin	Maine Cooperative Extension
Elias, Susan	MaineHealth Institute for Research, University of Maine Orono
Fish, Gary	Maine Department of Agriculture, Conservation, and Forestry
Fiske, Rachael	Maine Department of Agriculture, Conservation, and Forestry
Gardner, Allison	University of Maine, School of Biology and Ecology
Hill, Dana	University of Maine, Animal Health Laboratory
Jensen, Gary	Swamp, Inc.
Kanoti, Allison	Maine Forest Service
Keller, Jessica	Maine CDC
Kelley, Megan	Maine CDC
Lockwood, Maura	Maine CDC
Lubelczyk, Charles	MaineHealth Institute for Research
Matluk, Nick	Maine CDC
Meagher, Molly	MaineHealth Institute for Research
Meak, Sim	Maine CDC
Morrison, Michael	Swamp, Inc.
Patterson, Megan	Maine Department of Agriculture, Conservation, and Forestry
Peacock, Alexander	Maine Board of Pesticides Control
Peterson, Hillary	Maine Department of Agriculture, Conservation, and Forestry
Poland, Emily	Maine Department of Education
Porter, Megan	Maine CDC
Rietdyk, Marlys	Maine Department of Agriculture, Conservation, and Forestry
Rivard, Trevor	Maine CDC
Robich, Rebecca	MaineHealth Institute for Research
Rounsville, Thomas	Maine Cooperative Extension
Schappach, Brittany	Maine Department of Agriculture, Conservation, and Forestry
Smith, Rob	MaineHealth Institute for Research
Sohail, Haris	Maine CDC
Szantyr, Beatrice	Physician, Lincoln Maine
Szymanska, Kasia	Maine Department of Agriculture, Conservation, and Forestry
Taylor, Tegwin	Maine Department of Inland Fisheries and Wildlife
Urcuqui, Andres	University of Maine, School of Forest Resources
Webber, Lori	Maine CDC

To reach a member of the VBWG or to express interest in joining this workgroup, contact disease.reporting@maine.gov.

Appendix 7
2024 Governor's Proclamation



WHEREAS, the Maine Center for Disease Control and Prevention reported more than 2,900 probable cases of Lyme disease in 2023; and

WHEREAS, the actual incidence of Lyme disease in Maine is likely much higher than reported, disproportionately affecting children between five and fifteen years and adults over sixty-five years; and

WHEREAS, tickborne illnesses can be prevented by staying in the center of wooded paths, wearing light-colored, long-sleeved clothing, using an EPA-approved insect repellent, performing daily tick checks, and properly removing ticks; and

WHEREAS, public awareness and education are necessary to help reduce tickborne illnesses in Maine by promoting awareness of Lyme disease, other tickborne illnesses, and the regular use of prevention measures, as illustrated by the 2024 theme "Little Tick, Big Deal"; and

WHEREAS, the 124th Maine Legislature enacted Public Law Chapter 494, L.D. 1709, Item 1, *An Act to Enhance Public Awareness of Lyme Disease;*

NOW, THEREFORE, be it resolved that I, Janet T. Mills, Governor of the State of Maine, do hereby proclaim the month of May 2024 as

Lyme Disease Awareness Month

in Maine, and I urge all the citizens of Maine to become aware of the steps that can be taken to reduce the risk of tickborne illnesses.

In testimony whereof, I have caused the Great Seal of the State to be hereunto affixed GIVEN under my hand at Augusta this tenth day of April Two Thousand Twenty-Four

Janet T. Mills
Governor

Shenna Bellows
Secretary of State

Appendix 8
Maine CDC Lyme Disease Awareness Month Poster 2024
Artwork submitted by Kylie Welch from Katahdin Middle and High School

Appendix 9
Maine Tracking Network

Selected Tickborne Diseases | by Location, Year, Age Group and Sex

					Selected Tickborne Diseases		
					Anaplasmosis	Babesiosis	Lyme
Region	Location	Year	Sex	Age Group	Number	Number	Number
Town	Abbot	2018-2022	Both	All Ages	0	0	
	Acton	2018-2022	Both	All Ages	17	0	12
	Addison	2018-2022	Both	All Ages		0	11
	Albion	2018-2022	Both	All Ages	6	1	25
	Alexander	2018-2022	Both	All Ages	0	0	
	Alfred	2018-2022	Both	All Ages	14	3	29
	Allagash	2018-2022	Both	All Ages	0	0	0
	Alna	2018-2022	Both	All Ages	13		17
	Alton	2018-2022	Both	All Ages	0	0	
	Amherst	2018-2022	Both	All Ages	0	0	
	Amity	2018-2022	Both	All Ages	0	0	0
	Andover	2018-2022	Both	All Ages	0	0	0
	Anson	2018-2022	Both	All Ages	3	1	23
	Appleton	2018-2022	Both	All Ages	29	8	51
	Argyle Twp	2018-2022	Both	All Ages	0	0	
	Arrowsic	2018-2022	Both	All Ages			
	Arundel	2018-2022	Both	All Ages	1	1	20
	Ashland	2018-2022	Both	All Ages	0	0	0
	Athens	2018-2022	Both	All Ages			8
	Atkinson	2018-2022	Both	All Ages	0	0	
	Auburn	2018-2022	Both	All Ages	48	5	57
	Augusta	2018-2022	Both	All Ages	38	7	96
	Aurora	2018-2022	Both	All Ages	0	0	
	Avon	2018-2022	Both	All Ages	0	0	0
	Baileyville	2018-2022	Both	All Ages	0	0	
	Baldwin	2018-2022	Both	All Ages			19
	Bancroft Twp	2018-2022	Both	All Ages	0	0	0
	Bangor	2018-2022	Both	All Ages	14	2	77

Maine CDC's Infectious Disease Epidemiology Program collected and analyzed the data. Maine CDC used population data from the U.S. Census Bureau to calculate state and county rates of tickborne disease. Maine CDC used population data from Maine CDC Data, Research, and Vital Statistics (DRVS) to calculate town-level rates of tickborne disease. The Maine Environmental Public Health Tracking Program prepared the data display. Data updated: 05/2024. Display updated: 05/2024.

Appendix 10
Maine Tracking Network

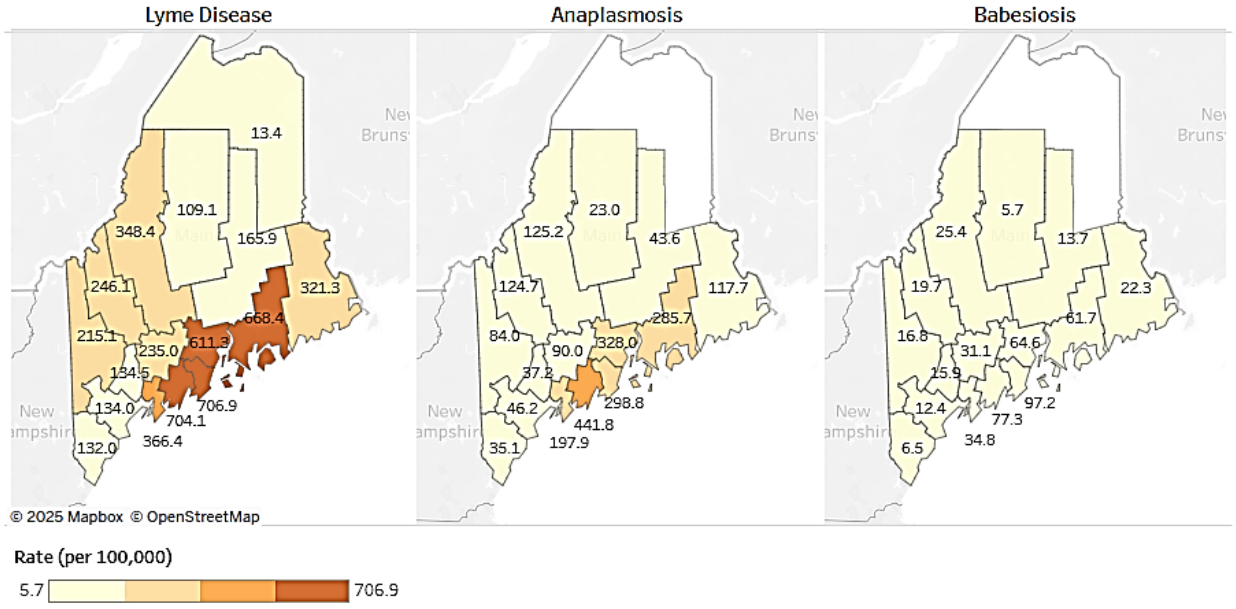
Cases of Tickborne Diseases, Maine 2024 (Preliminary Results)

Lyme Disease	Anaplasmosis	Babesiosis
3,218	1,284	309

This is the total annual number of case reports. Data shown are preliminary and subject to change.

Topic: (All) | Measure: Rate (per 100,000) | Display: Maps | Data Labels (Maps/Charts): On

Rate of Tickborne Diseases by County, 2024 (Preliminary Results)

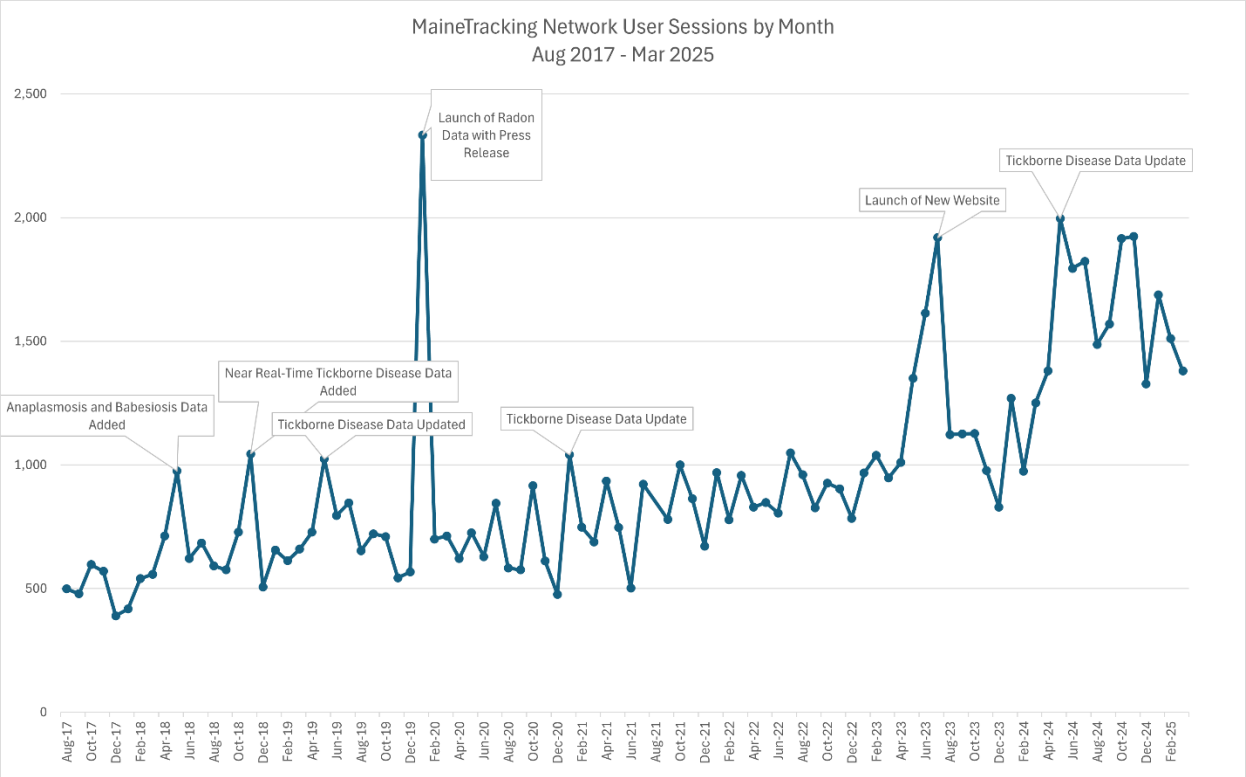


Rate (per 100,000)

5.7 — 706.9

Maine CDC's Infectious Disease Epidemiology Program obtains tickborne disease data through notifiable conditions surveillance, based on reports from healthcare providers, laboratories, and other healthcare partners. Maine CDC used population data from the U.S. Census Bureau to calculate rates of tickborne disease. Surveillance case definitions are determined by the Council of State and Territorial Epidemiologists (CSTE) and change over time in accordance with disease trends and surveillance needs.

Appendix 11
Maine Tracking Network



Appendix 12
University of Maine Tick Submission and Tick Testing Data for 2024

Tick Species Submitted to the UMaine Extension Tick Lab in 2024

Tick Species	Common Name	Total
Ixodes scapularis	Blacklegged tick (also known as deer tick)	3650
Dermacentor variabilis	American dog tick	1045
Amblyomma americanum	Lone star tick	24
Ixodes cookei	Woodchuck tick	26
Amblyomma sp.	Unidentified *Amblyomma* sp.	14
Ixodes marxi	Squirrel tick	2
Unknown	Specimens damaged during removal/delivery	15

Source: University of Maine Cooperative Extension Tick Laboratory 2024 Annual Report

Infection Prevalence in Submitted Blacklegged Ticks (Ixodes scapularis) (Adults & Nymphs) - 2024

Pathogen	% of nymphs infected	% of adults infected	% of ticks infected
Borrelia burgdorferi	25.2%	45.4%	41.5%
Anaplasma phagocytophilum	5.1%	10.7%	9.7%
Babesia microti	5.7%	13.4%	12.0%
Borrelia miyamotoi	0.3%	1.2%	1.0%
Powassan Virus	0.6%	1.2%	1.1%
Borrelia + Anaplasma	1.9%	4.3%	3.8%
Borrelia + Babesia	2.6%	7.1%	6.3%
Anaplasma + Babesia	0.2%	0.7%	0.6%
Borrelia + Anaplasma + Babesia	0.5%	2.3%	1.9%

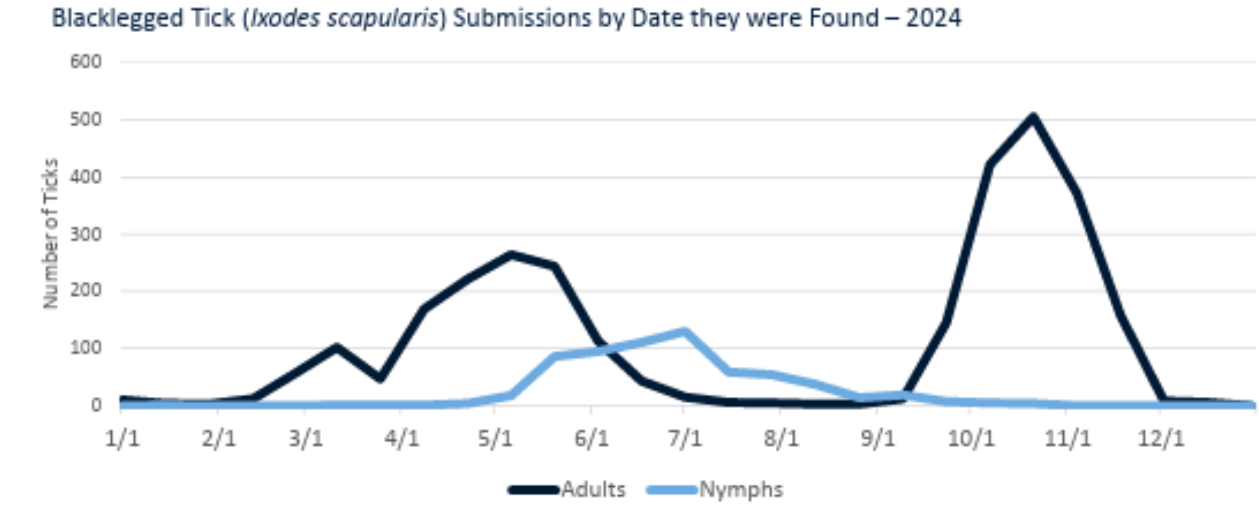
Source: University of Maine Cooperative Extension Tick Laboratory 2024 Annual Report

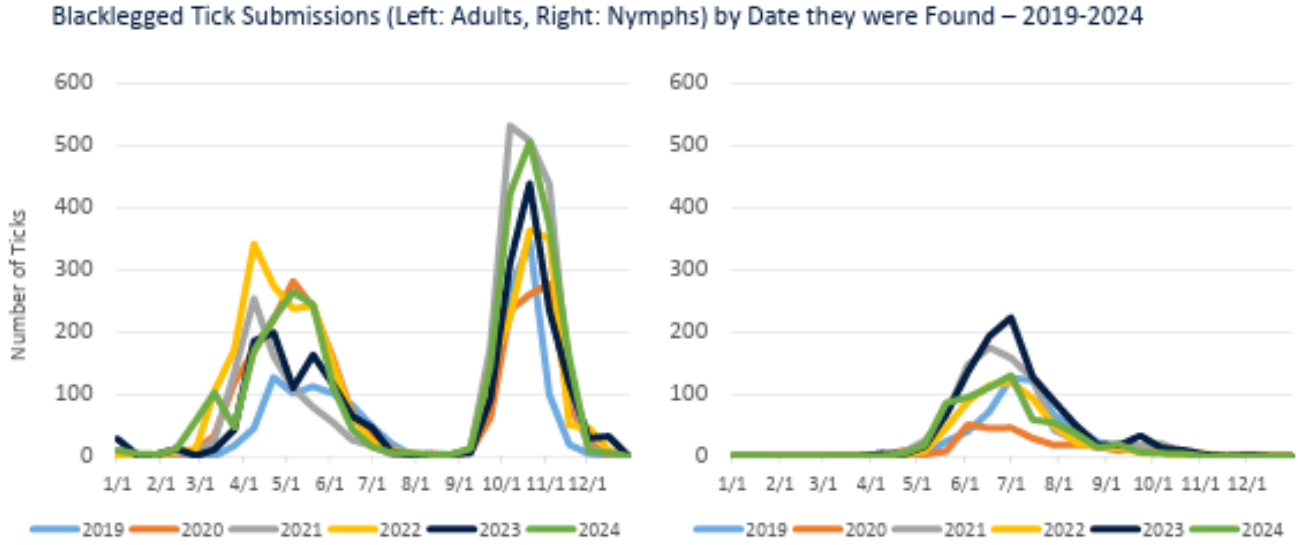
Infection Prevalence in American Dog Ticks and Lone Star Ticks - 2024

Pathogen	American Dog Ticks (*Dermacentor variabilis*)	Lone Star Ticks (*Amblyomma americanum*)
Rickettsia rickettsii	0/610 (0%)	0/20 (0%)
***Ehrlichis* spp.**	0/610 (0%)	0/20 (0%)
Francisella tularensis	0/610 (0%)	0/20 (0%)
Heartland Virus	0/610 (0%)	0/20 (0%)

Source: University of Maine Cooperative Extension Tick Laboratory 2024 Annual Report

Tick Submissions by Date Found in 2024





Source: University of Maine Cooperative Extension Tick Laboratory 2024 Annual Report

Appendix 13
2024 Tickborne Disease Legislation
Tickborne legislation and status recorded from LegiScan

Alabama
Title: Proclaiming Tickborne Disease and Illness Awareness Month (SJR85)
Status: Passed

California
Title: Lyme Disease Awareness Month (ACR170)
Status: Passed

Delaware
Title: An act to amend Title 3 of the Delaware code relating to Lyme disease (HB404)
Status: Passed

Title: Designating the month of May 2024 as "Lyme Disease Awareness Month" in the state of Delaware (SCR160)
Status: Failed

Illinois
Title: Lyme Disease Awareness Month (HR0705)
Status: Passed

Title: Mosquito abatement districts – powers (SB2938)
Status: Passed

Iowa
Title: A bill for an act relating to Lyme disease, including notice and consent provisions required for Lyme disease testing, and continuing education requirements for health care providers (HF2289, HF2591)
Status: Failed

Maine
Title: An act to ensure physicians receive full diagnostic test data concerning tick-borne diseases (LD906)
Status: Failed

Title: An act to require the reporting of Alpha-gal Syndrome to the Maine Center for Disease Control and Prevention (LD2100)
Status: Failed

Title: An act to support research, education, and outreach efforts at the University of Maine Cooperative Extension Tick Laboratory (LD1021)
Status: Passed

Maryland
Title: Health insurance – Lyme disease and related tick-borne illnesses – long-term antibiotic treatment (HB1351)
Status: Failed

Massachusetts
Title: Establishing a special commission to find the best practices to promote education, awareness, and prevention of Lyme disease (S1442)
Status: Failed

Michigan
Title: A resolution to declare May 2024 as National Lyme Disease Awareness Month in the state of Michigan (HR0238)
Status: Passed

New York
Title: Authorizes the commissioner of health to award grants for graduate medical education in Lyme and tick-borne disease and to designate organizations as centers for Lyme and tick-borne disease excellence (S04507)
Status: Failed

Title: Establishes a pilot program for Lyme and tick-borne disease testing in children (S04508)
Status: Failed

Title: Establishes that the council on human blood and transfusion services shall review all current medical research and guidance regarding the donation of blood by patients with a history of Lyme or tick-borne illnesses (S05060)
Status: Failed

Title: Includes Lyme disease and other tick-borne diseases as occupational diseases for purposes of workers' compensation; clarifies that disability includes disability caused by Lyme disease or other tick-borne diseases; requires insurance coverage of long term medical care for Lyme disease and other tick borne diseases (A04617, S03117)
Status: Failed

Title: Memorializing Governor Kathy Hochul to proclaim April 2024, as Lyme Disease Awareness Month in the State of New York (AJ01840, HK01094)
Status: Passed

Title: Relates to including the Asian longhorned tick and lone star tick on the invasive species list, and include them in the comprehensive plan for invasive species management (S07852)
Status: Failed

Title: Relates to lyme disease and tick-borne infection awareness and prevention for children's overnight, summer day and traveling summer day camps; provides guidelines for treatment and notification; provides for the development of materials (A03574, S05311)

Status: Failed

Title: Relates to the reporting of lyme and tick-borne disease infection after death (A02286, S00062)
Status: Failed

Title: Requires health insurers to provide coverage for long term medical care for Lyme disease and other tick borne related pathogens (S03379)
Status: Failed

Title: Requires health insurers to provide coverage for long term medical care for Lyme disease and other tick borne related pathogens; provides for taxpayer gifts for tick borne illness research, detection and education; establishes the tick borne illness research, detection and education fund (A04598, S03232)
Status: Failed

Title: Requires the department of health to publish a report on the incidence of tick-borne illnesses annually on the department's website; requires the department to submit an annual report to the governor and the leaders of the legislature; requires the superintendent of financial services to review the status of health insurance coverage for the treatment of Lyme disease and other tick-borne related diseases and to submit a report to the governor and the leaders of the legislature (A08943, S07600)
Status: Failed

Title: Requires the New York state health care quality and cost containment commission to issue a report considering the impact on health insurance costs and quality of legislation requiring coverage of long term and chronic Lyme disease and other tick-borne diseases (S05321)
Status: Failed

Pennsylvania
Title: Designating the month of May 2024 as "Lyme Disease and Tick-Borne Illness Awareness Month" in Pennsylvania (SR287)
Status: Failed

Title: In school health services, further providing for health services (SB232)
Status: Passed